Navigating Complexity:

Human – Environmental Solutions for a Challenging Future

Org. Iva Pires & Larissa Malty

Proceedings of the
XXIII International Conference of the Society for Human Ecology

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Introduction

The XXIII Conference of the Society for Human Ecology on Navigating Complexity: Human –Environmental Solutions for a Challenging Future, happened in Lisbon, Portugal, from July 7 to 10, 2018.

This was the third time that the SHE conference has been organized in Europe and it was truly a pleasure that it happened in Lisbon.

It was an honour for us to organize the conference and welcome people from 36 different countries. The atmosphere was truthfully international with the presence of experts from science, education, practitioners, business and politics from so many countries who utilize, or are interested in, interdisciplinary and ecological approaches.

The conference was an opportunity to create moments for sharing knowledge and experiences and networking, renewing old friendships, starting new ones and forging new collaborations.

The venue of the Conference, the Faculty of Social Sciences and Humanities offers a master programme in Human Ecology since 1992 and a doctoral programme since 2010. This international Conference was an opportunity to rethink the work already done and to project the future in a context of a network which is growing each day, spreading from Asia, to Africa, to the Americas and to Europe. It was also a unique opportunity for the students to meet and get to know face to face professors and researchers that they are only familiar with from the papers they read.

In our opinion this was the right time to reflect on a number of questions. How can we secure lasting and sustainable growth? What challenges are we going to face ahead of us? How can we organize ourselves to discuss and find solutions? Who should be involved to implement them?

Like is said in the short video prepared by the students to the conference "Open seas call for lighthouses; open minds are the place for good ideas make their nests."

In that sense, the Conference provided a unique opportunity to present scientific papers, for the discussion and exchange of knowledge among researchers with diverse sensitivities, backgrounds and nationalities. The diversity of topics that were addressed both in the symposium and in the contributed papers, is an enriching feature, complemented and extended by the keynote speakers lectures.

We had an excellent range of speakers, symposia, round-tables and individual presentations plus two discussion forums, one among the Human Ecology Associations and the other one dedicated to PhD students.

The Proceedings do not reflect the number and diversity of papers presented during the 3 days' conference as sending the final version was optional. Yet they are a good representation of the diversity of subjects, methodologies and visions of the papers presented during the conference.

Our efforts have been to organize a good program and also ensure that all feel at home. We hope to have succeeded in this aim and to see you all in the 2020 SHE conference that is being organized by our colleagues from Brazil.

Iva Pires
President Elected of the Society for Human Ecology (SHE)

3. Use of Natural Resources

3.1. Indigenous people in the hinterlands of the São Francisco river: dynamic of occupation and uses of natural resources

3.2. Naufrágios como substrato para recifes artificiais: representações de universtários de biologia e história e o imaginário do patrimônio cultural e da biodiversidade marinha

3.4. A fractured land: ethnographic approaches in exploring perspectives and perceptions toward hydraulic fracturing in New Zealand

3.3. Use of natural resources and socio-environmental conflicts in the northeast region of Brazil

4. Environmental Education

4.1. Coming to age experiences in (environmental) education

4.2. Desenvolvimento escolar: um desvio urbano pelo programa Minha casa minha vida em Maceió - AL - Brasil.

4.3. The human nature of children: ecoperceptions in school spaces

5. Human Health and Wellbeing of Indigenous Populations

5.1. Urbanization and indigenous health in northeast Brazil - concepts of the project of atherosclerosis among indigenous populations (PAI)

5.2. Ecology in health: ecolonizing knowledge and expirience

5.3. Living a week with the truká tribe (island of assunção, Brazil) for the project of atherosclerosis among indigenous populations (PAI) - a medical student experience report.

5.4. The use of force plants in traditional comunities of the brazilian northeast

6. Cross-Cutting Issues

6.1. A segregação espacial e a conjuntura da mobilidade

6.2. A terra viva: o uso da técnica da constelação sistêmica na hipótese Gaia

6.3. Adaptation and resiliency to economic tough times by low income families in southwestern Nigeria

6.4. Anthropic action at cruz village, municipality of delmiro gouveia – al, lower São Francisco

6.5. Lights and shadows for evaluating progress in the un 2030 agenda: review of gender dimensions and indicators included in the sdg5

6.6. Cross-cutting artistic creations, between sciences, humanities and technology: towards a meta-vision of sensitive data and dialogue?

6.7. Determinants of green purchase intention (GPI) - implications for marketing communication

6.8. Socioeconomic issues in the Paulo Afonso archaeological complex and alternatives to heritage management
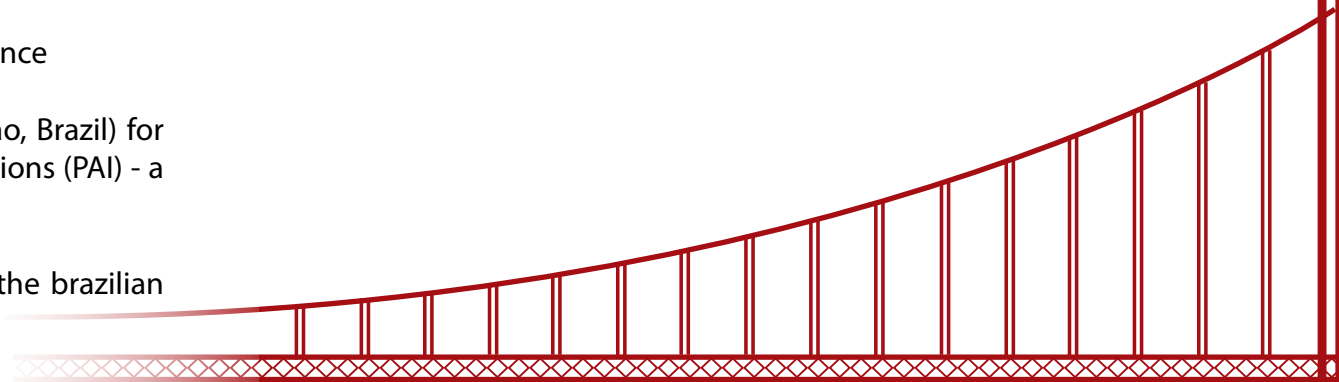
1. Sustainable Management of Agriculture and Food

1.1. Testing and adoption of bottom-up agricultural innovations to improve soil fertility in small holder farms in sub Saharan Africa: an interdisciplinary approach

Fernando Sousa, Gian Nicolay, Christoph Spurk, Noah Adamtey,
Andreas Fliessbach

Abstract

Soil fertility is at stake at a global scale, putting pressure on food security, poverty alleviation and environmental protection, under scenarios of climate change that in most cases aggravate the threat. In sub-Saharan Africa, a combination of depleted soils and population growth adds particular pressure to smallholder farmers and society. Their capacity to innovate in a social, economic, political and cultural context is seen as decisive to reverse the trend of declining soil fertility. However, many technologies with a potential to protect, maintain and build up soil fertility are hardly used by small-scale farmers, triggering the urgent question on their reasoning not to do so. Exploring and understanding the constraints and complexity of the social systems interacting with the implied institutional dynamics are essential steps in designing appropriate agricultural innovations that are scalable and adoptable. The focus of the inter- and transdisciplinary approach applied in the project ORM4Soil (Organic Resource Management for Soil Fertility; www.orm4soil.net) lies at the heart of this project. We are combining qualitative and quantitative methods from agronomy, sociology and communication sciences in order to bring soil-fertility-enhancing-technologies and their adoption to the center of the decision-making process of farmers' as well as local and regional institutions. At local and regional innovation platforms, stakeholders from business, government, academia and farmer organizations are discussing the outcomes of agronomic trials and sociological research. We are expecting to create bridges between the needs and concerns of farmers, relevant segments of society and policymaking, with the new common goal to enhance soil fertility.

Keywords: Soil Fertility; sub-Saharan Africa; Innovation Adoption; Transdisciplinary Research; Innovation Platforms

Introduction

Low and declining soil fertility are among the major bottlenecks to the improvement of agricultural productivity and sustainability in sub-Saharan Africa (SSA) (Vanlauwe et al. 2017). Nutrient depletion at farm level is very common throughout the continent (Henao and Baanante 1999; Stoorvogel and Smaling 1990). Many soils are highly weathered and show high contents of low activity clay minerals with poor adsorption capacity. Around 25% of the soils are acidic (pH < 5); and the majority are low in soil organic carbon (SOC) (< 20-30 gkg-1), resulting in important biophysical challenges such as low cation exchange and water holding capacity (Kolawole 2013).

In West Africa, long term experiments show a range between over 5% loss of SOM per year on sandy soils to around 2% on better textured soils (Bationo and Buerkert, 2001; Pieri, 1989). It is also estimated that per capita arable land in SSA has shrunk from 0.53 to 0.35 hectares between 1970 and 2000 (Place 2003), adding further pressure to invest in appropriate soil fertility management techniques.

This calls for urgent identification or development of agricultural innovations that are capable of improving soil fertility and can easily be adopted. The rate of adoption of a technology does not only depend on its physical performance but also on socio-economic and cultural factors (Kolawole, 2013; Glover et al., 2016). Within this challenging biophysical context, it is essential to understand the socio-cultural dynamics that determine farmer's perceptions and behaviors towards soil fertility management.

Social structure, norms, opinion leaders and communal authorities are highly influential in terms of how information and innovations disseminate (Rogers 2003). On a more tangible level, the low levels of education and illiteracy, frequently observed in SSA, seriously undermine farmers' ability to access, use and disseminate information and knowledge on agricultural innovations (Sanginga and Woomer 2009). For instance, it has been agreed that highly educated farmers are more likely to adopt agricultural innovations earlier than those who are relatively poorly educated (Basu et al. 2002).

The socio-economic status of the farmer co-determines the ability to invest resources and time in new techniques, as well as to take the inherent risk to change from the traditional technologies to new ones (Martey at al. 2013). This is also the case for other socio-economic factors such as household labour availability, the technology's profitability, market dynamics, land ownership and access to non-farm income (Boateng 2000; Mignouna et al. 2011; Martey at al. 2013). Access to quality information sources, such as a frequent interchange with extension officers and the existence of communication channels that speak the farmers' languages are also important in shaping farmers motivation and attitudes towards soil fertility management (Sousa et al. 2016). Local or regional social structures can help empower farmers to adopt soil fertility management techniques. For example, it has been shown that farmers

belonging to a local organization have a higher chance of accessing information on SFM and adopt new techniques (Katungi 2006).

Considering the complexity of the social and biophysical systems surrounding soil dynamics and how they are the basis of terrestrial life, the need for increasing adoption of appropriate SFM techniques is evident, as poor soil management remains the single main factor for soil fertility decline (Tittonell et al. 2013).

In this paper we briefly describe the need for appropriate agricultural technologies and their real application and adoption, as well as the prevailing constraints for the dissemination and adoption of already existing ones. Finally, we address the chosen methodology and pathway to impact of the ORM4Soil project, and how a bottom-up and interdisciplinary approach may contribute to significantly overcome the system's hindrances to the improved adoption of appropriate SFM technologies in the studied contexts.

The need for improved adoption of appropriate technologies

The last decades of soil and soil fertility research and development in SSA saw a dramatic shift from an almost exclusive focus of recommendation programs on inorganic fertilizers in the 70s and 80s – inspired by the Asian green revolution – to a more integrated approach, with the use of more organic and low external input based systems (Vanlauwe et al. 2017). This shift was stimulated by early research showing the negative effects of the continuous use of inorganic fertilizers on soil acidity, nutrient leaching, nutrient deficiencies and SOC dynamics concluding that this technology alone was not appropriate to keep soil fertility levels and instead contributed to declining soil quality and fertility in the long-term (Juo and Lal 1977, van der Heide et al. 1985, Kotschi 2013). Even though, authors such as Vanlauwe and Giller (2006) claim the soil threat of degrading fertility caused by mineral fertilizers to be overestimated.

As a consequence, the following decades saw an increase in the testing and dissemination of soil management solutions that were rather based on organic inputs and system approaches. Among the new technologies was integrated soil fertility management (ISFM), seeking to include organic inputs such as animal manure and compost along inorganic fertilizers (Vanlauwe et al. 2010). The nutrient release from organic resources being more closely synchronized with plant uptake and showing residual effects on the following crops, besides promoting the build-up of SOC (Giller 1997).

Intercropping is another systemic approach that brings benefits related to diversification and the reduction of crop failure risk, as well as the optimization of the use of resources by the two different plants. In addition, the use of leguminous plants as an intercrop can add nitrogen to the soil for the direct benefit of the non-legume crop (Rusinamhodzi 2012). This technology has been tested in many African countries,

using plants such as cowpeas or pigeon peas and an alternated spatial distribution of the crops, with positive results in terms of total crop yields, despite more labour input for weeding (Rusinamhodzi 2011).

Even though the first intercropping experiments used auxiliary crops, whose single contribution was their anticipated effect on soil fertility, research has since then turned the focus to species with dual or triple purposes – edible grain, fodder, N enrichment and even pest management – which have a higher adoptability among farmers (Vanlauwe 2017). One well studied case is the push-pull method, which intercrops cereals with an insect repellent plant, such as Desmodium, and an attractive trap plant, such as Napier grass (Fischler 2010).

If sufficient water is available, green manures– usually nitrogen fixing legumes – can be planted before or after harvesting the main crop, with its subsequent use as soil amendment, plowed into the soil (Cherr et al. 2006). However, according to the same author, the technology is only appropriate for the farmer if all benefits such as pest and weed control, nutrient capture, soil protection, SOM increase and use as fodder for cattle are accounted for.

Some small scale soil mobilization technologies, such as the indigenous Zaï technique and demi-lunes for water harvesting (Pasternak et al. 2009), can help combat erosion while promoting water and nutrient retention. When combined with the inorganic fertilizer micro-dose technique, these technologies can help improve yields while increasing nutrient use efficiency at a low cost (Fatondji et al. 2006).

Agroforestry is getting attention from research and development efforts since the 1980s, consisting of the integration of trees into cropping systems. The integration of trees into agricultural landscapes can generate several improvements in the soil as a habitat for soil organisms and also for crop growth (Barrios et al. 2012), but the loss of productive land and the competition to the crop plant for soil resources needs to be taken into account. Among the effects trees can have in agricultural systems are the build-up of SOM, soil cover, lower temperature fluctuations, increased moisture levels, lower erosion rates, increased biodiversity levels with consequences for organic pest management, among other ecosystem services (Barrios et al. 2012). But integrating trees in arable land often poses practical problems particularly for small-scale farmers under various ecological and socio-economic constraints.

However, despite the number of available approaches and decades of efforts in the research and development sectors towards testing, evaluating and disseminating different SFM technologies, these remain poorly adopted by farmers and frequently dependent on projects (Douthwaite et al. 2002). The disappointing rates of adoption of existing SFM techniques have thus deserved much academic research and attention (Sunding and Zilberman 2001, Pannell et al. 2006, Adolwa et al. 2012, Glover et al. 2016).

According to Tittonell (2014), most farmers in the SSA context do not have access, cannot afford or are unwilling to adopt modern agricultural technologies, which too often don't suit the reality of small scale farmers across the continent. The dependency of farmers and farms on societal factors remains poorly understood (Nicolay 2017), clouding the understanding of the adoption dynamics of promising technologies.

Efforts to correct this failure have resulted in another major shift within the agricultural research and development sector: the inclusion of farmers in the process of identifying and testing agricultural innovations (Adekunle and Fatunbi 2012). Such a bottom-up or participatory approach may promote adoption of agricultural innovations, facilitating the emergence of solutions that suit the farmers' realities better. Another aspect of this perspective shift was the inclusion of multi-stakeholders platforms in the process of validation and dissemination of the developed technologies (Nicolay 2016).

Despite these much needed shifts in the attitudes and perspectives from researchers and policy makers throughout the last decades, farmers struggle to adapt agricultural innovations to their farm situation. As other authors suggest (Ouédraogo et al. 2001, Sanginga and Woomer 2009), and as preliminary results from the ORM4Soil research process allow to confirm, adoption levels of even relatively simple techniques, which have been targeted by many projects such as composting, are still not widely adopted and remain largely unknown in many localities, suggesting that quality communication channels and efficient networks of knowledge and dissemination are still missing.

Communication matters: The relevance of quality communication and information sources

The role of communication and its impact on farmers' perceptions and behavior towards soil fertility management is an important aspect of innovation dissemination. In some rural contexts of SSA, the use of radio, farmer field days, extension services and in some cases even TV programs were considered the most accessible, reliable, informative and understandable communication channels (Adolwa et al. 2012, Nyambo and Ligate 2013).

Agricultural instruction videos for mobile phones have been shown to have potential in SSA's rural context, since most farmers use mobile phones that can read videos, which can be easily translated into farmers' languages and disseminated by farmers themselves via the Bluetooth technology (Sousa et al. 2016). Extension services are among the information sources most valued and trusted by farmers because they provide direct and continuous contact with experts and information about new technologies (Sousa et al. 2016). However, such services are very often insufficient, have poor quality or are absent in many regions (Nyareza and Dick 2012).

Kimaru-Muchai et al. (2013) argue that low adoption rates of soil fertility management techniques are due to inadequate mass communication channels for the dissemination of information. Fischler (2010), on the other hand, suggests that interpersonal communication is more effective than mass media in the adoption of farming innovations. As stated by Spurk et al. (2013), trust in information providers, type of content, its quality and mode of information (top-down or debating options) are the most relevant aspects to meet farmers' information needs for considering investments. Yet, the link between poor SFM technologies' adoption and the quality of existing communication channels remains poorly explored.

Many studies have focused on the frequency of contact with different information sources, such as radio, farmer field schools, extension services and others (Kimaru-Muchai et al. 2013, Adolwa et al.2012, Nyambo and Ligate 2013, Sousa et al. 2016), but few have addressed the effects of such information on the use of organic resource inputs to improve soil fertility. The ORM4Soil project seeks, among other goals, to find the best suited communication channels capable of efficiently disseminating SFM messages that are interesting, informative and comprehensible for farmers.

Using inter and transdisciplinarity to deal with a complex system: the case of ORM4Soil [1]

The complex nature of SSA's rural contexts, where i) local and national agricultural systems show defying biophysical and socio-cultural challenges, ii) improved adoption of appropriate SFM technologies are urgently needed and iii) a wide diversity of actors with contradicting interests constitute elements of the system required the use of inter- and transdisciplinary approaches in order to design effective intervention strategies.

The "Farmer-driven organic resource management to build soil fertility" project (ORM4Soil) seeks such an approach, aiming at improving soil fertility through a participatory and interdisciplinary methodology. This research and development process brings together farmers, researchers and other stakeholders in a joint effort to develop action plans and tools to reverse soil degradation and improve fertility by increasing adoption of appropriate SFM techniques and bringing more attention to the topic through novel knowledge.

Researchers and students from five countries (Mali, Ghana, Kenya, Zambia and Switzerland) representing three main disciplines – agronomic sciences, sociology/socio-economics/agro-economics and communication sciences – embarked on a six-year collaboration. To achieve this, an intercultural and interdisciplinary dialogue had to be built, with the necessary deconstruction of some discipline related language barriers and persisting stereotypes between different research fields.

The ongoing process of finding a common language across academic disciplines was met by the additional challenge of communicating and collaborating with non-academic actors, such as farmers, technicians and other stakeholders. This involves learning how to communicate scientific results and approaches in a non-scientific language with the involved actors. Despite the difficulties encountered in bringing such a diverse array of actors under the same framework, this has remained the core of the project and the engine behind its novel approach.

The process of bottom-up selection of agricultural innovations to be tested began with an exercise that was to be the first joint interdisciplinary activity between the different project members: a participatory rural appraisal (PRA). The PRA was conducted in two sites per country, allowing to cover a diversity of environmental and social rural contexts, where the final selected techniques were to be tested. Different participatory methods were used, meant to engage all participants and map the basic relationships and societal dynamics within the studied rural communities.

Towards the end of the PRA, a survey and participatory discussions with farmers allowed the selection of the ORM4Soil techniques to be tested in each site, later developed into experimental protocols by each national research team to be implemented in a total of 8 on-station and 120 on-farm trials. In Mali for example, farmers chose to test an agroforestry technique, the intercropping of cotton, maize and sorghum with Gliricidia sepium trees. In Ghana, farmers wanted to explore further the application rates and combinations of existing organic resources such as cow manure, compost, biochar and crop residues. In Kenya, the chosen techniques were different organic resources (including Tithonia, an abundant invasive plant) in combination with minimum and conventional tillage. In Zambia, on the other hand, farmers chose the techniques of alley cropping and other intercropping techniques with legumes and the improved version of a traditional type of green manure, locally known as fundikila.

Other interdisciplinary activities and initiatives were (or are now under the process of being) carried out along the project's research process, including innovation platforms, farmer field days and surveys before and after a communication campaign seeking to disseminate the results. An ongoing socio-economic research will include aspects such as profitability calculations for the most appropriate technologies being tested and focus group discussions capable of better capturing the social dynamics these innovations might face. Towards the end, an "endline survey" will help to assess the impact and efficiency of disseminating the lessons learned via various channels, and the extent of acquired knowledge and final uptake of adapted technologies.

The final results will be compiled in specific recommendations, brought not only to the relevant policy makers, but also to the main target population of the whole study, the farmers.

The ORM4Soil adoption model and pathway to improved adoption

Rogers (2003) identified five attributes of an innovation decisive for its adoptability: its relative advantage, its compatibility with the existing set-up at production and society level, its complexity and the way how to deal with it, its trialability before adopting it, and finally the observability of the innovation. Some agricultural adoption related studies identify agro-economic factors (Sunding and Zilberman 2001) as central to the decision to adopt a technology (in Rogers' terms "relative advantage"), while other authors concentrate on communication channels (Adolwa et al 2012, Kimaru-Muchai et al 2013, Nyambo and Ligate 2013).

The work of Pannell et al. (2006) identified three main factors relevant for adopting agricultural innovations: i) the process of learning and experience about the innovation, ii) the characteristics of the farmers within their socio-economic environment and iii) the characteristics of the technology itself. Kuehne et al. (2017) have developed this framework further, generating the ADOPT (Adoption and Diffusion Outcome Prediction Tool) model.

The ADOPT model (Kuehne et al. 2017) asks the users 22 main questions related to i) characteristics of the technology that influence its relative advantage, ii) characteristics of the population influencing their perceptions of the relative advantage of the technology, iii) characteristics of the technology influencing the ease and speed of learning about it, and iv) characteristics of the potential adopters that influence their ability to learn about the practice. The 22 variables are then parameterized and defined algorithms are used to measure the expected adoption rate. The model is designed to contribute to the conceptual understanding of adoption related dynamics within the agricultural sector.

In the project, the ADOPT model for smallholders is seen as appropriate to help understand the complexity of adoption dynamics in the studied agricultural contexts. A new version, focussing on developing contexts and considering its specific characteristics, is being developed and the international ORM4Soil team and experience might provide relevant insights for it.

Pathway to impact: Paving the way towards improved adoption

The agronomic and sociological results coming from the project's research process at local level are brought into a continuous and dynamic interactive discussion centered on the innovation platforms (IP). These multi-stakeholder structures were set up in each of the eight project sites, and are expected not only to identify collectively the local constraints and opportunities around the topic of SFM technologies and build-up of soil fertility. They also to bring the lessons learned and the acquired knowledge to a wider dialogue and help paving the way to its practical implementation and scale up.

Insights from well-functioning IPs are vital to assess the adoptability and scale up potential of the tested technologies, since the diversity of actors can interlink cross-discipline information such as the likeliness of the technology to have good yields, to generate profit, to be easy to implement and to build-up soil fertility. Therefore, the IPs are also instrumental in producing messages from the outcomes of the project, which are being disseminated in the communication campaigns in the eight project sites.

The following scheme represents the timeline of ORM4Soil's pathway to impact, with the width of the triangle outlining the potential proportion of technology adopters along and beyond the project's lifetime.
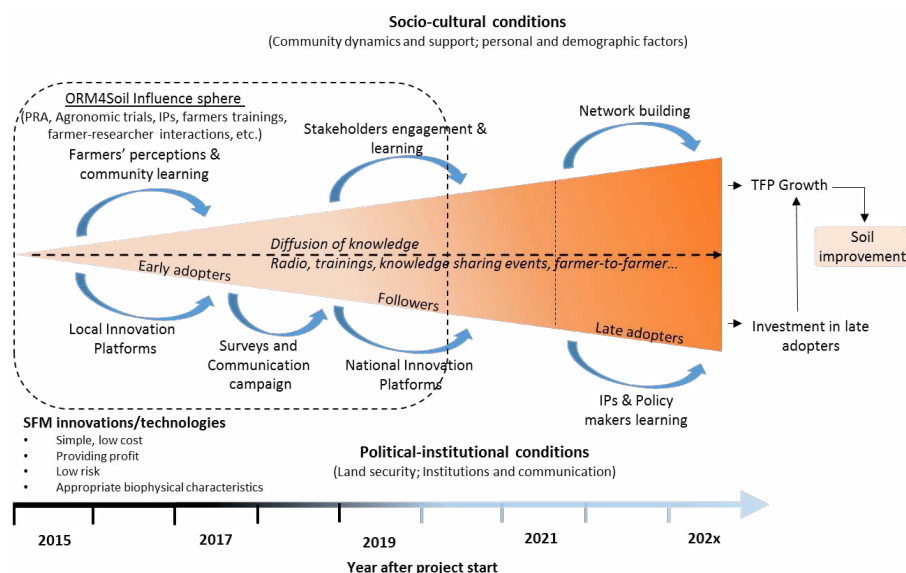

Fig. 1. Timeline of ORM4Soil's pathway to impact, paving the way to the improved adoption of appropriate SFM technologies.

llustrating the potential growth of the project's technologies or its adoption rates, the left side of the scheme shows the little proportion of early adopters, still triggered by the project's activities and by the farmers directly engaged in the project. After the development and ripening of the IPs set up in the framework of ORM4Soil, as well as after the first wider diffusion of the project's messages and successfully tested technologies during the communication campaign, the proportion of adopters is expected to grow.

The communication campaign will engage radio and extension services, and will be complemented by farmer field days in order to show the practical results to a wider audience. The messages used for dissemination during the communication cam-

paign will be produced by the coordinated efforts of each national team, joining cross discipline data and expertise, with the consultation of IPs for fine tuning.
The IPs are also meant to expand their range and reach the regional and hopefully national levels, seeking to influence policy and engage nation-wide stakeholders and their networks.

Bridges with other structures, such as small and medium enterprises (SME), extension services, governmental and non-governmental agencies working in the agricultural sector and other relevant stakeholders are expected to be built. Extension services in particular can prove instrumental in the ORM4Soil's strategy for dissemination of the produced messages.

As time goes by, the project's acquired knowledge and experience is expected to translate into action and behavioral change regarding the adoption of SFM technologies, hopefully reaching farmers outside of the eight project sites and contributing to fulfill the project's overall aim of building soil fertility and tackling food insecurity.

Notes:
[1]www.orm4soil.net

References

Adekunle A. and Fatunbi A. 2012. Approaches for Setting-up Multi-Stakeholder Platforms for Agricultural Research and Development. World Applied Sciences Journal 16, 981-988.

Adolwa I.S. Okoth P.F. Mulwa R.M. Esilaba A.O. Mairura F.S. Nambiro E. 2012. Analysis of Communication and Dissemination Channels Influencing the Adoption of Integrated Soil Fertility Management in Western Kenya. The Journal of Agricultural Education and Extension 18, 71-86.

Badiane O, & Collin, J. 2016. Agricultural growth and productivity in Africa: Recent trends and future outlook. In J. Lynam, N. M. Beintema, J. Roseboom, & O. Badiene (Eds.), Agricultural research in Africa: Investing in future harvest (pp. 3–30). Washington, DC: International Food Policy Research Institute.

Barrios E. Sileshi G. Sheperd K. Sinclair F. 2012. Agroforesty and Soil Health: Linking Trees, Soil Biota, and Ecosystem Services. In: Soil Ecology and Ecosystem Services. Oxford University Press.

Bationo, A., Buerkert, A. 2001. Soil organic carbon management for sustainable land use in Sudano-Sahelian West Africa. Nutrient Cycling in Agroecosystems 61, 131-142.

Basu, K., Narayan, A. and Ravallion, M. 2002. Is literacy shared within households? Theory and evidence for Bangladesh. Labour Economics, 8 (6), 649–665.

Boateng, K. 2000. Effects of application of poultry manure on growth, yield and Economic returns of Okra growth in the forest zones of Ghana. Ghana Journal of Horticulture, 1, 9-13.

Cherr, C.M., Scholberg, J.M.S., McSorley, R. 2006: Green Manure Approaches to Crop Production: A Synthesis. Agronomy Journal 98, 302-319.

Douthwaite, B., Manyong, V.M., Keatinge, J.D.H., Chianu, J. 2002. The adoption of alley farming and Mucuna: lessons for research, development and extension. Agroforestry Systems 56, 193-202.

Fatondji, D., Martius, C., Bielders, C.L., Vlek, P.L.G., Bationo, A., Gerard, B. 2006. Effect of planting technique and amendment type on pearl millet yield, nutrient uptake, and water use on degraded land in Niger. Nutrient Cycling in Agroecosystems 76, 203-217.

Fischler, M. 2010. Impact assessment of push-pull technology developed and promoted by icipe and partners in eastern Africa. ICIPE Science Press.

Giller, K., Cadisch, G., Ehaliotis, C., Adams, E., Sakala, W.D., Mafongaya, P.L. 1997. Building up soil nitrogen capital in Africa. In: Replenishing Soil Fertility in Afrika. American Society of Agronomy and Soil Science Society of America (ed.). pp 151-192. Soil Science Society of America, Madison, USA.

Glover, D., Sumberg, J., and Andersson, J. A. 2016. The adoption problem; or why we still understand so little about technological change in African agriculture. Outlook on Agriculture 45, 3-6.

Henao, J., Baanante, C. 1999. Nutrient depletion in the agricultural soils of Africa. 2020 Briefs 62.

Juo, A. S. R., & Lal, R. 1977. The effect of fallow and continuous cultivation on the chemical and physical properties of an Alfisol in western Nigeria. Plant and Soil, 47, 567–584.

Katungi, E. 2006. Gender, Social Capital and Information Exchange in Rural Uganda IFPRI and Melinda Smale, IFPRI (International Food Policy Research Institute) CAPRI Working Paper No. 59, University of Pretoria.

Kimaru-Muchai, S., Mucheru-Muna, M., Mugwe, J., Mairura, F., Mugendi, D. 2013. Communication channels used in dissemination of soil fertility management practices in the Central Highlands of Kenya. In: Agro-Ecological Intensification of Agricultural Systems in the African Highlands, Kigali, Rwanda, 2011, 2013. Vanlauwe, B., van Asten, P., Blomme, G. (eds.), pp 283-307.

Kolawole, O.D. (2013): Soils, science and the politics of knowledge: How African smallholder farmers are framed and situated in the global debates on integrated soil fertility management. Land Use Policy 30, 470-484.

Kotschi J. 2013. A Soiled reputation: Adverse impacts of mineral fertilizers in tropical agriculture. Heinrich Boell Stiftung, Germany.

Kuehne, G., Llewellyn, R., Pannell, D.J., Wilkinson, R., Dolling, P., Ouzman, J., Ewing, M., 2017. Predicting farmer uptake of new agricultural practices: A tool for research, extension and policy. Agric. Syst. 156, 115-125.

Martey, E., Wiredu, A.N., Asante,B.O., Annin, K., Dogbe, W., Attoh, C., & Al- Hassan, R.M. 2013. Factors Influencing Participation in Rice Development Projects: The Case of Smallholder Rice Farmers in Northern Ghana. International Journal of Development and Economic Sustainability. Vol. 1, No.2, pp 13-27.

Mignouna, D. B., Manyong, V. M., Mutabazi, K. D. S., & Senkondo, E. M. 2011. Determinants of adopting imazapyr-resistant maize for Striga control in Western Kenya: A double-hurdle approach. Journal of development and agricultural economics, 3(11), 572-580.

Nicolay, G. 2016. Theory-based Innovation Platform management. A contribution of sociology to agriculture research and development. In "12th European IFSA Symposium, 2016. Theme 2: Methodology and frameworks of farming systems transformation.". Harper Adams University.

Nicolay, G. L. 2017. Why is Africa struggling with organic farming? A methodological contribution from sociology. In Rahmann, Gerold (Ed.) et al. (2017): Innovative research for organic 3.0 - Proceedings of the scientific track. In "Organic World Congress 2017, November 9-11", Vol. Volume 2, pp. 708-719. Thünen Report, No. 54,2, Delhi, India.

Nyambo, B., Ligate, E. 2013. Smallholder Information Sources and Communication Pathways for Cashew Production and Marketing in Tanzania: An Ex-post Study in Tandahimba and Lindi Rural Districts, Southern Tanzania. The Journal of Agricultural Education and Extension 19, 73-92.

Nyareza, S., Dick, A.L. 2012. Use of community radio to communicate agricultural information to Zimbabwe's peasant farmers. Aslib Proceedings 64, 494-508.

Ouédraogo, E., Mando, A., Zombré, N.P. 2001. Use of compost to improve soil properties and crop productivity under low input agricultural system in West Africa. Agriculture, Ecosystems & Environment 84, 259-266.

Pannell, D.J., Marshall, G.R., Barr, N., Curtis, A., Vanclay, F., Wilkinson, R., 2006. Understanding and promoting adoption of conservation practices by rural landholders. Australian Journal of Experimental Agriculture 46, 1407-1424.

Pasternak, D., Senbeto, D., Nikiema, A., Kumar, S., Fatondji, D., Woltering, L., Ratnadass, A., Ndjeunga, J. 2009. Bioreclamation of Degraded African Lands with Women Empowerment. Chronica Horticulturae 49, 24-27.

Pieri, C. 1989. Fertilité des terres de savane. Bilan de trente ans de recherche et de développement agricoles au Sud du Sahara. Coopération, M.d.l. (ed.), pp 444. CIRAD, Paris, France.

Place F, Barrett C.B, Freeman H.A, Ramisch J.J, Vanlauwe, B. 2003. Prospects for integrated soil fertility management using organic and inorganic inputs: Evidence from smallholder African agricultural systems, Food Policy, 28, 365–378

Rogers, E. M. 2003. Diffusion of Innovations, 5th Edition, New York, Free Press.

Rusinamhodzi, L., Corbeels, M., van Wijk, M., Rufino, M., Nyamangara, J., Giller, K. 2011. A meta-analysis of long-term effects of conservation agriculture on maize grain yield under rain-fed conditions. Agronomy for Sustainable Development 31, 657-673.

Rusinamhodzi L. Corbeels M. Nyamangara J. Giller K.E. 2012. Maize–grain legume intercropping is an attractive option for ecological intensification that reduces climatic risk for smallholder farmers in central Mozambique. Field Crops Research 136, 12-22.

Sanginga, N. and Woomer, P.L. 2009. Integrated Soil Fertility Management in Africa: Principles, Practices and Developmental Process. Nairobi: Tropical Soil Biology and Fertility Institute of the International Centre for Tropical agriculture.

Sousa F. Nicolay G. Home R. 2016. Information technologies as a tool for agricultural extension and farmer-to-farmer exchange: Mobile-phone video use in Mali and Burkina Faso. Int J Educ Dev Using Inf Commun Technol. 12(3):19-36.

Spurk C. Schanne M. Mak'Ochieng M. Ugangu W. 2013. Good information is in short supply - Kenyan Farmers and their assessment of information on agricultural innovation, Winterthur and Nairobi.

Stoorvogel J.J. Smaling E.M.A. 1990. Assessment of soil nutrient depletion in Sub-Saharan Africa: 1983-2000. Vol 1, Main Report. The Winand Staring Center, Wageningen, NL.

Sunding D. Zilberman D. 2001. Chapter 4: The agricultural innovation process: Research and technology adoption in a changing agricultural sector. Handbook of Agricultural Economics. Elsevier, pp. 207-261.

Tittonel P. Muriuki A. Klapwijk C. Sheperd K. Coe R. Vanlauwe B. 2013. Soil Heterogeneity and Soil Fertility Gradients in Smallholder Farms of the East African Highlands. Soil Science Society of America Journal 77:525-538.

Tittonell P. 2014. Growing more with less – the future of sustainable intensification. In: 1st Africa Congress on Conservation Agriculture. IACCA (ed.), pp 18-25. ACT, NORAD, Lusaka.

van der Heide J. van der Kruijs A. C. B. M., Kang, B. T., & Vlek, P. L. 1985. Nitrogen management in multiple cropping systems. In B. T. Kang & J. van der Heide (Eds.), Nitrogen management in farming systems in humid and subhumid tropics (pp. 291–306). Haren: Institute for Soil Fertility.

Vanlauwe B. Giller K. 2006. Popular myths around soil fertility management in sub-Saharan Africa. Agriculture, Ecosystems & Environment 116 (1/2):34-46

Vanlauwe, B., Bationo, A., Chianu, J., Giller, K.E., Merckx, R., Mokwunye, U., Ohiokpehai, O., Pypers, P., Tabo, R., Shepherd, K.D., Smaling, E.M.A., Woomer, P.L., Sanginga, N. (2010): Integrated soil fertility management - Operational definition and consequences for implementation and dissemination. Outlook on Agriculture 39, 17-24.

Vanlauwe B., A. H. AbdelGadir, J. Adewopo, S. Adjei-Nsiah, T. Ampadu-Boakye, R. Asare, F. Baijukya, E. Baars, M. Bekunda, D. Coyne, M. Dianda, P. M. Dontsop-Nguezet, P. Ebanyat, S. Hauser, J. Huising, A. Jalloh, L. Jassogne, N. Kamai, A. Kamara, F. Kanampiu, A. Kehbila, K. Kintche, C. Kreye, A. Larbi, C. Masso, P. Matungulu, I. Mohammed, L. Nabahungu, F. Nielsen, G. Nziguheba, P. Pypers, D. Roobroeck, M. Schut, G. Taulya, M. Thuita, V. N. E. Uzokwe, P. van Asten, L. Wairegi, M. Yemefack & H. J. W. Mutsaers 2017. Looking back and moving forward: 50 years of soil and soil fertility management research in sub-Saharan Africa. International Journal of Agricultural Sustainability.

1. 2. Sostenibilidad de la agricultura familiar paraguaya de cuatro distritos de la región oriental. Una mirada desde la ecología humana

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Resumen

Desde la perspectiva de la Ecología Humana siempre se da una interacción entre el sistema social humano y el resto del ecosistema; este sistema social es uno de los determinantes en el nivel de impacto de las actividades humanas en este ecosistema (Marten, 2001). La investigación fue realizada en cuatro distritos con el objeto de entender la sostenibilidad de la agricultura familiar desde la perspectiva de la ecología humana, con una población de 120 sistemas y una muestra no probabilística de 50. La Caracterización se realizó por medio del análisis estadístico multivariado y la sostenibilidad fue determinada a través de la metodología Biograma. Los sistemas están conformados por 4 a 5 personas, el tamaño varia de entre 2 a 9,59 ha de superficie, en promedio, es utilizado el 50% para la producción de maíz (Zea Mays L.), mandioca (Manihot esculenta Crantz) y yerba mate (Ilex paraguariensis A.St-Hil.) combinados con la cría de animales y pequeñas huertas; en su mayoría utilizan sistemas de manejos orgánicos y el ingreso económico depende de actividades extra prediales. En los cuatros territorios la dimensión más crítica es la económico productiva; en cuanto al Índice integrado de Desarrollo Sostenible el promedio es de 0,52.

Palabras clave: agricultura familiar, sostenibilidad, ecología humana.

Abstract

From the perspective of Human Ecology there is always an interaction between the human social system and the rest of the ecosystem; This social system is one of the determinants in the level of impact of human activities in this ecosystem (Marten, 2001). Agricultural systems or agroecosystems constitute one of the main alterations made by human beings (Sans, 2007, Altieri, 1999). These interactions and their levels of capacity to modify the natural environment have increased due to technological and cultural development, putting the sustainability of the systems themselves in many cases at risk (Gamboa-Bernal, 2011).

The concept of sustainability covers economic, ecological and social dimensions (Torres, Rodriguez, & Sanchez, 2004), and it can be considered that an agriculture is sustainable when it has stable yields over time and preserving the natural capacity of the productive system to regenerate itself before alterations external (Delgado, Hernández, García, & Cruz, 2006). The sustainability analyzes seek to identify the factors that make the productive system sustainable and for that use the general theory of systems (Cárdenas, Giraldo, Idárraga, & Vásquez, 2006); The methodology used in this research is based on a methodological guide for the construction of sustainability indicators in family agricultural production systems "(Barrantes C., Siura, Castillo, Huarcaya, & Rado, 2015), validated in Paraguay by the Inter-American Institute of Agricultural Cooperation (IICA). In Paraguay there are two models of agricultural production, peasant and indigenous family agriculture and technified agriculture or agro-business (Gras & Hernández, 2013). Family farming is the one that brings together a greater number of productive units or farms and, according to data from the National Agricultural Census made in 2008, represents 84% of the productive units (Gattini, 2011).

The research was conducted in the districts of Tava'i and San Juan Nepomuceno (Department of Caazapá) and Alto Vera and Itapúa Poty (Department of Itapúa); in order to understand the sustainability of family farming from the perspective of human ecology. The study population includes 120 productive systems beneficiaries of the project Improving the Conservation of Biodiversity and Sustainable Land Management in the Atlantic Forest of Eastern Paraguay better known as Paraguay Biodiversity, the sample of the non-probabilistic type corresponds to 50 units. Characterization was carried out through multivariate statistical analysis and sustainability was determined through the Biogram methodology.

The systems are made up of 4 to 5 people, the size varies from 2 to 9,59 ha of surface, on average, 50% is used for the production of corn (Zea Mays L.), cassava (Manihot esculenta Crantz) and yerba mate (Ilex paraguariensis A.St-Hil.) combined with the breeding of animals and small orchards; Most of them use organic management systems and the economic income depends on extra-farm activities. The majority of productive units (94%) practice reforestation; a high percentage (72%) consider that the quality of their soils is good or very good and they carry out management practices such as direct sowing or rotation.

In the four territories, the most critical dimension is the productive economic one that is located within a critical state; On the other hand, the socio-cultural dimension is located in an unstable situation. On the other hand, the environmental and institutional dimension are in an acceptable range. This can demonstrate that the sustainability of these productive units is more linked to factors related to the social ecosystem than to the natural ecosystem.

In general, the Integrated Index of Sustainable Development shows that the productive units are in a situation of instability, this means that they are susceptible to alterations and their capacity for resilience are very low.

Keywords: family farming, sustainability, human ecology.

Introduction

La ecología humana no se trata de una simple extensión de la ecología general ya que posee sus propias características y aplicaciones; centra sus estudios en el ser humano, que posee una capacidad de modificar el medio ambiente para adaptarlo a sus exigencias (Olivier, 1993; Gamboa-Bernal, 2011). La ecología humana, además de las relaciones existentes entre los ecosistemas vivientes, se estudian las relaciones personales y la cultura (Gamboa-Bernal, 2011). Este ecosistema viviente comprende a todo lo existe en un área determinada, inclutendo las construcciones humanas, y las comunidades biológicas (Marten, 2001).

Para entender estas interacciones entre el ecosistema y los seres humanos, la ecología humana plantea la existencia de un sistema social que interactúa con el ecosistema natural, este sistema social comprende a las personas, su población, la psicología y organización social que definen su comportamiento (Marten, 2001).

Los seres humanos modifican el ecosistema natural para satisfacer sus necesidades a través de los servicios ambientales, estos servicios proporcionan agua, combustibles, alimentos, materiales para confeccionar vestimentas, materiales de construcción, y oportunidades de recreo (Marten, 2001). Una de las principales alteraciones realizadas son los ecosistemas agrícolas o agroecosistemas, estos ecosistemas son sistemas antropogénicos y su origen y mantenimiento están asociados actividades humanas (Sans, 2007; Altieri, 1999); la interacción entre los factores biológicos ambientales (ecosistema natural) y los factores sociales económicos (sistema social) general las particularidades de cada agroecosistema (Hecht, 1999).

Estas interferencias o alteraciones en el medio ambiente han ido aumentando a través de tiempo de acuerdo al desarrollo tecnológico y cultural; generando hoy día diferentes tipos de problemas que ponen en riegos la sostenibilidad de los sistemas (Gamboa-Bernal, 2011). En los sistemas agrícolas la excesiva intensificación ocasiono una drástica modificación del paisaje natural, empobrecimiento de los suelos y la aceleración de los procesos de erosión (Sans, 2007).

El terminó sostenible se empezó a utilizar en 1987 a partir del informe "Nuestro futuro común" de la Comisión Burtland y hace referencia a la capacidad de un sistema de satisfacer las necesidades de las generaciones presentes, sin comprometer la facultad de las generaciones futuras para satisfacer sus propios requerimientos (Maccagno, 2006). El concepto de sustentabilidad abarca dimensiones ecológicas, sociales y económicas (Torres, Rodriguez, & Sanchez, 2004). Dentro de este marco, una agricultura sustentable es aquella que permite lograr rendimientos estables a través del tiempo mediante la utilización de tecnologías que utilizan insumos locales de manera que; la eficiencia biológica del sistema mejore, se mantenga la capacidad productiva del agroecosistema, se preserve la diversidad biológica y la capacidad del sistema de regularse y mantenerse (Delgado, Hernández, García, & Cruz, 2006).

La complejidad y estabilidad de los agrecosistema, y por ende su sostenibilidad, se basa en la diversidad; esta diversidad entendida como un mosaico de elementos relacionados por medio de una serie de flujos y a su vez, interactuando con la cultura local (Sans, 2007).

El análisis de la sustentabilidad consiste en evaluar los atributos que hacen que un sistema agrícola sea sustentable, esto incluye aquellos factores que promueven la conservación del medio ambiente de manera tal que el sistema pueda seguir proporcionando los recursos necesarios para satisfacer las diferentes necesidades humanas (Torres, Rodriguez, & Sanchez, 2004). Para este análisis, en la mayoría de los casos, los métodos utilizan un enfoque de sistemas (Cárdenas, Giraldo, Idárraga, & Vásquez, 2006).

La metodología empleada está basada en la "Guía metodológica para la construcción de indicadores de sostenibilidad en sistemas de producción agrícola familiar" (Barrantes, Siura, Castillo, Huarcaya, & Rado, 2015), validada en el Paraguay por el IICA y desarrollada en base al "Marco para la evaluación de sistemas de manejo incorporando indicadores de sustentabilidad" (MESMIS) y la propuesta por Santiago Sarandón conocida como Biograma. Sus metodologías convergen en muchos pasos al realizar la evaluación de la sostenibilidad en sistemas agrarios, obteniendo indicadores óptimos para la medición de cada dimensión de la sostenibilidad y detectando puntos críticos que permitan generar sostenibilidad a dichos sistemas a partir de la aplicación de estrategias de gestión (Sarándon & Flores, 2014; Maseras, Astier, & López-Ridaura, 2000).

En Paraguay conviven dos tipos de agricultura; la agricultura familiar campesina e indígena y la agricultura tecnificada o agronegocio. La agricultura tecnificada se desarrolla en función a cuatro pilares: el tecnológico, el financiero, el productivo y el organizacional. Cada uno de estos pilares aporte diferentes componentes al sistema productivo considerando siempre el énfasis en la dimensión económica (Gras & Hernández, 2013).

El sector de la agricultura en general (incluyendo los sectores agrícolas, pecuarios y forestales, y las industrias y servicios vinculados) tienen una participación cercana al 41% en la economía paraguaya (Ferreira & Vázques, 2015). Este sector es el principal motor del crecimiento económico del Paraguay y entre los años 2004 al 2014, en promedio, fue responsable del 19% del crecimiento económico del país (Massi, 2015). La agricultura familiar es el sector más importante, en cuanto a población, en las zonas rurales del Paraguay; según datos del Censo Agropecuario de 2008 representa el 84% de los establecimientos rurales existentes en el país y constituyen el 4% de la superficie cultivada (Gattini, 2011). Este sector además es el que más conserva las costumbres y tradiciones del pueblo paraguayo. De ahí radica la importancia de emprender acciones que permitan su fortalecimiento (Palau, 1996; Instituto de Bienestar Rural, 1998)

El Ministerio de Agricultura y Ganadería define a la agricultura familiar como emprendimiento rural con mano de obra familiar, no contrata un número mayor de 20 trabajadores temporales y no utiliza más de 50 ha. En la Región Oriental (Almada & Barril, 2007; Gattini, 2011).

Los principales problemas que enfrenta este sector son pequeñas superficies de explotación, degradación de los recursos naturales (agua y suelo), tecnologías inadecuadas, bajos precios de sus productos, falta de acceso a créditos y mercados, alto costo de los insumos agrícolas. La economía de la agricultura familiar no se encuentra sustentada en la producción de un rubro sino en un sistema de finca diversificada. Sus principales características económicas son producción de auto consumo, utilización de materiales existentes en finca, las actividades que generan el ingreso monetario son muy diversas (explotación de recursos naturales, producción de cultivos de rentas, remesas) y mano de obra familiar. Por ello la base del éxito económico de la agricultura familiar se sustenta en la diversidad (Palau, 1996; Instituto de Bienestar Rural, 1998).

Metodologia

La investigación fue realizada en los departamentos de Caazapá, distritos de San Juan Nepomuceno y Tava'i y del departamento de Itapúa, distritos de Alto Vera e Itapúa Poty.

La población de estudio comprende a 120 beneficiarios del proyecto Mejorando la Conservación de la Biodiversidad y el Manejo Sostenible de la Tierra en el Bosque Atlántico del Paraguay Oriental más conocido como Paraguay Biodiversidad ejecutado a través de la Itaipú Binacional en conjunto con el Ministerio del Ambiente y el Desarrollo Sostenible y el Ministerio de Agricultura y Ganadería, donde el Banco Mundial es la agencia de implementación y su objetivo es "conservar la diversidad biológica de importancia global y promover el uso sustentable de la tierra en el ámbito productivo del Bosque Atlántico del Alto Paraná (BAAPA) y los ecosistemas asociados dentro de una región conocida como el "Corredor de Conservación de Paraguay Biodiversidad", en la Región Oriental del Paraguay" (Paraguay Biodiversidad, 2018).

Se aplicó un muestreo no probabilístico dando como resultado 50 sujetos de estudio considerando el teorema del límite central (Barrantes, Siura, Castillo, Huarcaya, & Rado, 2015), la selección de los 50 individuos fue realizada de manera casual.

Para la caracterización de los sistemas de la agricultura familiar presente en cada uno de los territorios comprendidos por el corredor mencionado anteriormente, se utilizó la técnica del análisis estadístico multivariado (Escobar & Berdegué, 1990; Barrantes, Siura, Castillo, Huarcaya, & Rado, 2015).

Las variables utilizadas corresponden a las indicadas por la metodología MESMIS y Biograma y pueden ser apreciadas en el cuadro 1

Tabla 1. Grupos de variables analizadas por dimensiones (Barrantes, Siura, Castillo, Huarcaya, & Rado, 2015)

Dimensión	Variables
socio-culturales	• Sexo y edad • Cantidad de habitantes por finca • Autosuficiencia alimentaria
económico-productivas	• Tamaño de la finca. • Sistemas productivos existentes en la finca • Nivel de intensificación tecnológica. • Tipo de articulación con los mercados de productos. • Insumos
biofísico-ambientales	• Elementos climáticos • Elementos agroecológicos • Control de plagas • Calidad del suelo • Agua
institucionales	• Capacidad de gestión de los productores. • Instituciones locales • servicios públicos

Las herramientas utilizadas para la recolección de datos fueron encuestas (aplicada a los productores y sus familias) y entrevistas a informantes claves (técnicos de organismos públicos y privados; dirigentes de organizaciones y autoridades locales). Para determinar la autosuficiencia alimentaría fue utilizado el cuestionario de diversidad alimentaria que constituye un instrumento de evaluación de bajo costo, rápido, fácil de usar y de cuantificar. La diversidad alimentaria es una medida cualitativa del consumo de alimentos que refleja el acceso de los hogares a una variedad de alimentos (Kennedy, Ballard, & Claude, 2013).

Para determinar la sustentabilidad de los sistemas de agricultura familiar se utilizó la metodología del biograma que consiste en la selección y elaboración de indicadores, estandarización de indicadores, y análisis y determinación de puntos críticos de la sostenibilidad (Sepúlveda, 2008). Los indicadores fueron elaborados de manera conjunta con los pobladores y técnicos involucrados en el proyecto. La estandarización de los indicadores se realizó mediante el método Min-Max donde se asignan valores mínimos y máximos a partir de lo observado a cada categoría (Sepúlveda, 2008). La normalización min-max utiliza los valores mínimo y máximo observados para normalizar linealmente los datos de manera que los valores mínimos y máximos de los

indicadores se desplacen a los valores 0 (menos sostenible) y 1 (más sostenible), respectivamente, y todos los demás indicadores adopten valores relativos que varían en el rango adimensional [0,1], de modo que la distribución original se mantenga, sin que se mantenga el factor de escala (Barrantes, Siura, Castillo, Huarcaya, & Rado, 2015)

Resultados y Discución

Caracterización

El análisis multivariado no arrojo ninguna sub clasificación de los sistemas agrícolas estudiados, si fue posibles identificar pequeñas diferencias de acuerdo al territorio o distrito al que pertenecen las unidades productivas.

Las familias residentes en estas fincas poseen en promedio 5 miembros con ligera predominancia masculina, 55% de las personas son hombres, y una población joven, el promedio de edad es de 26 años; pero si se analiza a partir de la pirámide poblacional (Figura 1) se observa que las personas con edades comprendidas entre los 22 a 30 años representa apenas el 14% de la población total.
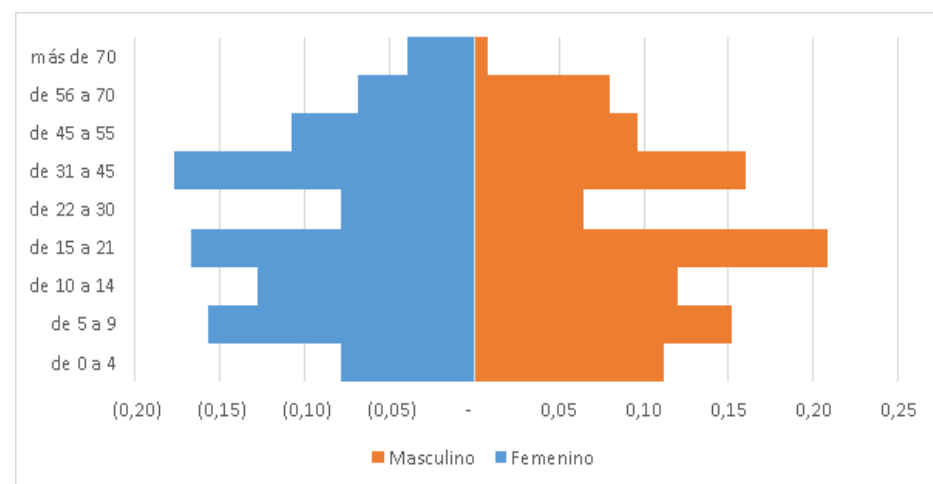

Figura 1. Composición de la población por edad y sexo

El 56% de las fincas poseen superficies de entre 6 a 10 Ha y el 26%, a fincas de entre 1 a 5 Ha. Con respecto al uso de las tierras en la finca, las actividades agropecuarias abarcan un total de 57%, las cuales se encuentran distribuidas de la siguiente manera: cultivos temporales 36%, 15% a cultivos permanentes y un 7% a pasturas. La diferencia se distribuye en un 31% a Monte, un 3% de barbecho, y un 9% a otros usos. La producción agrícola del país se concentra en dos tipos de cultivos: los temporales

(rubros con un ciclo aprox. de 180 días) y los permanentes (rubros frutícolas – industriales de ciclo perennes).

Entre los principales rubros temporales se encuentra el maíz, la mandioca, el poroto (Phaseolus vulgaris L.), la habilla (Vigna unguiculata (L.) Walp.) y el sésamo (Sesamum indicum (L.) Matsum. Nakai); entre los rubros permanentes se destaca la yerba mate. Con respecto a la diversificación productiva, las fincas bajo estudio arrojan un promedio de 4 cultivos/finca. Por otro lado, la producción de hortalizas se caracteriza por tener un promedio de producción de 4 hortalizas/finca, destacándose los rubros de tomate (Lycopersicon esculentum Miller), lechuga (Lactuca sativa L.), cebolla de hoja (Allium fistulosum L.) y menor medida la zanahoria (Daucus carota L.) y el repollo (Brassica oleracea Capitata).

Un aspecto que no deja de llamar la atención, es la producción de soja (Glycine max (L.) Merr.) en los distritos de Itapúa Poty, San Juan Nepomuceno y Tava'i, entre los sistemas de agricultura familiar, rubro vinculado tradicionalmente a la mediana y gran producción, esto da cuenta, que la producción del mencionado rubro se da mediante el arrendamiento de una parte de la finca, a productores con mayor capacidad tecnológica, esto basado en el rendimiento alcanzado en los diferentes rubros

Entre los rubros destinados a la generación de ingresos se encuentran el maíz y el sésamo, los mismo son comercializados en la vinca a intermediarios, encuadrándose la forma de vinculación con el mercado de manera "Tradicional", consecuente con una de las tipologías de comercialización del sub sistema de la agricultura familiar (Instituto Interamericano de Cooperación para la Agricultura, 2016).

La tipología de comercialización tradicional se expresa en una cadena larga con alta participación de intermediarios esta forma de acceso al mercado presenta por la dispersión de la producción, los bajos volúmenes, la heterogeneidad de la calidad y los altos costos de producción. A más de las limitaciones meramente de índole productiva, se suman las malas condiciones de acceso vial a la Colonia La Amistad, agravando así, la posibilidad de acceso a otros canales de comercialización.

La tecnología empleada por parte de los agricultores es la tradicional, se cita principalmente los implementos de uso manual como ser: la azada, machete y pala (98%), pulverizador (78%) y rastrillo (26%). Un aspecto destacado es el uso de productos de orgánicos (fertilizantes y defensivos agrícolas), en el proceso productivo, encontrándose solo un 22% de los agricultores que aplican productos sintéticos (agroquímicos).

En lo referente a la producción pecuaria del total de consultados en este ámbito, entre un 89% al 100% cuentan con aves de corral (gallina y pato), un 56% con ganado porcino y un 33% con ganado bovino. Es importante resaltar que una de las

principales características de la agricultura familiar paraguaya es la combinación de la producción agrícola con la cría de animales menores.

El mayor ingreso monetario se da por las actividades extra prediales (Jornales), solo el 22% de los ingresos proviene de actividades agropecuarias (Figura 2). Esto refuerza la idea de que la agricultura familiar paraguaya está más orientada a la producción de alimentos para consumo de la familia y solo el excedente es comercializado, solo son algunos los rubros cultivados exclusivamente para la comercialización, como la soja y la yerba mate.
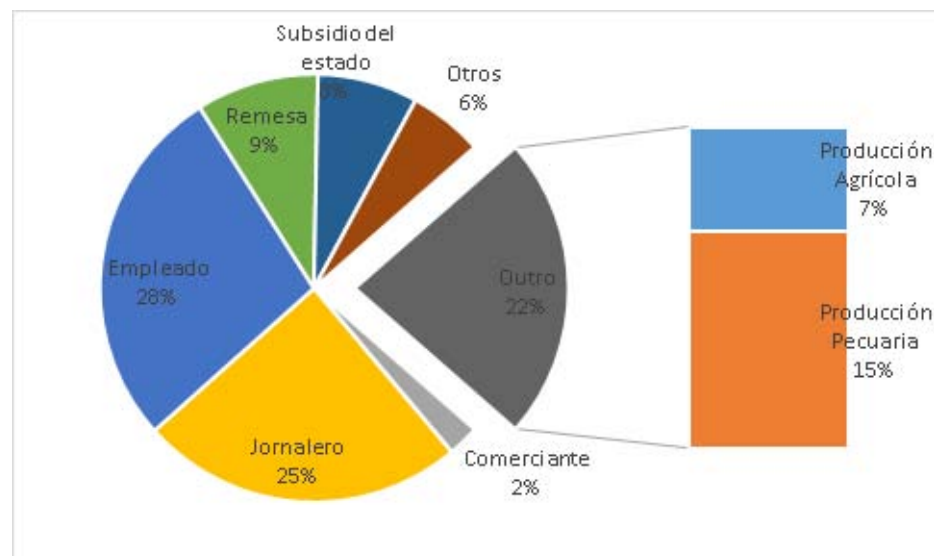

Figura 2. Composición promedio del ingreso anual

En ese sentido cabe destacar lo mencionado por varios estudios sobre el origen de los ingresos monetarios de la AF (Riquelme, 2016), quienes consideran un progresivo aumento del proceso de monetización de la AF, debido a la oferta de nuevos bienes y servicios que exigen la tenencia de efectivo. Esto puede ser comprobado en las fincas consideradas, teniendo en cuenta la diversidad de fuentes de ingresos no generados en la propia finca.

Sin embargo, cabe resaltar que 67% de las fincas cuentan con ingresos mediante la producción agrícola, en tanto que, un 22% de las mismas indicaron generar por medio de la producción pecuaria.

En la dimensión biofísica-ambiental fueron consideradas las variables de manejo de recurso forestales, reforestación, elementos climáticos, agroecológicos, control de plagas, calidad del suelo y agua.

Con respeto al manejo de recursos forestales, los entrevistados mencionaron una diversidad de usos; en la Figura 3 puede apreciarse el porcentaje de los diferentes sub productos forestales.
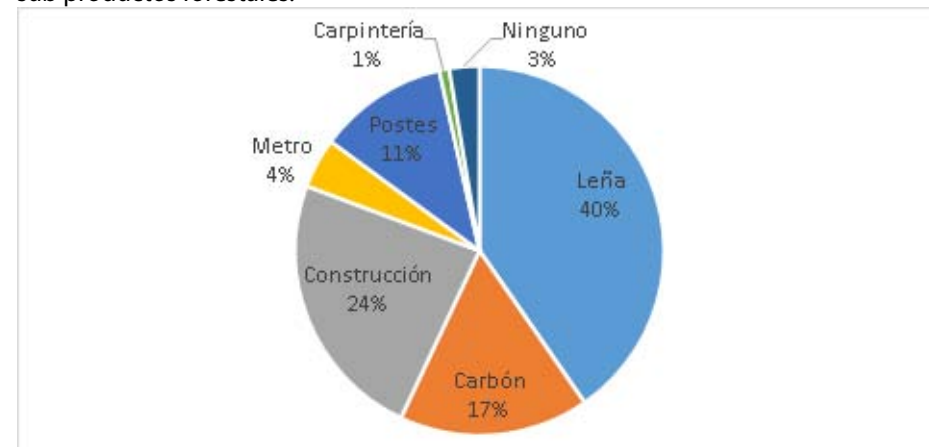
Figura 3: Uso de los recursos forestales.

En cuanto a la reforestación, el 94% de las fincas realiza la reforestación con una diversidad promedio de 3 especies, las principales especies forestales sembradas son el lapacho, cedro, lapacho (Tabebuia spp. Gomes ex DC.), cedro (Cedrela odorata L.) y yvyra pytä (Peltophorum dubium (Spreng.) Taub.).

Siguiendo con análisis de variables, en lo relacionado a la calidad del suelo, se destaca el hecho de que la mayoría de los productores y productoras encuestados perciben que su suelo es bueno o muy bueno (72%) y solo un 6% lo considera como malo; esto es contrario a la mayoría de las investigaciones realizadas donde se expone como uno de los problemas de la agricultura familiar paraguaya, la degradación de los suelos (Gattini, 2011; Riquelme, 2016)

Las principales técnicas de manejo de suelo empleadas son la siembra directa y la rotación de cultivos, técnicas que se pueden considerar como tradicionales de la agricultura Guaraní (Vargas, Giménez, Lehner, & Florentin, 2012).

El 94% de los sistemas productivos se vio afectado por algún tipo de fenómeno climático, siendo la sequía, en un 80% de los casos, la que más unidades productivas afecto; la helada solo afecto a un 20% de las unidades.

Sostenibilidad de Los sistemas

De acuerdo al biograma, en la dimensión bio física ambiental, en promedio, las unidades productivas se sitúan dentro del rango de estable (entre 0.60 y 0.80); pero si observamos la figura 4 se puede ver, que, en algunos indicadores, la situación está dentro del rango crítico (por debajo de los 0.40) o crítico (menor a 0.20).

B1   Cantidad de eventos climáticos que afecto a la producción
B2   Cantidad de técnicas de manejo de suelo empleadas
B3   Realiza reforestación
B4   Realiza reforestación en los bosques de galería
B5   Relación de la superficie boscosa con la superficie total
B6   Diversidad agrícola y forestal
B7   Control de plagas
B8   Calidad del suelo
B9   Tipo de suelo
B10   Nacientes de agua en la propiedad

Se puede observar que la diversidad, uno de los factores claves considerados para la sostenibilidad de los sistemas agrícolas (Sans, 2007), se encuentra dentro de un rango inestable (entre 0.40 y 0.60), pero es importante aclarar, que para esta investigación solo se consideró la diversidad de especies cultivadas y no las demás dimensiones; además la calidad de suelo está basado en la percepción de los productores y las productoras.

Por su parte, en la dimensión económica productiva la situación se identifica como crítica. En la figura 5 se puede apreciar que varios indicadores están en situación crítica o directamente de colapso; esta situación coincide con las estadísticas nacionales, donde se señala que el 36% de la población rural es pobre (Dirección General de Estadísticas, Encuestas y Censos, 2017).

E1   Relación entre uso agropecuario y superficie de las fincas
E2   Rendimientos agrícolas
E3   Producción hortícola
E4   Cría de animales
E5   Procesamiento
E6   Cantidad de técnicas productivas utilizadas
E7   %Ingresos propios
E8   Relación con línea de pobreza
E9   Participación en mercados
E10   Dependencia de insumos internos

Figura 4. Sostenibilidad de la dimensión bio física ambiental

Figura 5. Sostenibilidad de la dimensión económico productiva

El único indicador que se encuentra por encima de la línea de inestabilidad es el de producción hortícola, considerando el alto porcentaje de unidades productivas que poseen pequeñas huertas destinadas a la producción de hortalizas principalmente para el consumo familiar. Esta situación crítica en la dimensión económica productiva podría ser consecuencia de que, en la mayoría de los casos, hoy día, estas unidades productivas ya no están destinadas a la gener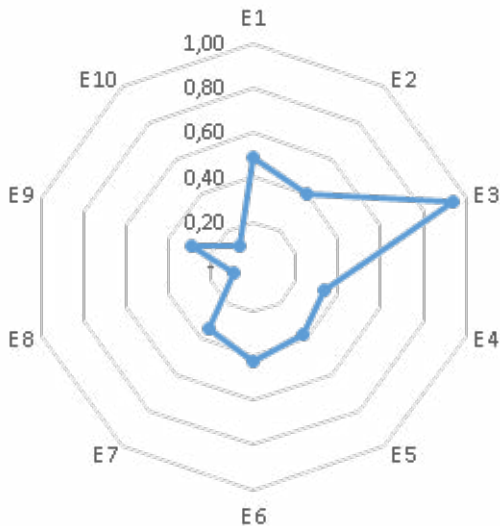ación de rentas, lo que se ve reflejado en la alta dependencia existente de ingresos externos o extra prediales, sino a la producción de alimentos para las familias.

Por su parte, la dimensión socio cultural se encuentra en una situación inestable. En la figura 6 se puede apreciar que no existen ningún indicador dentro de los límites aceptables, pero tampoco en estado de colapso.

S1   Edad
S2   Nivel educativo
S3   Trabajo remunerado
S4   Diversidad de la dieta
S5   Situación de la tierra
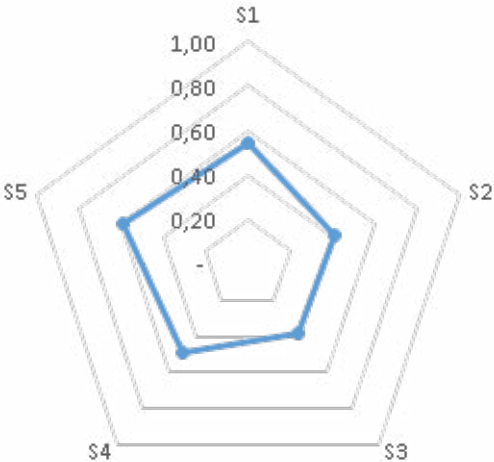
Figura 6. Sostenibilidad de la dimensión socio cultural

Los principales problemas identificados están vinculados al bajo nivel educativo y la alta dependencia a trabajos remunerados externos al sistema. El único indicador que se podría considerar que se encuentra en el límite de pasar de una situación crítica a aceptable, es la tenencia de la tierra, ya que la mayoría de las unidades productivas cuentan con títulos de propiedad o por lo menos poseen documentos que avalan sus derechos sobre las tierras que ocupan.

En cuanto al apoyo institucional recibido o dimensión institucional se encuentra dentro de una situación de estabilidad. En la figura 7 se puede apreciar que el principal factor de sostenibilidad dentro de esta dimensión está vinculado al hecho de que, la mayoría de los productores y productoras se encuentran trabajando de manera asociativa; por otro lado, en los indicadores vinculados al apoyo de organizaciones externas a sus comunidades, tanto públicas como privadas, y en el acceso a servicios financieros (principalmente créditos), ambos se encuentran dentro de una situación de inestabilidad.

I1   ¿Forma parte de algún otro comité o comisión?
I2   Instituciones visualizadas en la comunidad
I3   Servicios financieros
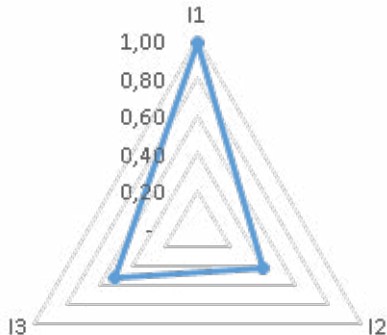
Figura 7. Sostenibilidad de la dimensión institucional

A partir de estos indicadores por dimensión se construyó el Índice Integrado de Desarrollo Sostenible que demuestra que las unidades productivas se encuentran en una situación de inestabilidad.

Figura 8. Índice Integrado de Desarrollo Sostenible

Esta inestabilidad está más vinculado a las dimensiones asociadas al ecosistema social o sistema social como lo son la económica productiva y la socio cultural.

Conclusion

En los cuatros distritos los sistemas de agricultura familiar presentan similitudes en su dimensión socio-cultural, en la dimensión económico-productiva las variantes se dan en cuanto a las superficies de las unidades productivas y rubros de renta, pero son similares en cuanto a la combinación d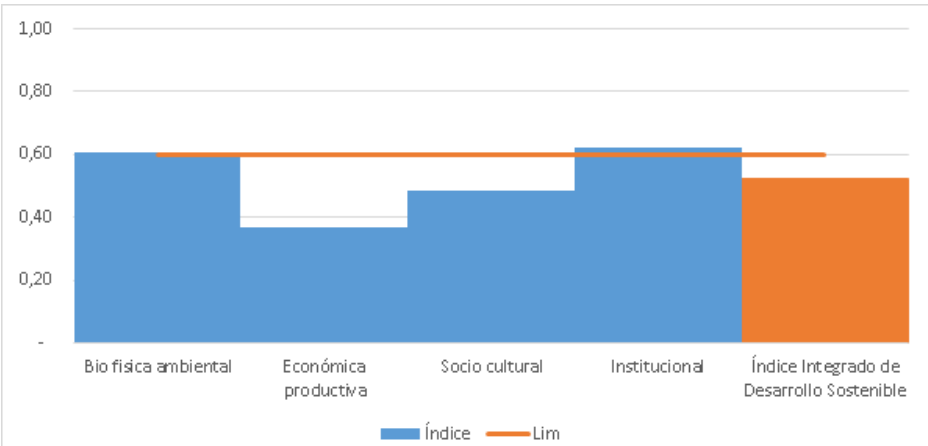e la producción agrícola con la cría de animales menores y la introducción de rubros perennes y las dificultades en el acceso al mercado. En cuanto a la dimensión biofísico-ambiental se destaca el hecho que la mayoría no utiliza productos químicos en la producción, la alta tasa de reforestación, pero el bajo cuidado de los recursos hídricos. En lo institucional un gran número de unidades se encuentran asociadas y trabajan de manera cercana instituciones públicas y privadas.

El Índice Integrado de Desarrollo Sostenible arroja que las unidades productivas se encuentran en una situación de inestabilidad, esto quiere decir que son susceptibles a alteraciones y su capacidad de resiliencia son muy bajas.

Estos puntos críticos que generan esta baja capacidad de resiliencia están más vinculados a factores pertenecientes al ecosistema social como son el bajo nivel educativo, bajo nivel de ingresos, alta dependencia a ingresos externos, entre otros; por lo que se podría afirmar, que la sostenibilidad de las unidas productivas situadas en el territorio de análisis depende más de factores sociales que de factores ambientales.

Referencias

Almada, F., & Barril, A. (2007). La agricultura familiar en los países del cono sur. Asunción: IICA.

Altieri, M. (1999). Agroecología: bases para una agricultura sustentable. Montevideo: Editorial Norman-Comunidad.

Astier, M., Masera, O., & Galván-Miyoshi, Y. (2008). Evaluación de sustentabilidad.Un enfoque dinámico y multidimensional. España.

Barrantes, C., Siura, S., Castillo, E., Huarcaya, M., & Rado, J. (2015). Guía metodológica para la construcción de indicadores de sostenibilidad en sistemas de producción agrícola familiar. Lima: Universidad Nacional Agraria La Molina.

Cárdenas, G., Giraldo , H., Idárraga, Á., & Vásquez, L. (2006). Desarrollo y validación de metodología para evaluar con indicadores la sustentabilidad de sistemas productivos campesinos de la Asociación de Caficultores Orgánicos de Colombia-ACOC. Investigaciones UNISARC, 4(2), 22-46.

Delgado, M., Hernández, R., García, M., & Cruz, R. (2006). Desarrollo agrícola sostenible. Recuperado el 27 de Agosto de 2015, de Universidad Pinar del Río: http://213.254.226.17/biblioteca/PinardelRio/DesarrolloSostenible.pdf

Dirección General de Estadísticas, Encuestas y Censos. (2017). Boletin de Pobreza. Fernando de la Mora: Secretaría Técnica de Planificación y Desarrollo Económico y Social.

Escobar, G., & Berdegué, J. (1990). Tipificación de sistemas de producción agrícola. Santiago de Chile: RIMISP.

Ferreira, M., & Vázques, F. (2015). Agricultura y desarrollo en Paraguay. Asunción: Unión de Gremios de la Producción.

Gamboa-Bernal, G. (2011). Ecología humana y ecología ambiental: binomio clave. Persona y Bioética, 15(1), 5-9.

Gattini, J. (2011). Competitividad de la agricultura familiar en Paraguay. Asunción: CADEP.

Gras, C., & Hernández, V. (2013). El agro como negocio. Producción, sociedad y territorios en la globalización. Buenos Aires: Biblos Sociedad.

Hecht, S. (1999). La evolución del pensamiento agroecológico. En M. Altieri, Agroecología: bases científicas para una agricultura sustentable (págs. 15-30). Montevideo: Editorial Nordan-Comunidad.

Instituto de Bienestar Rural. (1998). Cultivar arraigo campesino. Asunción: Instituto de Bienestar Rural.

Instituto Interamericano de Cooperación para la Agricultura. (2016). La agricultura familiar en las Américas: principios y conceptos que guían la cooperación técnica del IICA. San José: IICA.

Kennedy, G., Ballard, T., & Claude, M. (2013). Guía para medir la diversidad alimentaria a nivel individual y del hogar. Roma: Organización de las Naciones Unidas para la Alimentación y la Agricultura.

Maccagno, P. (2006). La construcción de un sistema nacional de indicadores de desarrollo sostenible: lecciones técnicas y políticas. Santiago de Chile: FAO.

Marten, G. (2001). Ecología humana: conceptos básicos para el desarrollo. Earthscan Publications.

Maseras, O., Astier, M., & López-Ridaura, S. (2000). Sustentabilidad y manejo de recursos naturales: el marco de evaluación MESMIS. México: Mundi Prensa México.

Massi, F. (2015). El crecimiento económico y el factor agroalimentario. Economia y Sociedad, 17-22.

Olivier, G. (1993). La ecología humana ¿Qué se? México: Editor Publicaciones Cruz.

Palau, T. (1996). La agricultura paraguaya al promediar los 90s: situación, conflictos y perspectivas. Asunción: BASE Investigaciones Sociales. Recuperado el 20 de Noviembre de 2011, de http://biblioteca.clacso.edu.ar/Paraguay/base-is/20120911030250/Doc86.pdf

Paraguay Biodiversidad. (25 de setiembre de 2018). Descripción del proyecto. Obtenido de Paraguay Biodiversidad: http://www.paraguaybio.com.py/det_proy_descripcion.html

Riquelme, Q. (2016). Agricultura Familiar Campesina en Paraguay: notas preliminares para su caracterización y propuestas de desarollo rural. Asunción: Centro de Análisis y Difusión de la Economía Paraguaya.

Sans, F. (2007). La diversidad de los agroecosistemas. ecosistema, revista científica y técnica de ecología y medio ambiente, 16(1), 44-49.

Sarándon, S., & Flores, C. (2014). Agroecología: Bases teóricas para el diseño y manejo de agroecosistemas sustentables. La Plata: Universidad de la Plata.

Sepúlveda, S. (2008). Metodología para estimar el nivel de desarrollo sostenible de territorios: Biograma. San José: IICA.

Torres, P., Rodriguez, L., & Sanchez, O. (2004). Evaluación de la sustentabilidad del desarrollo regional. El marco de la agricultura. Región y Sociedad, XVI(29), 109-144.

Vargas, F., Giménez, A., Lehner, B., & Florentin, A. (2012). Ñande kuaapy tee "Un rescate de saberes y tecnologías ancestrales". Asunción: Acción Contra el Hambre.
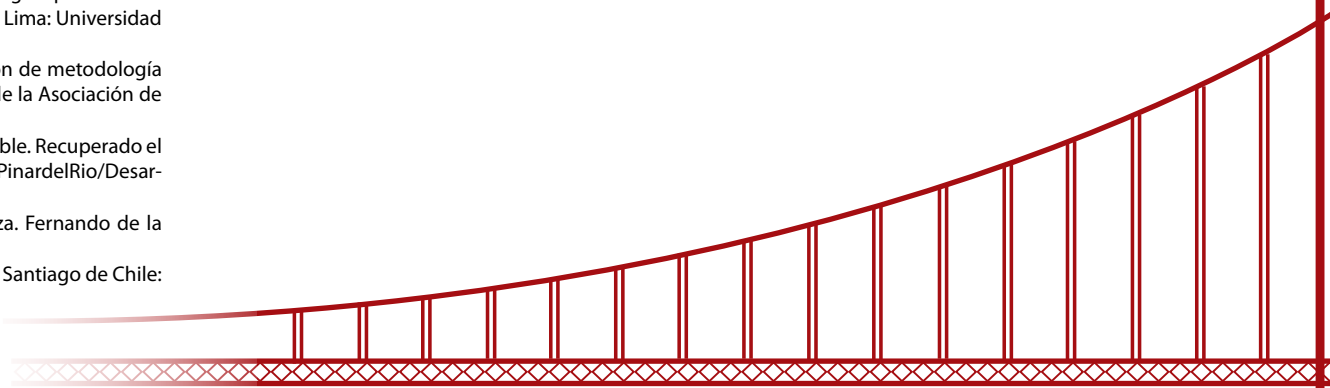
1.3. Stakeholders sustainable management in agriculture - lessons from participatory processes

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Abstract

Stakeholders are nowadays encouraged to become actively involved in the sustainable management of the territory and, in rural areas such as Castro Verde which is Natura 2000 Special Protection Area and nowadays a UNESCO Biosphere Reserve, as well as in the all country, equilibrium between nature conservation and farm production systems is a key factor for sustainability. This paper focuses on the contribution of local actors to evaluate the agro-environmental commitments applied during the last Portuguese Rural Development Program (PRODER/2007-2013). It aims to propose adjustments and new ideas to improve agricultural sustainable practices by assessing the existing commitments and supporting new public strategies regarding the new 2014-2020 programming cycle of the European Agricultural Fund for Rural Development. This was accomplished through the participation of local stakeholders in a set of five workshops, each one in different agricultural region of Portugal. The three-hour workshops were based on interactive techniques as drivers to generate debate, promote knowledge exchanges and produce new knowledge to be presented to policy makers.

Keywords: Active Public participation, Stakeholders, Interactive techniques

1.Introduction

The European Union (EU) is a world leading force in taking action in environmental sustainability (1) promoting biodiversity through the implementation of Agro-Environmental Measures (AEM). These are intended to support agricultural production methods providing sustainable development to rural areas, and are used to support farmers and promote good agricultural and environmental practices by promoting their adoption of agricultural land uses that meet the requirements of environmental protection, rural landscape, natural resources, the soil and genetic diversity. The National Rural Development Program (NRDP, which in Portugal is called: PRODER) provides the framework for the implementation of the EU rural development policy at national, regional and local level. Available for the period of 2007 to 2013, PRODER provided a variety of interventions in rural areas including AEM. Integrated production, organic agriculture, sustainable forest management, conservation of endangered local breeds, the conservation of the countryside or landscape and biodiversity conservation in Natura 2000 are some examples of Agro-Environmental Measures.

Financial support is available to those farmers getting involved in "Agro-Environmental Measures" and wishing to implement sustainable farming practices. The amount of funding is calculated based on income lost and additional costs resulting from the implementation of these measures, in order to encourage them to respect the environment.

Despite the existence of a substantial body of literature advocating the importance of public participation for a long time, in Portugal, active public participation processes are still becoming accepted in different fronts now. In 2007, the Commission of European Communities recognized, in the Green Paper(1), that without public intervention and the strong commitment of all actors it would be impossible to reach ambitious objectives such as promoting environmental sustainability, reducing dependence on external resources, ensuring the competitiveness of European economies, halting loss of biodiversity or preserving natural resources.

This paper focuses on the contribution of local actors to improve the uptake in the development and implementation of the agro-environmental commitments present in the last National Rural Development Program (PRODER) and to help on the conception of new commitments considering the new 2014-2020 programming cycle for Rural Development Programme. It shows that a) active public participation processes are actually on the field and b) it is possible in a short amount of time, when appropriate methodology is used, to promote dialogue and to create knowledge and use it as a driver for further discussion that ultimately can nourish and influence the adoption of future agro-environmental measures.

2. Public Participation and Sustainability

2.1 The Framework

To think about sustainability implies to think in a holistic, integrated systems approach addressed to the biophysical, economic, social and cultural systems. To answer these complex issues, it is common nowadays to propose a participatory and collaborative work in order to achieve a more robust environmental decision-making process.

The importance and the need to include community perspectives in natural resource management is a long time debate and there is an interesting historical overview by Lynam et al(2) on the changes on participatory tools over decades. This overview starts from a point of awareness through the incorporation of local perspectives in the data collecting to the recognition of local knowledge and the production of knowledge itself until the present where public participation is viewed as a tool and a norm for sustainable development. Citizens around the world demand greater participation in democratic systems and greater power of direct intervention to their governments(3)

Public Participation is (4) the practice of consultation and involvement of civil society on the agenda of decision and policy-making processes within organizations/institutions responsible for policy development. Looking into what can be expected in terms of "sustainability" from equitable decision-making processes and policies that consider alternative perspectives of natural resource management-Therefore it is not surprising that participatory management has gained enormous popularity in academic discourse and current practices(5), (6), (7). This is particularly evident if we thinkin about active public participation as advocated by Rowe et al (4), Vasconcelos et al(8) or Pretty et al(9). In most European countries, there are agreements allowing direct involvement of citizens in policy-making regarding matters as diverse as urban development, environmental planning issues or political science. Most of them are locally based(10), having a intense and immediate impact in local communities, making issues such as representativeness become less pronounced in small electorates and the use of local knowledge of citizens more attractive (10). Blackstock (11) points out three reasons for the active involvement of stakeholders and citizens in participatory processes: a) individual and social learning results from the exchange of experiences; b) better understanding of the issues, thus bringing about the development of more adequate solutions, meaning that new knowledge brings with it both reflection and a better understanding of the problems, and c) mitigation of existing conflicts results from dialogue practices. A general understanding of the added value of active participation is building up among the public increasing the demand for it and making it quite attractive in different contexts.

2.2 Why is public participation attractive

For Ravez(12) despite the fact that the human species used and modified natural systems over thousands of years, its impact on the planet seems now to be out of control and failures in systems can now be seen globally. He also calls attention to the prospect of a break in our civilization and even the extinction of species making us recede to earlier times of life on Earth. Recognizing that now it is obvious that there are many flaws in the systems from which modern society depends, Ravez(12) believes that these systems are complex / reflective, i.e. they have to engage people/institutions and must be considered in their various aspects - technical, social and ideological. Nowadays, the implementation of participation is expected to promote sustainable policies, efficient and equitable and collaborative decision-making practices to assure sustainable resource management(7), (13). Without making the most out of the knowledge available in society, it is difficult to consciously bring about the necessary changes. Indeed, the greater the complexity, the greater the uncertainty, the more(14) and earlier(15) urgency to have citizenship and active agents with distinct social, political and economic profiles involved for joint solution building. The involvement of stakeholders/ citizens contributes to the creation of a participatory network that allows for better a) agreements capacity building b) knowledge of reality and c) appropriate solutions(14), (15). So, active public participation turned out to be a key element of environmental planning to enhance the protection of natural re-

sources and support sustainable development benefiting individuals, communities, institutions and governments. It contributes to the betterment of the whole society (16).

3. Workshop methodology

Methodologically, the challenge was to develop a process design for the five half-day workshops, which would be sufficiently standardized and robust to be applied in five different regions of Portugal - namely Castro Verde, Évora, Idanha a Nova, Torre de Moncorvo e Cadaval - to deliver comparable results, while at the same time offering a design open and flexible enough to be adapted to regionally different logics and content driven challenges. Adaptations may be necessary depending on the number of participants, the team, the date or the technical equipment what could have to undergo unexpected changes.

Content driven adaptations would result, for example, from the diversity of the agricultural situations in the chosen locations. Above all there was a constant need to encompass lessons learned from previous workshops without generating distortion when comparing results. The methodological scheme was finally set up as described below (table 1), proving to be able to fulfil all above mentioned requirements.

Table 1: Methodologic activities sequence for workshops

Time	Program
14:30-14:40 Reception Participants Preliminary Activities	Interview with each participant on used agricultural exploration + inventory of his/her preference to discuss between two possible Agro-Environmental Measures (AEM) - Mode of Production (MP) or Integrated Territorial Intervention (ITI). A Flash on "Best Agricultural Practice and Biodiversity" (collection of written ad-hoc answers to 2 questions): - To me, "means… Meeting with invited experts and consultants
14:40-14:50	Opening Session and Welcome
14:50-15:00	Presentation (project team): The project and the Workshop Methodology
15:00-15:30 Group Work Part 1	- Evaluation Agro-Environmental-Measures (AEM): Mode of Production (MP) and Integrated Territorial Intervention (ITI) (collective voting of "favorable" and "disadvantageous" Agro-Environmental Measures (AEMs) – 2x3 votes/participant) - Working groups (3-4 pax): Work sheets to explain in depth a consensual evaluation of Mode of Production (MP) and Integrated Territorial Intervention (ITI) - Parallel: experts may be requested by groups to explain unclear issues

15:30-16:15	Presentation of Results (group-wise) + Discussion
16:15-16:30	Prioritization of Mode of Production (MP) and Integrated Territorial Intervention (ITI) regarding 3 criteria: (1) easy to implement / (2) low cost / (3) efficient in result (3x3 votes per participant)
16:15-16:30	Coffee-Break
16:30-16:50 Ice-breaker	- Each participant selects from a set of objects the one that symbolizes "Biodiversity" and chooses a related key-word - Presentation of his/her choice and the key-word
16:50-17:30 Group Work Part 2	- Working groups (2 pax): Work sheets to propose Best Practice in order to promote and increase biodiversity
17:30-18:00	Presentation of Results (group wise) + Discussion
18:00	Closure and (written) Evaluation of the Workshop Methodology

These workshops implemented within the project "Dissemination of best practices for biodiversity in the application of agro-environmental measures", were promoted by the League for the Protection of Nature (LPN), a Portuguese NGO, in partnership with the Portuguese Farmers Confederation (CAP). The main objective of this project was to disseminate knowledge among Portuguese farmers on the best practices in Agro-Environmental Measures regarding the preservation of biodiversity.

4. Workshop outputs

Farmers were invited to discuss the actual agro-environmental commitments, to choose individually the three best and the three worst commitments, regarding MP and ITI. Then, in groups, they discussed their individual opinions.

After this discussion, groups presented the conclusions to the others. Throughout the presentations, it turned out to be evident that some commitments were considered very positive for all (e.g. traditional culture rotation), while for others unanimity could not be reached (e.g. bands without weed control). For all the debated commitments and opinions were well justified to be integrated into the final report.

Adapted to the cultural specificity of each region, some commitments seem to affect more intensely some regions than others, depending on the agricultural practices of each region, since reactions to a specific Agro-Environmental Measure were very different. For instance, pastures' improvement is a positive commitment in one region (Idanha-a-Nova, center of Portugal) but a negative one in another (Cadaval, in midwest Portugal). According to farmers, this happens because commitments vary according to the regions.

More than evaluating actual environmental commitments, farmers discussed them and, in some cases, proposed new or adapted ones. They explained why commitments were good or bad; what needed to be upgraded, needed implementation. They offered many inputs, suggestions or just comments in order to come up with agriculturally and environmentally friendly solutions.

We can say that workshops knowledge was disseminated and new knowledge about good practices was built. Moreover, farmers pointed out the constraints they faced to apply actual measures in their daily life activity, namely, AEMs to promote biodiversity –.

The five workshops carried out took into account the major specificity of the regions according to the 2007-2013 Portuguese Rural Development Program (PRODER) and the Natura 2000 classification. The results should be seen, on a global perspective, as a national contribution to a better knowledge for good practices regarding the implementation of biodiversity conservation measures both for farmers and for policy makers.

At the regional scale, the social learning resulting from the three-hour debate sessions could contribute to: a) analyses of implementation of the existing commitments and its effectiveness for biodiversity; b) to promote the dissemination of individual knowledge/experiences exchange and to contribute to a better implementation of measures aimed at biodiversity conservation; and c) to contribute to a greater awareness of farmers to the market opportunities created by the promotion of biodiversity and the promotion of environmental services.

5. Participants assessment

In a process such as this, it is of utmost importance to know how the participants evaluate the sessions, in order to make re-adjustments and improvements when needed and to improve these methodologies to make them more efficient. Therefore, the main results of the evaluation accomplished at the end of the sessions are presented here.

From a total of 105 participants, 98 answered to the survey, highlighting as the most positive aspects: a)The straightforward way all farmers exposed the problems of the region; b) The contact with farmers with different ways of doing agriculture; c) The interaction between participants and the exchange of ideas in a constructive and structured dialogue considering it as always a positive; d) The open and interested participation of all stakeholders and openness from facilitators and organizers; e) The opening of the debate on issues that directly affect this region; f) The freedom to select the measures to be put into practice; g) the plurality of ideas and opinions included in the debate.

In the opinion of the participants, the benefits of the process are:

- the awareness regarding the existence of institutions that study/listen to them and talk to the responsible authorities, proposing new insights to be incorporated in the legislation for the primary sector
- the knowledge about different point of views on certain topics and different opinions and
- the exchange of experiences and creation of synergies, and
- a better understanding of various topics resulting from their discussion and the highlighting of the problems farmers are facing.

The understanding that the problems are common to all farmers and the possibility to correct some of the Agro-Environmental Measures (AEM) according to the specific needs of each region were aspects very relevant also.

Concluding Remarks

Besides, being possible to identify the economic, generational and gender profile of the participants, one of the positive results of the five forums that took place in different parts of the country, within a period of two months, was the development of a global vision in real time.

The farmers in these sessions, insistently expressed the inexistence of the rural extension support, and therefore the absence of sound technical support to farmers in their daily management decisions and/or access to funding – governmental subsidies.

The rural extension, previously implied a technician of proximity working closely with the farmer giving the technical requested. This technician guided the farmer on the best way to explore the land taking into account the social, economic and environmental factors. Government extinct these services of rural extension for over a decade and farmers were left on their own.

The technicians and farmers enjoy the debate, agreeing that these moments for debating and sharing experiences and ideas are very important, namely a farmer comment "we should have a better interaction with local technicians".

To overcome this difficulty, farmers associations and/or cooperatives of producers often hire a technician, to explore funding opportunities, to inform farmers about the existing available funding and helps them to develop projects directed at these funds. This sort of technical support often advices farmers to take up management strategies directed to changing their estates into land uses eligible for funding, making decisions that are quite often perverse to the type of exploration of the region. Measures imported directly from the EU might have been more adapted and ad-

justed to the country reality if farmers were effectively heard before they were implemented, to adequate them to the region, adapted to the local economy, the cultural values and able to preserve the environment. The standardization of these measures responding to a different reality - the Nordic models – are having perverse consequences that discourage the collaboration of many farmers already overwhelmed with measures, stating that – "The existing ones are enough!".

Our society is based on networks. Therefore, any effort to reinforce the existing ones and to build new ones is indispensable to contribute to our society's long-term resilience. The aim of a participatory process is to connect people in a genuine effective way so that these links are able to make a difference for direct intervention in the generation of public policy. Making the most of local knowledge emerging from different stakeholders, in an equitable and respectful approach to their joint work, it is possible to make this difference come true.

Acknowledgements

References

COMMISSION OF THE EUROPEAN COMMUNITIES COM(2007), GREEN PAPER on market-based instruments for environment and related policy purposes {SEC(2007) 388}, Brussels, 28.3.2007 140 final

Lynam, T., W. De Jong, D. Sheil, T. Kusumanto, and K. Evans. 2007. A review of tools for incorporating community knowledge, preferences, and values into decision making in natural resources management. Ecology and Society 12(1): 5. [online] URL: http://www.ecologyandsociety.org/vol12/iss1/art5/(download in 07.06.2017).

Cichowski, Rachel, 2006, Courts, Rights and democratic Participation, comparative Political studies, Vol 39, nº 1, Sage Publications, http//online.sagepub.com

Rowe, Gene e Frewer, Lynn, 2004, Evaluating public participation exercises: a research agenda, Science, Technology and Human Values, Vol. 29, Nº 4, pp512-556

Depoe, S., Delicath, J. e Elsenbeer, M-F, 2004, Introduction in Comunication and Public Participation in Environmental Decision Making, State University of new York Press

Gallopin, G. and Vessuri, H. (2006) Science for sustainable development: articulating knowledges. In: Guimarães Pereira, A., Guedes Vas, S. and Tognetti, S. (eds), Interfaces Between Science and Society. Sheffield: Greenleaf.

Osmani, S., 2008, Participatory Governance: An overview of issues and evidence. in Participatory governance and the Millenium Development Goals (MDGs) United Nations Department of Economic and Social Affairs (UNDESA), United Nations.

Vasconcelos, Lia, Batista, Idalina e Henriques, Teresa Rosa, 2002, Sustainability at the local level – Intellectual, Social and Political Capital Building, AESOP Conference: Planning and Regional Issues in the Border Regions, 10-15 Julho, Volos, Grécia

Bass, S., Dalal-Clayton, B. and Pretty, J., Participation in Strategies for Sustainable Development, Environmental Planning Issues No. 7, May 1995 in http://pubs.iied.org/pdfs/7754IIED.pdf

Nanz, Patrizia, Provedel, Renzo, Boutall, Trevor and Dalferth, Simon, 2009, Public participation in Europe, Na International Perspective, a report from European Institute for Public Participation, 49pp.

Blackstock, K., Kelly G. e Horsey, B., 2007, Developing and applying a framework to evaluate participatory research for sustainability, Ecological Economics, 60 (4): 726-742

When communication fails - a study of failures of global systems, in Guimarães Pereira, Â., Guedes Vaz, S. and Tognetti, S. (eds) Interfaces Between Science and Society. Greenleaf Publishers. (2006)

Muñoz-Erickson, T. A., B. Aguilar-González, and T. D. Sisk. 2007. Linking ecosystem health indicators and collaborative management: a systematic framework to evaluate ecological and social outcomes. Ecology and Society 12(2): 6. [online] URL: http://www.ecologyandsociety.org/vol12/iss2/art6/(download in 26.05.2017).

Ihobe, 2004, Agenda 21 Local - Guia para puesta en marcha de mecanismos de participation, Bilbao, Gobierno Basco

Vasconcelos, Lia, Oliveira, Rosário e Caeser, Ursula, 2009, Participação Pública no Processo de Planeamento Municipal in Governância e Participação na Gestão Territorial, Série política de Cidades-5, Editado por Direcção Geral do Ordenamento do Território e Desenvolvimento urbano (DGOTDU)

Vognimary, Marie Odette, 2005, Public Participation Applied to the Environmental Planning, Article ID, geo-Espacial Information Science, Vol 8, Issue 2,

1.4. Fruta feia: uma cooperativa portuguesa que salva "fruta feia" do lixo

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Abstract

Developing and implementing better systems that reduce wastefulness is a cornerstone of any transition to a more sustainable world. In Europe, estimates say that up to 50% of wealthy edible food is lost along the entire food supply chain. Massive waste occurs in the field and at large groceries if products fail to reach pre-defined marketing standards that include rules stablishing what products should look like (not related to health issues) in terms of size and shape and so are considered "ugly" and unsellable. Grocers argue that they have to follow strict cosmetic standards for fruit and vegetables since otherwise consumers will not buy them. The consequence is that tons of edible food are thrown away every year in the most developed countries.

However, nowadays there is a growing movement to promote and sell 'ugly' products and even large groceries are changing their practices and creating areas dedicated to the sale of out-of-size products at lower prices. In Portugal, it lead to the creation of the cooperative Fruta Feia. A young environmentalist created this cooperative in Lisbon in 2013 under the motto "Pretty People eat Ugly Fruit". The rapid growth of the cooperative moving from an idea to a successful business that has 14,000 people on the waiting list shows that many people review themselves in a more sustainable consumption model that helps to rescue 15 tons of potential food waste per week. The aim of this paper is to discuss food waste in Portugal and creative ideas to fight it, like the one proposed by Fruta Feia.

Key words: food waste, food supply chain, sustainability, Portugal

1. Introdução

> "Cada dia a natureza produz o suficiente para nossa carência. Se cada um tomasse o que lhe fosse necessário, não havia pobreza no mundo e ninguém morreria de fome". Mahatma Gandhi

Num mundo cada vez mais globalizado, o desperdício de alimentos representa um sério problema de sustentabilidade, seja pela pressão colocada sobre os ecossistemas, com o gasto inútil de recursos ambientais e económicos associados, que pode comprometer a capacidade de crescimento das gerações presentes e futuras, seja pelo facto de milhões de toneladas de alimentos serem lançadas ao lixo anualmente, num mundo onde um sexto da população mundial passa fome (FAO,2009)

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Não obstante os avanços tecnológicos e científicos, observados ao longo dos anos 60/70 do século XX, terem contribuído para ampliar de forma considerável a produção de alimentos no mundo, a insegurança alimentar voltou a crescer afetando 815 milhões de pessoas em 2016 (das quais 155 milhões são crianças), ou seja, cerca de 11% da população mundial. A insegurança alimenyat resulta não só de conflitos bélicos e das alterações climáticas, identificadas como uma das maiores ameaças à produção alimentar pelos impactos esperados no ambiente, mas também do aumento do preço e do desigual acesso aos alimentos (FAO; WTP; IFAD,2012; FAO, IFAD, UNICEF, WFP, & WHO, 2017). Na União Europeia (UE), em 2015, cerca de um quarto da população corria o risco de cair na pobreza ou de sofrer exclusão social e 42,5 milhões de pessoas não tinham meios para ter uma refeição de qualidade dois dias seguidos (Eurostat, 2017).

Paradoxalmente, segundo a Organização das Nações Unidas para a Alimentação e a Agricultura (FAO) cerca de um terço (1,3 mil milhões de toneladas por ano) de todos os géneros alimentares destinados ao consumo humano perde-se ou é desperdiçado entre o local de produção e o de consumo e na fase de consumo (que seria suficiente para alimentar 3 milhões de pessoas). A produção desses alimentos usa 30% da área de terra agrícola do mundo (1,4 mil milhões de hectares), aproximadamente um quarto de toda a água para fins agrícolas, estimando-se também que esteja na origem de 8% das emissões mundiais de gases com efeito de estufa (FAO, 2015).

Na UE estima-se que são produzidas anualmente cerca de 88 milhões de toneladas de desperdícios alimentares, ou seja, 180 kg por pessoa, com custos associados estimados em 143 mil milhões de EUR. Os setores doméstico, de restauração e de retalho, contribuem com 70% desses resíduos alimentares da UE e os setores de produção e processamento com os 30% restantes. A produção e a eliminação destes resíduos geram 170 toneladas de emissões de CO2 e utilizam 26 milhões de toneladas de recursos (FUSIONS, 2016) . Em Portugal são desperdiçadas um milhão de toneladas de alimentos por ano, cerca de 17% do que é produzido no país (Batista, et al, 2012).

A população global atual é de 7,6 mil milhões de pessoas e deve subir para 9,8 mil milhões em 2050. Irá viver maioritariamente em áreas urbanas, com a maior parte desse crescimento a ocorrer em África e na Ásia. A China tem hoje 1,4 mil milhões de habitantes e a Índia 1,3 mil milhões, prevendo-se que em 2022 a Índia ultrapasse a China como o país mais populoso do mundo. Enquanto isso, a população da Nigéria deve superar a dos Estados Unidos antes de 2050.

Por forma a satisfazer as crescentes necessidades humanas a FAO estima que o mundo necessite, até 2050, de 70% a mais de alimentos, 50% a mais de energia e 40% a mais de água. Mas também será necessário repensar o atual modo de produção e consumo de alimentos, e aumentar a eficiência do uso dos recursos naturais – prin-

cipalmente a água, a energia e a terra (Nelleman et al., 2009) – para que os sistemas agrícolas e alimentares consigam produzir mais alimentos com menos recursos (FAO 2013).

Motivos mais que suficientes para despertar para a necessidade de combatermos e reduzirmos o desperdício de alimentos.

Essas preocupações estão bem expressas na Agenda 2030 das Nações Unidas Transformar o Nosso Mundo: A Agenda 2030 para o Desenvolvimento, que propõe um novo modelo global para acabar com a pobreza, promover a prosperidade e o bem-estar de todos, proteger o ambiente e combater as alterações climáticas. Esta Agenda integra 17 Objetivos de Desenvolvimento Sustentável (ODS), entre os quais se destacam: "Acabar com a fome, alcançar a segurança alimentar, melhorar a nutrição, e promover a agricultura sustentável" (ODS 2); a necessidade de "Assegurar padrões de consumo e produção sustentáveis"(ODS 12) e " até 2030, reduzir pela metade o desperdício de alimentos per capita mundial, nos níveis de retalho e do consumidor, e reduzir as perdas de alimentos ao longo das cadeias de produção e abastecimento, incluindo as perdas pós-colheita"(ODS12.3)

No mesmo sentido, o Parlamento Europeu instou os países da UE no sentido de tomarem medidas para reduzir para metade o desperdício alimentar até 2030, solicitando que "sejam também incluídos nas normas atuais relativas à definição de resíduos, os resíduos alimentares de origem agrícola" (CE 2015).

Note-se que o consumo alimentar é o principal contribuinte do aquecimento global na Europa (31%) ultrapassando a habitação (23,6%) e os transportes (18,5%) (Tukker A et al., 2006).

Daí que, num mundo com escassez de recursos naturais (água e solos) e com crescentes preocupações ambientais, ao invés de procurar novos solos para aumentar a produção de alimentos, mais racional e mais sustentável será reduzir o desperdício de alimentos.

2. O desperdício alimentar

2.1 Quantificar o desperdício alimentar

Apesar das diferentes interpretações do significado de desperdício alimentar, de faltar ainda uma definição consensual e das diferentes metodologias utilizadas para o medir, a Organização das Nações Unidas para a Alimentação e a Agricultura(FAO) estima que cerca de um terço de todos os alimentos destinados ao consumo humano perde-se ou é desperdiçado ao longo da cadeia de abastecimento alimentar. As perdas resultam de ineficiências dos sistemas produtivo e industrial, resultado de

limitações financeiras e estruturais nas técnicas de colheita e infraestrutura de transporte e de armazenamento. Ocorrem sobretudo nos países em desenvolvimento (54%) e nas primeiras etapas da cadeia de aprovisionamento, rcom consequências para a segurança alimentar (Food security) das populações (Figura 1). Já o desperdício alimentar acontece primordialmente nos países industrializados (46%), principalmente na fase de consumo (Gustavsson et al. 2011).
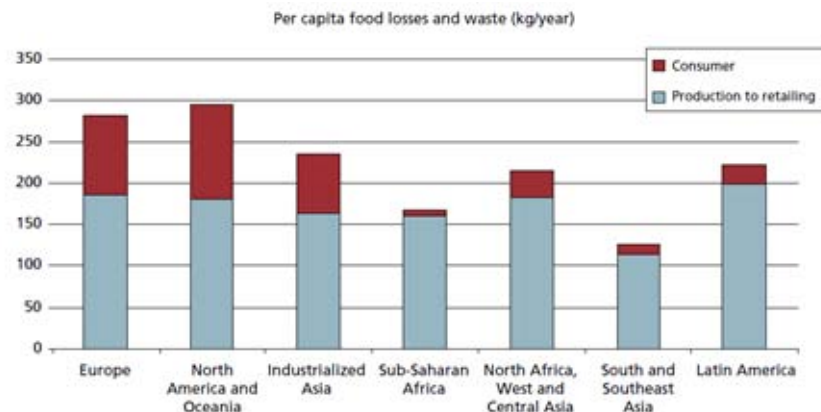

Fig. 1 Perdas alimentares e desperdício de alimentos per capita (kg/ano) na produção e consumo nas diferentes regiões do mundo (FAO,2011)

Mesmo utilizando metodologias distintas os valores obtidos para o desperdício de alimentos mostram de forma clara a dimensão do problema. A investigação de Mena et al. (2011) indica que entre 25% e 50% de toda a produção se perde ao longo da cadeia de aprovisionamento e consumo. Nos EUA de uma produção de alimentos de 22 milhões de ton em 2008, 57,1 milhões de ton (26%) eram desperdiçadas ao nível da distribuição e do consumidor final (Hodges et al, 2011). Na Austrália 3 kg de resíduos alimentares evitáveis são descartados por aluno por ano, o que significa um total de 3 milhões de peças de fruta, 1,3 milhões de alimentos embalados e 3,5 milhões de sanduíches inteiras (Boulet, M. et al, 2016)

2.2 O desperdício de frutas e legumes

As frutas e os legumes estão entre os alimentos que mais se desperdiçam. Várias razões contribuem para explicar essa situação, nomeadamente o facto de serem produtos mais perecíveis.

Durante a produção a fruta que cai das árvores, que se estraga com as intempéries, que não cresce por falta de chuva, que é atacada por insetos e que se estraga durante a colheita, ou a sobreprodução, a queda dos preços no mercado que inviabiliza a sua colheita, são algumas das razões que explicam as perdas de frutas e legumes no início da cadeia, durante ou logo após a produção.

Se no início da cadeia é difícil controlar as condições de produção e que conduzem a perdas de alimentos, no final da cadeia existem outras causas que poderiam ser evitadas, nomeadamente a preferência dos consumidores por produtos "bonitos" que conduz os grandes distribuidores a fazer uma triagem rigorosa deixando nos produtores todos os frutos e legumes que consideram não cumprem essas exigências estéticas.

Apesar de o Regulamento (EC) Nº543/2011, de 7 junho de 2011, ter sido criado com o objetivo de estabelece padrões gerais e específicos de comercialização de frutas e legumes e por isso incluir regras que estabelecem o aspeto que os produtos devem ter (não relacionado a problemas de saúde) em termos de tamanho e forma, acabou por contribuir, embora inadvertidamente, para o desperdício alimentar. Mesmo se em 2009 o número de padrões de comercialização específicos para frutas e legumes ter diminuído de trinta e seis para dez (FUSIONS, 2015) eles ainda existem e determinam que aqueles que não estiverem conformes podem ser retirados da cadeia de abastecimento alimentar, implicando um potencial desperdício apenas por não cumprirem critérios estéticos.

Certo é que se impôs uma ditadura da estética onde aparentemente o aspeto exterior é mais importante do que a qualidade e o valor nutricional. A fruta e os legumes "feios", que nasceram "tortos", fora do tamanho (demasiado pequenos ou demasiado grandes), com manchas na casca, perdem valor comercial nas grandes cadeias de distribuição e os agricultores têm dificuldade em escoá-los para o mercado (Pires, 2018).

Um estudo recente realizado no Reino Unido estima que nove por cento das culturas de morangos acabaram como resíduos em 2015, equivalentes a 10 mil toneladas de produtos em todo o setor, avaliados em 24 milhões de libras inglesas. As principais causas estavam relacionadas com requisitos de qualidade, principalmente em resultado de danos, pragas ou doenças. Para a alface, a WRAP conclui que cerca de 19% de todas as alfaces não foram colhidas em 2015, representando 38 mil toneladas perdidas no setor, com um valor estimado de 7 milhões de libras inglesas (WRAP, 2017b).

Num estudo francês, comissariado pela ADEME (Agence de l'Environnement et de la Maitrise de l'Energie), encontramos mais alguns exemplos do volume de desperdício de legumes calculado em percentagem do volume de produção, a sua pegada carbónica e o valor teórico dos produtos que foram retirados do consumo humano: para o caso das batatas, 24% de perdas (1,234 milhões de toneladas), 199 mil toneladas de CO_2e, 816 milhões de euros; e das salada, 57% de perdas (205 000 toneladas), 51 mil toneladas de CO_2e, 553 millhões de euros. (INCOME Consulting – AK2C, 2016). No caso da cadeia de abastecimento de tomate nos EUA, cerca de 415 mil toneladas foram perdidas ou desperdiçadas ao longo da cadeia, 57 mil milhões de litros de água foram usados para os produzir, bem como uma média de 7 milhões de horas de

trabalho. A eliminação dos tomates custou cerca de 12,3 milhões de euros e causou 312 mil toneladas de emissões de gases de efeito estufa (Buzby, et al., 2011).

Também as famílias dão um contributo relevante para o desperdício de frutas e legumes. Em Nova Iorque as famílias desperdiçam cerca de 1,7Kg de alimentos adequados para o consumo por semana, em parte consequência da "ditadura da estética" já que 64% dos inquiridos afirmaram preferir frutas e legumes sem manchas (Hoover, 2017). Na Noruega, dados recolhidos a partir de dois painéis de 1000 famílias cada, um no qual se questionava a quantidade de alimentos deitados fora e outro sobre os comportamentos e atitudes face ao desperdício mostram que os produtos que mais se desperdiçam são as frutas e legumes (27%), e os consumidores apontaram como razões para o descarte o facto de partes do produto estarem danificadas ou não parecerem comestíveis (37%), enquanto cerca de 22% indicaram a má qualidade ou mau aspeto (Stensgård, A. e Hanssen. O., 2016). Em Portugal o estudo PERDA também realizou um inquérito on-line às famílias e ainda entrevistas semi-estruturadas e mostrou que as frutas, os hortícolas e o pão são os alimentos que elas mais reportaram como sendo os que mais se desperdiçam (Batista el all, 2012).

2.3 Causas do desperdício alimentar

Porque e como desperdiçamos alimentos?
É reconhecido que nas sociedades modernas mais desenvolvidas parte dos problemas ambientais resultam de modos de produção e comportamentos de consumo não sustentáveis. Uma situação que se tem agravado com a adoção pelas classes médias das economias emergentes (os "BRIC" - China, Índia, Brasil e Rússia) de estilos de vida e padrões de consumo "ocidentais" (Parfitt et al.,2010).

Com a compressão do espaço-tempo na pós-modernidade (Harvey, 1996) e o avanço da globalização (alimentar), a indústria alimentar foi modificando a forma e o modo como consumimos alimentos. Novas lógicas alimentares substituíram os sistemas tradicionais de abastecimento e de consumo. Com a desterritorialização do alimento (da sua produção e consumo) e dos serviços à escala global, pudemos assistir desde -finais do século XX a um certo "desenraizamento da alimentação" (Ortiz, 1994), consequência da diversificação da oferta de produtos e da passagem da cozinha (dieta) tradicional, para uma cozinha (dieta) baseada em alimentos processados, baratos e rápidos (Pollan, 2009) que transformaram o espaço social alimentar , originando novas formas de estar e viver em comunidade (Poulain, 1999).

Por outro lado, a tecnologia permite a produção de alimentos em larga escala, fora da estação do ano e dos locais tradicionais, sendo também acessíveis em locais distantes da sua produção, rompendo totalmente com uma tradição alimentar que se orientava pela proximidade. Atualmente os alimentos que consumimos podem viajar milhares de Km (food miles), antes de chegarem ao nosso prato, com enormes

impactos climáticos decorrentes das emissões de gases de efeito estufa (GEE) associados seu ao transporte (terrestre ou marítimo) (NRDC, 2007).

Por outro lado, a contração do setor agrícola, os fenómenos da urbanização e da mobilidade, com as suas novas dinâmicas, bem como a melhoria das condições de vida da população e as alterações nas estruturas familiares, ao criarem novos estilos de vida, levaram a regimes alimentares desadequados e insustentáveis. Segundo dados da FAO e da OMS, come-se muito para além das necessidades calóricas do individuo (FAO,2008) prejudicando não só a saúde humana como a do ambiente:

> "A comida (agricultura globalizada e industrial) é o maior problema de saúde que há no mundo, e também é o maior problema para a saúde do planeta" (Vandana Shiva,2018)[1]

> "Não é possível separarmos a saúde do corpo da saúde do ambiente a partir da qual nos alimentamos ou onde nos alimentamos (..)" (Pollan, 2009:171)

Após épocas em que ocorreram situações de má nutrição no mundo, decorrente da falta de alimentos, nas sociedades industrializadas e modernas, onde o alimento é usado como símbolo de prosperidade e de melhor qualidade de vida, podemos afi¬rmar que se vive num clima de superabundância alimentar: "Nunca na história das sociedades ocidentais a população teve tanto o que comer e esteve tão livre da fome ou da escassez como agora" (Contreras, 2011).

No sociedade de consumo os estilos de vida (horários de trabalho prolongados, as novas rotinas domésticas no aprovisionamento de alimentos, a falta de tempo para cozinhar e planear as compras, comprar demasiados produtos de cada vez), o tipo de família (em termos de dimensão, rendimento, composição, demografia e cultura), a "ditadura da estética" ou a regulação de segurança e qualidade dos produtos alimentares são algumas das razões que explicam a passagem de "alimento" para "desperdício" (Wenlock et al 1980, Lyndhurst 2007, Parfitt et al., 2010 Evans 2011 e 2012, WRAP, 2011).

Em suma, motivos mais que suficientes que nos devem levar a refletir e a questionar o atual modelo de produção e consumo e a necessidade de adotar comportamentos alimentares mais responsáveis e escolhas de consumo mais conscientes.

3. A cooperativa "Fruta Feia": Um caso de empreendedorismo social no combate ao desperdício alimentar em Portugal

A atividade do empreendedor social é revestida de significados. Trata-se de um agente que se ajusta ao novo espírito do capitalismo (Boltanski and Chiapello, 2009), ao incorporar o papel social (Dahrendorf, 2012) de transformador dos cenários de crise, e simultaneamente configurar uma resposta a uma lacuna do sistema capitalista.

A cooperativa de consumo Fruta Feia, cujo lema é "Gente bonita come fruta feia", criada em Portugal em 2013, é um exemplo de um projeto de empreendedorismo social e sustentável, criado por uma jovem ambientalista que ao explorar uma ineficiência de mercado, procura "perturbar o status quo e transformar o mundo" (alterar padrões de consumo), ou seja, trabalha a para a mudança social.

Na origem da Fruta Feia está a perplexidade da sua gestora Isabel Soares em relação ao facto de toneladas de frutas e legumes acabarem no lixo por, aparentemente, não terem as condições adequadas para a sua comercialização por serem irregulares na forma e tamanho ou por terem manchas ou pequenos defeitos que as tornam esteticamente menos apelativas para o consumidor. Contudo, não estava em causa a sua qualidade nutritiva s pelo que parecia paradoxal e ineficiente do ponto de vista económico e ambiental estar a deitá-las para o lixo. A cooperativa surgiu assim da ideia de dar uma nova oportunidade aos legumes e frutas que os produtores não conseguiam colocar nos circuitos de comercialização tradicionais.

Um modelo inovador e sustentável que combate o desperdício de fruta e legumes ocorrido nos campos, recolocando no mercado produtos que, por meras razões estéticas ou de calibre, foram rejeitados pelo circuito comercial e iriam terminar no lixo. Trata-se de um modelo de consumo alternativo. Para além de economizar os recursos associados à produção desses alimentos (água, terras cultiváveis, energia e tempo de trabalho), gera valor para os agricultores e para os consumidores. Os produtores têm oportunidade de escoar produtos que, apenas por razões de aparência e tamanho, foram rejeitados pelos distribuidores. Por seu lado, os consumidores (que não julgam a qualidade pela aparência), podem comprar produtos da sua região, a um preço mais baixo. Como refere Isabel Soares:

> "Se no início era uma ideia, uma vontade, havia um risco associado, não sabíamos se a coisa ia resultar. Salvar em quatro anos e meio, mais de mil toneladas de hortícolas (15 toneladas por semana) , que teriam como destino o lixo pela sua aparência , ter 162 agricultores como parceiros, chegar aos 11 trabalhadores, ter 11 pontos de entrega e 4600 associados (com 14 000 em lista de espera), significa que não somos só uma ideia, é mesmo um modelo que funciona, uma proposta de consumo em que muita gente se revê e que tem provado a sua sustentabilidade tanto social, como ambiental, pois seguimos uma política de consumo de proximidade (não nos deslocamos a mais de 70 km dos pontos de entrega) e financeira, dado que o dinheiro das receitas serve para pagar os custos de funcionamento, um valor justo aos agricultores pelos seus produtos e um salário justo aos trabalhadores (excerto de entrevista dada por Isabel Soares em Dezembro de 2017)

A opção por criar uma cooperativa em lugar de uma empresa que vende produtos mais baratos aos consumidores decorreu da assunção de que no primeiro caso existiria um compromisso maior por parte dos associados do que se fossem meros consumidores. Os associados pagam um valor de subscrição e comprometem-se

a levantar o seu cabaz (a não ser que com 5 dias de antecedência cancelem a sua encomenda) todas as semanas. A responsabilização dos associados é essencial para reduzir o desperdício de alimentos decorrente de cabazes encomendados, mas não levantados e, aos mesmo tempo, garantir a compra regular de produtos aos produtores. Existem assim dois tipos de beneficiários – os associados (os consumidores que compram semanalmente os cabazes) e os produtores (os agricultores que fornecem as futas e os legumes com os quais se compõem os cabazes).

Os associados pagam uma quota anual de 5€, e comprometem-se a adquirir uma de duas cestas que variam no tamanho: a pequena, com um custo de 3,5€, de 3 a 4Kg e 7 variedades de produtos; e a grande com um custo de 7€, de 6 a 8Kg e 8 variedades de produtos (Informação da empresa). Os cabazes são compostos por produtos da época e da região, que variam semana a semana conforme a altura do ano. As vantagens económicas são evidentes já que, segundo informação da empresa, as cestas são vendidas com redução de 50% face ao seu valor de mercado.

A opção por este modelo parece ter criado uma situação na qual todos saem a ganhar – os produtores, os associados, o ambiente e a empresa. Ao mesmo tempo, tem tido um papel importante na sensibilização da sociedade civil para a problemática do desperdício alimentar, objetivo que está inscrito nos seus estatutos.

As vantagens para os produtores são obvias. Em média cada produtor obtém 874€ de receita anual pela venda das frutas e legumes "feios" à cooperativa. Mas a sua perceção dos ganhos é mais vasta: "Dos 20 agricultores inquiridos, 71% afirma que a maior vantagem em ser parceiro da cooperativa é conseguir escoar e vender os fruto-hortícolas que não conseguem colocar no mercado. Em relação ao que representa a receita extra, 65% refere que conseguem pagar despesas tais como, a plantação, seguro de um trabalhador, combustível, enquanto cerca de 25% refere que chega a conseguir pagar o salário de um funcionário" (Mira, 2015: 72).

Uma outra vantagem referida pelos produtores foi o facto de quando vendem os seus produtos à Fruta feia recebem de imediato, ao contrário do que acontece quando os vendem às grandes superfícies pois têm que esperar bastante tempo até serem pagos (Ribeiro et al, 2018).

No âmbito do projeto FLAW4LIFE - Spreading ugLy Fruit Against food Waste[2] foi possível contabilizar também os benefícios ambientais. Assim, no terceiro ano de atividade a empresa contabiliza uma redução 14,6 ton de desperdício de frutas e legumes por semana, com consequentes ganhos em termos económicos e também ambientais pela redução das emissões de GEEs associadas de 13.021 ton de CO_2 (Tabela 1).

Tabela 1 – Redução do Impacto Ambiental Decorrente da Atividade da Cooperativa Fruta Feia

	Projeto piloto (Set 2015)	Primeiro ano (Set 2016)	Segundo ano (Set 2017)	Terceiro ano (Set 2018)
Redução de desperdício (ton/semana)	3,3	6,5	9,9	14,6
Redução de emissões GEEs (kg CO2 eq/semana)	2.897	5.794	8.847	13.021
Eficiência de recursos - água (m3/semana)	3.572	7.144	10.908	16.054
Eficiência de recursos - energia (KWh/semana)	4.667	9.333	14.215	20.975
Eficiência de recursos - solo (ha)	3	6	10	16

Fonte: Projeto Flaw4Life http://www.flaw4life.com/pt/resultados

Mira (2015) fez um exercício de cálculo de todos os benefícios referentes ao primeiro ano de atividade da cooperativa Fruta Feia, por delegação, usando a metodologia SROI (Social Return on Investment), e concluiu que "a cooperativa gera 1,63€ de valor social, por cada 1 euro investido. O impacto social (Total Present Value) nos stakeholders da cooperativa é estimado em 107 594,00€. Se a este valor retirarmos o investimento (Present Value), obtemos um impacto social de 41 490,80€/ano." (Mira, 2015: 76-77).

Assim, para além dos benefícios económicos e ambientais existem claramente também benefício sociais. Por isso a Fruta Feia é apontada como um exemplo de um modelo de negócio híbrido combinando sustentabilidade financeira com impacto social e ambiental (Dias, 2018).

O sucesso do modelo de negócio baseado nos baixos custos de funcionamento e a recetividade dos consumidores incentivou à sua replicação para outras partes do País (Figura 2). Em 2018 contava já com 11 pontos de entrega dos cabazes em Lisboa, Almada e quatro no norte do país em Braga, Gaia, Porto e Matosinhos, 191 produtores e 5204 consumidores (informação da empresa). A replicação é fundamental para assegurar a viabilidade económica do projeto já que tanto os indicadores ambientais, como os sociais e os económicos melhoram com o aumento do número de postos de distribuição e com a ampliação da rede (Ribeiro et al, 2018).

Fonte: Projeto Flaw4Life http://www.flaw4life.com/pt/resultados
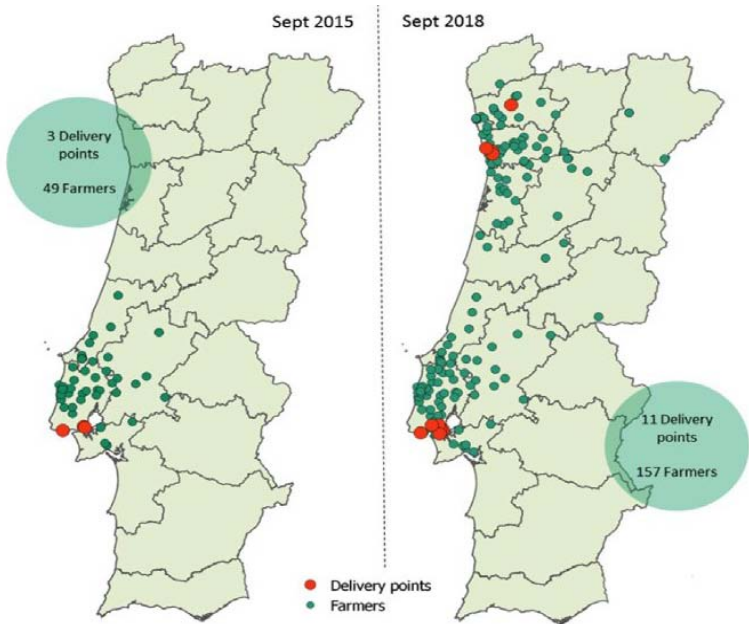
Figura 2- Replicação do Modelo

Tendo em conta que a lista de espera para inscrição na cooperativa para aquisição dos cabazes não tem parado de crescer é expectável a replicação deste modelo de negócio para outras localidades. Por outro lado, as grandes superfícies já entraram neste nicho de mercado e disponibilizam aos seus clientes áreas específicas onde sem podem encontrar as frutas e legumes feios com redução de preço. Resta saber que impacto terá a entrada das grandes superfícies neste negócio.

Considerações finais

O desperdício de alimentos tem-se tornado uma questão cada vez mais importante ao nível local e global. As emissões de GEE resultantes e o seu contributo para acelerar as alterações climáticas, o esgotamento dos recursos naturais e a poluição dos solos e da água pelo uso de agroquímicos, são os mais importantes impactos associados à produção de alimentos. Não faz assim sentido que toneladas destes produtos acabem no lixo sem serem consumidos.

As perdas e o desperdício de alimentos representam um importante retrato da ineficiência dos nossos sistemas alimentares. Considerando as implicações ambientais, económicas e sociais de desperdício alimentar, o primeiro passo para uma resolução

mais sustentável passará por adotar uma produção e consumo sustentáveis, usando os alimentos de forma mais eficiente e encontrar soluções para o desperdício de alimentos em toda a cadeia de fornecimento.

O nosso modelo atual de produção e consumo deve ser readaptado, a fim de minimizar as pressões exercidas a nível dos recursos (não renováveis) da Terra. Reduzir o desperdício alimentar terá que ser um compromisso de todos, o que exigirá uma reconsideração abrangente da forma como produzimos, comercializamos e consumimos alimentos.

Deitar fora alimentos saudáveis e em condições comestíveis, além de ser imoral e injusto, tem impactos ao nível social, sanitário, ambiental e económico (o custo relacionado com o valor dos produtos em si, mas também os custos incorridos com a produção, o transporte e o armazenamento dos produtos desperdiçados, bem com o respetivo tratamento) pelo que, não nos pode deixar de inquietar. Nesse sentido a hierarquia de resíduos alimentares ao considerar as três dimensões de sustentabilidade (ambiental, económica e social), oferece uma abordagem holística e mais sustentável para a questão dos resíduos alimentares, e onde a ênfase é colocada na prevenção, uma vez que é mais benéfico evitar o desperdício do que ter de o combater posteriormente.

Nesse sentido valoriza-se o esforço do empreendedor social que ao procurar soluções para os mais variados problemas sociais e ambientais, se apresenta como um agente ativo e transformador dos valores e dos comportamentos da sociedade, como referido na análise à cooperativa Fruta Feia.

Notes:

[1]http://www.ihu.unisinos.br/78-noticias/578380-a-comida-e-o-maior-problema-de-saude-que-ha-no-mundo-entrevista-com-vandana-shiva

[2]tp://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=5236

Referências

Batista, P., Campos, I., Pires, I., Vaz, S. (2012). Do Campo ao Garfo: Desperdício Alimentar em Portugal. Lisboa: Cestras.

Bloom J. (2010). American Wasteland: how America throws away nearly half of its food (and what we can do about it). Da Capo Lifelong Books.

Boltanski, L.; Chiapello, E. (2009). O novo espírito do capitalismo. São Paulo: Martins Fontes.

Boulet, M. (et al) (2016). Tackling Avoidable Food Waste in Western Australian Schools.

Buzby, J.; Hyman, J.; Stewart, H.; Wells, H. (2011). The Value of Retail and Consumer-Level Fruit and Vegetable Losses in the United States. The Journal of Consumer Affairs, pp.492–515, ISSN 0022-0078.

CE, COMISSÃO EUROPEIA. (2015). "Closing the loop - An EU action plan for the Circular Economy". 2015. Disponível em https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52015DC0614

Contreras, J. (2011). A modernidade alimentar: entre a superabundância e a insegurança. Curitiba: Edição de UFPR.

Dahrendorf, R. (2012). Homo sociologicus. Lisboa: Quetzal.

Dias, M. (2018). Creating a hybrid business model to generate economic and ecological value: The case of Fruta Feia Consumer Cooperative. MSc Dissertation in Business. Lisboa: Universidade Católica Portuguesa.

EUROSTAT. "Estatísticas da distribuição do rendimento". 2017. Disponível em: <http://ec.europa.eu/eurostat/statistics-   explained/index.php/Income_distribution_ statistics / pt>. Acesso em: 15 abr. 2017.

Evans, D. (2011). Blaming the consumer – once again: the social and material contexts of everyday food waste practices in some English households. Critical Public Health, 21: 429-440.

Evans, D. (2012). Beyond the throwaway society: ordinary domestic practice and a sociological approach to household food waste. Sociology, v. 46 (1): 41–46.

FAO (2013) Food Wastage Footprint. Impacts on Natural Resources. Rome.

FAO (2015a). The State of Food Insecurity in the World. Rome.

FAO (2015b). Technical Platform on the Measurement and Reduction of Food Loss and Waste. Rome.

FAO, IFAD, UNICEF, WFP and WHO (2017). The State of Food Security and Nutrition in the World 2017. Building resilience for peace and food security. Rome.

FUSIONS, (2016). Estimates of European food waste levels. Reducing food waste through social innovation. Disponível em: https://www.eu-fusions.org/phocadownload/Publications/Estimates%20of%20European%20food%20waste%20levels.pdf

Gustavsson, J., Cederberg, C., Sonesson, U., Van Otterdijk, R., & Meybeck, A. (2011). Perdas globais dos alimentos e resíduos de alimentos. Roma, Itália: Food and Agriculture Organization, United Nations.

Harvey, D. (2006). Condição pós-moderna: uma pesquisa sobre as origens da mudança cultural. 15. ed. Tradução de Adail Ubirajara Sobral e Maria Stela Gonçalves. Rio de Janeiro: Edições Loyola.

Hodges R.J.; Buzby J.C.; Bennett B. (2011). Postharvest losses and waste in developed and less developed countries: opportunities to improve resource use. Journal of Agricultural Science, 149:37-45.

Hoover, D. (2017). Estimating Quantities and Types of Food Waste at the City Level. Natural Resources Defense Council (NRDC) and the Rockefeller Foundation.

INCOME Consulting – AK2C (2016). Pertes et gaspillages alimentaires: l'état des lieux et leur gestion par étapes de la chaîne alimentaire. ADEME (Agence de l'Environnement et de la Maitrise de l'Energie). Disponível em: www.ademe.fr,/mediatheque

Lyndhurst, B. (2007). Food behavior consumer research – findings from a quantitative survey. Briefing paper. UK: WRAP

Mira, R. P. (2015). A avaliação dos impactos sociais através da metodologia SROI- Estudo de caso: Cooperativa Fruta Feia. Dissertação de mestrado em Gestão. Lisboa: Instituto Superior de Gestão.

Mena C.; Adenso-Diaz B.; Yurt O. (2011). The causes of food waste in the supplier-retailer interface: Evidences from the UK and Spain. Resources, Conservation and Recycling (55): 648-658.

Natural Resources Defense Council (NRDFC) (2007). Food miles: How far your food travels has serious consequences for your health and the climate. www.nrdc.org/policy

Nellemann, C. M. M., T. Manders, B. Eickhout, B. Svihus, A. G. Prins and B. P. Kaltenborn (2009). The Environmental Food Crisis. UNEP.

Ortiz, R. (1994). Mundialização e cultura. São Paulo: Edição de Brasiliense.2. ed.

Parfitt, J., Barthel, M. & Macnaughton, S. (2010). Food waste within food supply chains: quantification and potential for change to 2050. Phil. Trans. R. Soc. (365): 3065-3081.

Pires, I. (2018). Desperdício Alimentar. Série Ensaios, nº86. Lisboa: Fundação Francisco Manuel dos Santos. Depósito Legal nº444169/18

Pollan, M. (2010). Em Defesa da Comida, Manifesto de um consumidor. Lisboa: Dom Quixote Poulain J-P. (1999). L'espace social alimentaire. Cahiers de Nutrition et de Diététique, 34(5):271-80.

Ribeiro, I.; Sobral, P.; Peças, P.; Henriques, E. (2018). A sustainable business model to fight food waste. Journal of Cleaner Production (177):262 -275.

Tukker, A., Huppes, G., Guinée, J., Heijungs, R., de Koning, A., Van Oers, L., et al. (2006). Environmental impact of products (EIPRO); analysis of the life cycle environmental impacts related to the final consumption of the EU-25. European Commission, DG JRC, Institute for Prospective Technological Studies, Technical report EUR 22284 EN. http://ec.europa.eu/environment/ipp/pdf/eipro_report.pdf.

Wenlock R.; Buss B.; Derry D.; Dixon E.J. (1980). Household food wastage in Britain. British Journal of Nutrition.

WRAP (2011). New estimates for household food and drink waste in the UK, Material Change for a Better Environment. Written by: Tom Quested and Andrew Parry. Banbury, UK: WRAP

WRAP (2017). Food waste in primary production – a preliminary study on strawberries and lettuce. Prepared by 3Keel LLP and University of Warwick.

2. Human-Nature and Human-Animal Relations

2.1 The Contemplation of Nature: An Integrated Approach for Resilient Thinking

Ajay Rastogi & Tanya Kim Grassley

Abstract

There are few scholars who will disagree that we are living in a highly fragmented world. The call for action for sustainability requires immediate integration on a global scale. One of the root causes for loss and damage of the environment, as well as rising social inequity in our global society, is that consumerism has become synonymous with the pursuit of happiness.
In addition, current notions of progress leads to the growth of megacities, resulting in more people living in densely packed urban areas, with a lack of connection to the natural world. In addition, our global culture defines individuals' success with access to material goods and experiences connected to the consumer lifestyle.

The Contemplation of Nature offers an integrated approach for increasing critical awareness connected to Sustainability and Resilience. Self-awareness, empathy and compassion is enhanced through the experience of 3 principles of Resilience (Dignity of Physical work, Interdependence and Interconnectivity). Internal motivation to live sustainably can be enhanced through the regular practice of a simple 3 step mindfulness meditation technique that connects with nature. The overall aim, as well as finding inner balance, is to align everyday behaviour with values, by connecting more deeply with the natural world.

This paper also elaborates on how an expanding our notions of value and view of self through Resilient Thinking can encourage an appreciation of a simpler, richer and more sustainable way of life.

1. Introduction

On increased fragmentation: The deterioration in the natural environment is a common concern for the whole humanity across nationality, race, caste, creed, gender, age, religion, faith and other manmade boundaries. Fragmentation is visible everywhere we look; we are being held back by the narrow confines we define for ourselves and this is a universal issue and a global cause of concern. We live in divisive times. From notions of self to family, family to community, communities within communities, communities to societies, and notions of nation states and nations within and across nations; fragmentation is rife.

Collectively polarised: Ironically, with the advent of a Networked Society, the world is becoming increasingly polarised and unable to understand and respond to complex issues such as climate change with clarity. The mass of information caused a cut-off, where people become increasingly withdrawn, and also have difficulty managing our own stress-levels and emotions as well as relationships at home or at work. Our feelings towards our fellow neighbours and citizens seems irrelevant, and our shared concerns about something as fundamental as our natural environment are hard to grasp.

Leadership and Legislation: Fragmentation exists despite the fact that education standards have risen globally, that science and technology has progressed, and there are more laws governing ethical conduct at home and in society. At the same time there are more international regulations than ever before. Almost all of these endeavours are aimed to improve Quality of Life, but the maze of legislation sometimes lacks consistency, depth and a larger purpose. The legislation itself is fragmented. Companies in particular are often not held accountable across national borders, and so the legislation that does exist is not being consistently implemented. On a broader level, much of the legislation and standards do not have a wide enough definition of impact. Even if there is a will to change, the response that is needed to face current global challenges far exceed the processes and structures designed for the industrial age. We need a new type of leadership embedded with a Resilient Mindset, to move beyond current definitions of sustainability into a new paradigm.

Quality of life: The discourse on the 'Quality of Life' is again highly divided- and how that quality of life can be brought to the diverse populations of the world. There is a general assumption that growth and access to infrastructure, with all its amenities, is a reflection of a quality life and thus leads to happiness. Economic growth to facilitate access to a broad range of experiences and purchasing power is considered desirable and an indicator of success. Freedom is synonymous with freedom to buy things and to buy into a certain type of lifestyle, as expressed by brands.

Growing concerns: There is a growing concern that current forms of consumerism extracts too much from the planet, our common pool of natural resources, and exists at the expense of our global neighbours, who are invited to participate in global society as low paid workers or manufacturers of goods, rather than consumers or producers of 'culture'. Some of the negative side effects of global consumerism are very localised such as pollution or poverty and erosion of community, while others
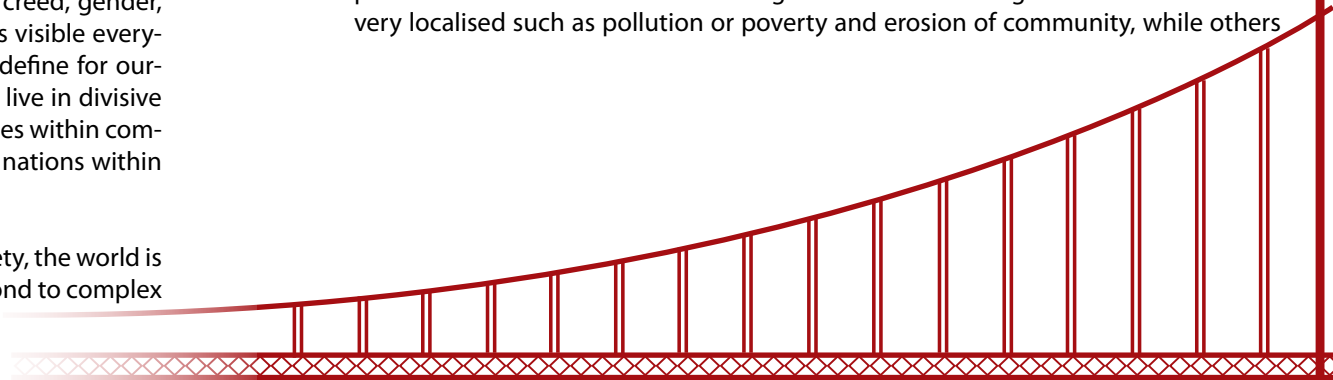
are global, such as the climate change. Regardless of the causes, it is undeniable that large populations are highly vulnerable, especially those along the coastlines and in mountains and other fragile environments.

Green washing guilt: With a rising consciousness about climate change, environmental destruction, fair trade and animal welfare to mention but a few global challenges; there is an increasing demand for green products and services. Most analysis, however, points out that 'greening' the economy could only help peripherally. The widening gulf between the cumulative impact of these minor changes and the scale of the challenge we confront is openly acknowledged. (Crompton, 2008) What we need, therefore, is a fundamental shift in the way we 'think and do' sustainability; how we define what sustainability is and what policies and lifestyle behaviours would be conducive to radically increase short-term positive impact to tackle the environmental crisis in a meaningful way. The core issues of nature conservation call for a change in human behaviour in the way we treat our environment.

Life is carbon: Overconsumption, green or otherwise is a root cause of many societal problems from ill health to climate change. Everything we do demands some sort of energy consumption, and some sort of use of resources. To a large extent it has been recognised and a large part of the current debate hovers around what is considered basic and necessary consumption and what is considered additional consumption for comfort and luxury. Design Thinking in the last decades has been centred around how to define human needs, as well as who should pay for the environmental costs, and how the ecosystem of services should be valued. All our endless streams of international meetings, seminars and conferences on the environment also add to mankind's carbon footprint and indirect damage to the environment.

1.1.　　A resilient mindset

In an effort to look at the other 'not just intellectual' ways to save our environment and change our mindset, we can look towards the past; to how traditional societies managed to maintain harmony with the natural world.

Working closely with the villagers of Majkhali, The Foundation for the Contemplation of Nature hosts immersion courses with the aim of increasing authentic leadership skills and critical thinking. The courses are run out of the village homestays to offer hands-on experiential learning with a resilient, sustenance community. Visitors see how a low-impact, organic and vegetarian community works, from how the waste and water is managed to how value, such as growing vegetables, making crafts, or preparing food, is created together, as an enjoyable past-time.

In 2015, global leaders from 194 United Nations member states agreed on the Sustainable Development Goals — a set of milestones and a road map for eradicating

poverty and hunger and tackling climate change by 2030. A central message emerging from this agenda was the need for building resilience.

Many organisations are struggling to understand the vast array of issues that are coming their way: Climate change, poverty, resource depletion, peak oil – not only does the list seem to be growing, but the items on it seem to get more complex and urgent. These organisations need to a new type of leadership and organisational structure equipped with the skills to tackle such issues head on. For the Foundation, this begins with enabling individuals to shift to a Resilient Mindset; a deeper understanding of sustainability with new softer skills needed to replace the traditional skillsets of the industrial age. Competitiveness will be replaced with collaboration and co-creation, talking with listening, ambition with empathy.

Traditional life is a dynamic spectrum that gently evolves and changes over changing geographies and landscapes. But it is a story that is continuous and connects us all, refusing to be contained by national boundaries. The integrated principles of resilience as practiced in the sustenance communities such as the village of Majkhali can be used in organisations. Resilient Thinking enables a new vision of sustainability that considers the impact of all activities in an integrated way to result in genuinely sustainable outcomes and avoid 'trade-offs.'

1.2.　　Stewardship as a concept of self

One of the first steps in shifting to a Resilient Mindset is how we view ourselves and our place in the world as individuals. In the face of emergency, environmental issues have often taken a 'back seat' to some of the mega issues our human society has been faced with. Some of these issues, however, may be interrelated at a deeper level. Rapidly declining communities and sense of community, loss of empathy, increasing stress, an overwhelming amount of information - all these lead to individuals feeling powerless and unable to do anything to help or change the world. In addition, most of our jobs and economies are embedded in the industrial model, perpetuating the supply chain of commodities while advertising perpetuates consumption. Whilst being cut off from its effects, most of us still earn a living in an outdated system that one person alone cannot change.

In the case of environment, the circle of 'otherness' is more inclusive. As everything is connected, the 'other' includes the non-human world as well as our common habitat. Environment is much more than the resources that mankind needs to survive, but the environment's fate is now in the hands of human beings. The state of emergency is here. Environment is on the front line of global challenges. The notion of 'stewardship' to describe the role of Homo sapiens species brings the environment back to the forefront of care.

To see oneself as a steward is already a huge shift in mindset. Suddenly we can see the possibilities for protecting the environment in our everyday lives in the actions we make daily, in and out of our homes and workplaces. We can exercise our responsibility with our wallets too- refusing to buy a never-ending pile of stuff. Increasingly, more and more people are interested in what they can do in their own lives, and this is illustrated in the growth of new online communities, connected across social media by hashtags; #zerowaste or #quitplastic being prime examples.

As stewards of our immediate environments we start to think about where our waste goes and the impact on our consumption patterns on the world. The sense of individual encompasses a much more fundamental and primary biological being, that has a natural place in the world. It is clear that consumer society has, by and large, taught us to separate ourselves from this notion of connectedness and live fragmented lives with little integrity between our thoughts and actions. On one hand we are expected to express our values, while on the other, the only acknowledged expression of those values is through what we consume, i.e. we are only acknowledged as consumers.

Stewardship addresses the fact that we are losing our connection with the natural world very rapidly. The primary domain of our work and life culture in the modern times is shifting further away in terms of physical distance but also in terms of our emotional and intellectual engagement with nature. Our language is embedded with consumerism- the default mode is 'non-organic.' Alongside this, technology is driving a new kind of 'self-sufficiency' revolution that has create a fake abundance, where we can order almost anything one imagines to our door step via Internet. The need for interaction or communal activities is reduced to a minimum. Most effort is targeted towards increasing the desire for 'purchasing power' whilst to oppose these mechanisms and make the 'right choice' day in and out seems to weigh heavily on the individual's time and energy.

Going with the consumer society flow means continuously damaging the environment and cutting off our emotions from the horrors of reality. The more we cut off, the more our emotional intelligence is underdeveloped. We get the social 'fix' we need by going online. We get self-esteem from the clothes we wear. Experiences from television, internet etc. are cognitively experienced as 'real' by the brain. Our emotions are influenced and that in turn continues to influence our everyday behaviour, as the emotions are the key influencers of action. (Frijda et al. 2000).

Emotions also influence our deeply held beliefs. The problem of poor emotional balance is being further aggravated by the disconnect with nature: external natural surroundings as well as internal human nature of reflection and contemplation, as Mayer et al. (2009) observed in their seminal work on Role of Connectedness to Nature:

> "Environmentalists (e.g., Berry, 1997; Leopold, 1949; Orr, 1994) and nature writers (e.g., Louv, 2005; Muir, 1894; Thoreau, 1854) have long maintained that humans derive physical and psychological benefits from spending time in the natural world. The past two decades of research in environmental psychology have supported this contention. Using a variety of methodologies and measures, researchers have shown that exposure to the natural world decreases negative behaviours and states (e.g., aggression, anxiety, depression, illness) and increases positive ones (e.g., affect, health, cognitive capacity). The big picture is clear: Exposure to nature leads to many desirable outcomes." (See the Health Council of the Netherlands and Dutch Council for Research on Spatial Planning, 2004; van den Berg, 2005; Frumkin, 2001).

Fredrickson et al., (2008) has reviewed recent research in the field of psychology to show how subtle emotions create a transforming impact on oneself.

> "A paradox surrounds positive emotions. On one hand, they are fleeting: Like any emotional state, feelings of joy, gratitude, interest, and contentment typically last only a matter of minutes. Moreover, positive emotions are less intense and less attention grabbing than negative emotions (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001) and are more diffuse (Ellsworth & Smith, 1988). Yet on the other hand, research indicates that positive emotions contribute to important downstream life outcomes, including friendship development (Waugh & Fredrickson, 2006), marital satisfaction (Harker & Keltner, 2001), higher incomes (Diener, Nickerson, Lucus, & Sandvik, 2002), and better physical health (Doyle, Gentile, & Cohen, 2006; Richman et al., 2005). People who experience frequent positive emotions have even been shown to live longer (Danner, Snowdon, & Friesen, 2001; Moskowitz,2003; Ostir, Markides, Black, & Goodwin, 2000). Indeed, a recent meta-analysis of nearly 300 findings concluded that positive emotions produce success and health as much as they reflect these good outcomes." (Lyubomirsky, King, & Diener, 2005)

So, in a way it does not sound so far-fetched to maintain that compassion, self-integrity and care can make a significant contribution in dealing with some of the world's major problems. An attitude of profiteering and perpetual growth results in environmental destruction, but also emotional and physical violence, drugs, corruption and socially unjust exploitation of other human beings. A mainstream shift in mindset could potentially reduce many of these human-made challenges.

Many societies and communities are recognising this and some of the nations have started to work on 'Gross Domestic Happiness' instead of 'Gross Domestic Product.' Gross National Happiness is a philosophy that guides the government of Bhutan and

has gained traction in Nordic countries and Finland in particular, in recognition that technology and material goods have their limits when it comes to making people happy, and that by reframing happiness, society can also address the constraints of environmental resources. This approach, however, can neither offer a sole solution nor an easy one. There is an urgent need to initiate work on developing tools and techniques to integrate improved connection with external and internal nature to complement the existing efforts of saving the environment and the humanity.

1.3. Tools for acquiring resilient thinking

The mindful contemplation of nature works on two core aspects; One is to try and deepen the contact with natural surroundings; and the second is to have opportunities for positive emotions to flourish. The two cannot be separated, because the premise is that when subtle, pleasurable and positive emotions are experienced in contact with nature, a caring connection for nature is cultivated, and this mindset in turn influences action.
There are three plausible ways how we learn and all these need to be engaged to result in a shift in mindset: cognitive, experiential and contemplative.

The cognitive way: This is the dominant method that is employed to develop and transmit knowledge. Cognitive-based learning includes familiar methods of reading, writing or listening to various texts, and understanding the issues contained in those texts. There is a phenomenal body of knowledge developed in the field of Environmental Studies, and Environmental Education is taught from the earliest school age, through to colleges to universities. Today, there is no shortage of environmental information on any sphere of human activity. There is a flood of literature, films, television programmes and events addressing environmental concerns. All these, however, are communicating cognitively, and more often than not lack the ability to put us on the path of hard action. Environmental studies can be a purely intellectual pursuit.

The experiential way: Another way is to learn through active experience; learning by doing. It could be guided experience or experiential. Experiential learning benefits from a prior theoretical or cognitive understanding of the subject. Many areas of education encompass both approaches. Experiential learning in Environmental Educational started early on in the form of field studies and experiments, for example, to the theory taught in the classroom.

Even in our consumer society, experiences are being increasingly valued over possession of material wealth. The increasing popularity of nature tourism, for example, indicates that people like to go and have a direct experience of nature. Although the emotive component in experiential learning is much higher and offers memorable moments of nature, the affect doesn't seem to last very long after the experience.

It may help cultivate feelings for the particular place or person the experience was shared with rather than increase feelings of connection with nature. Often, nature-based vacations turn out to be just another kind of consumptive entertainment and form of lifestyle expression.

The contemplative way: Contemplative methods are about being fully present in the process of learning and teaching. Mindfulness is not thinking, interpreting, or evaluating. It is merely the act of observing or an awareness of perception. Any activity can be done with mindfulness: Reading, writing, teaching, eating, listening, or even shopping or playing sports. Mindfulness practice helps students to uncover and develop the full range of capacities they possess (Bush, 2008).

> "Mindful learning has three characteristics: the continuous creation of new categories, openness to new information and an implicit awareness of more than one perspective." (Anonymous, 2008)

Students who learn mindfulness through contemplative practices in the classroom have the opportunity to approach the subject matter they learn in an expanded way.

> "More specifically, contemplative methods aim at: the cultivation of attention and emotional balance; and the development of faculties required for insight and creativity. Contemplative pedagogy sees itself as transformative." (Zajonc, 2008).

The social and emotional learning method. Contemplation of Nature encompasses both social and emotional learning methods and can be a catalyst for transformation towards a Resilient Mindset and the view of self as a steward of nature. Contemplation of Nature helps increase and internalise an awareness of the natural environment, thus affecting more of the decisions we make in our everyday lives. It appears that the contemplative approach is more suited for making a deeper inner impact which can sustain much longer than other known methods of learning. A holistic approach combining cognitive and experiential learning in combination with contemplation could increase self-motivation. Mindfulness in education programmes have already seen great success. There are various techniques being developed in contemplative environmental studies, and the Contemplation of Nature that has been developed at the Foundation for the Contemplation of Nature, (Rastogi, 2007) is one of many.
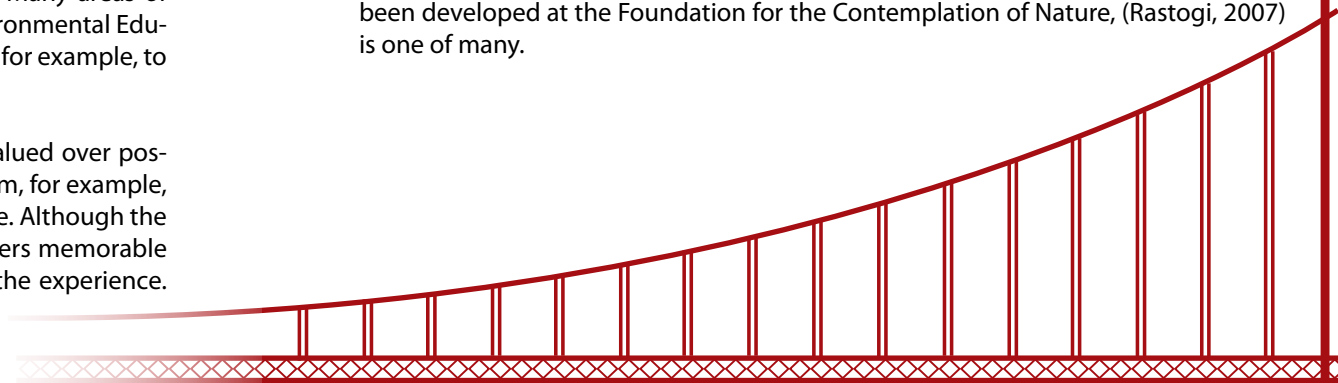
2.1 Overview of 'contemplation of nature' - a holsitic approach

The Contemplation of Nature is a nature-based meditative practice done in addition to acquiring principles and concepts of resilience. The Contemplation of Nature is an accessible meditative practice, aimed to cultivate mindfulness, inner silence and a deep connection with oneself and one's natural surroundings. It is a purely secular practice that doesn't require any dress code, postures or recitations. Although it stems from a combination of western and eastern philosophical traditions, The Contemplation of Nature, as a type of mindfulness practice, is duly supported by current scientific research and references.

2.2 Nature-based mindfulness

The mindfulness practice involves three simple steps: Soft gaze, Gentle Detachment, and Sympathetic Attention.

Soft Gaze: One chooses a view to observe and focus the mind on something; it could be a landscape, a body of water, a field, garden or a hedge. If there is no access to outdoor nature, the subject can choose to focus on a plant, flower, leaves of a tree, or even a pebble or sea shell. A comfortable place that is free of loud noises or foul smells or other sensory intrusions is desirable. Any sitting pose is fine, so long as the subject is comfortable and relaxed and not likely to fall asleep.

Gently focus the attention on the view or object. Keep a soft gaze and do not strain the eyes, because the ideal length for a session is around 30 minutes. Allow natural blinking of the eyes or even closing the eyes when needed. It is very normal that thoughts start to rush in as soon as the eyes are closed. If that happens, simply open the eyes again and remind yourself that you are contemplating nature. Do not try to fight the flow of thoughts, just observe them and let them go. Opening the eyes helps to focus on beauty; nature is a multi-sensuous engagement, you can see it, smell it and notice small sounds even without consciously engaging all the senses. Once we are comfortable in our posture with a steady soft gaze, the next step is to practice gentle detachment.

Gentle Detachment: This is about holding a sense of emotional distance from the subject's own needs, desires, concerns and outcomes in the process of contemplation. The great western philosopher Immanuel Kant has written about the concept of 'disinterestedness' and it has been widely discussed, elaborated and used in the integrated theory of aesthetic appreciation. (Brady, 2003). Kant pronounced that only a person with good moral disposition can appreciate beauty without any involved interest. (Baxley, 2005).

Quoted from (Guyer, 1993): "Schiller's suggestion is that it is precisely because aesthetic experience is free of servitude toward any particular cognitive or practical

objective that it can facilitate the realization of that freedom which is the precondition of successful moral action". One of the ideas inherent in the concept of disinterestedness is that the pleasant sensations should not lead to secondary desires. It has twofold ramifications. One, the pleasant experience should not lead us to have a preconception of having a similar experience when we interact with the same object next time. Secondly, it should not lead to desires of similar experience in other objects, (Budd, 1998).

This brings us to a much deeper conception of Kant's idea of freedom. 'Freedom from desire' is almost a common conception in various faiths, religions and spiritual traditions. In order to effectively initiate a contact with a beautiful object without conception of desire, Kant introduced the concept of 'immediate encounter'. The idea behind immediate encounter is that there are no preconceived expectations of desires when one encounters the object and the subject continues to maintain this state of 'disinterestedness' throughout contemplation.

The beautiful natural world is a perpetual source of aesthetic experience through contemplation even without an active pursuit of knowledge. To put it more classically, this element in the practice is referred to as 'transcendental'. How it is practiced is that though we are fully aware of our presence and that of the view or the object, we are not exercising our mind to find out any details about the view or the object per se. We discard judgement. Whenever the mind drifts into thought processes we remind ourselves of the concept of 'disinterestedness' and remain comfortably focussed with a soft gaze, also without judging the success, or failure of our own practice. We simply observe our focus of attention, the nature view, and observe our own process, without judgement.

Sympathetic Attention: This comes from the well-developed field of love and kindness meditation. This practice, in which one directs compassion and wishes for well-being toward real or imagined others, is designed to create changes in emotion, motivation, and behaviour in order to promote positive feelings and kindness towards the self and others (Salzberg, 1995). In an extensive review from Stanford University, Hutcherson et al. (2008) concluded that love kindness meditation enhances social connectedness:

"As a species whose survival depends on the ability to build mutually beneficial relationships with others (Brewer, 2004), human beings have a deep-seated need to feel connected, to be trusted and loved, and to trust and love in return (Baumeister & Leary, 1995). Feeling connected to others increases psychological and physical well-being (Brown, Nesse, Vinokur, & Smith, 2003; De Vries, Glasper, & Detillion, 2003; Lee & Robbins, 1998) and decreases the risk of depression and physical ailments." (Hawkley, Masi, Berry, & Cacioppo, 2006)

The practice: for anytime, anyplace: Contemplation Sessions can be held anywhere, as part of a day-trip or program at the centre- or at any existing event in India and overseas. They can be built into an existing conference programs, or corporate team building programs. These short sessions are a great way to bring people together and connect meaningfully. The sessions are experiential orientation sessions into the 3 simple meditation techniques for The Mindful Contemplation of Nature; Soft Gaze, Gentle Detachment and Sympathetic Attention.

Previously, the Foundation has organized contemplation events or side events in major conferences, such as The World Parks Congress and events at Olympic Park Sydney. They have been held in major organizational settings for senior management, such as the Food and Agriculture Organization HQ in Rome. Our contemplation practice is not connected to any faith and sessions have also been held in Churches and Temple complexes. The session in the church at Santiago the Chile was so well received that the entire concept has been translated in Spanish and published as a 90-page book in 2016, La Contemplacion De La Naturaleza.

2.3.   Why mindfulness meditation?

Mindfulness has been scientifically proven to have numerous physiological and psychological benefits, but meditation is not meant to be a quick fix for all our problems, or an all-soothing balm that brings instant well-being and enlightenment. Meditation and Mindfulness can contribute to a clarification of one's true values and motivate behaviours that are consistent with those values. The aim of the Foundation's headquarters, the Vrikshalaya Centre, is to offer natural surroundings and a serene organic way of life that is conducive for peaceful reflection.

Personal Growth: Personal growth, relationship, and community values are just a few examples that can be approached through mindful living. For long-term practitioners of meditation, dealing with negative thoughts, feelings, and sensations is very natural and part of the process, but for beginners, it can be an overpowering experience. When practicing the Contemplation of Nature, the mind slows down and thoughts about things we generally take for granted float to the surface. These can be very intense. While many of these experiences are more common after a lengthy meditation retreat, they can be experienced by more casual meditators as well. Meditation practitioners can learn to treat meditation 'pains' with the support of a community.

New research by Dr. Willoughby Britton and her colleague at Brown University, Dr. Jared R. Lindahl, have identified seven experience domains for meditation; perceptual, affective (emotional), somatic, cognitive, motivational, social, and sense of self. Becoming conscious of inner states in these domains can be challenging. Those who meditate can experience unpleasant sensations and emotions. What may seem to be a distressing experience during meditation practice, however, is considered in some traditions to be a leap forward, or a breakthrough. We always advise that visitors coming to our centre to have a connection with an existing meditation teacher or community back home, before and after their visit to us.

The Relaxation Response: As mentioned above, the recommended duration is about 30 minutes. Scientific research on mind-body connection has pointed out that after about 22 minutes of restful mind, a much deeper physiological relaxation starts to take place (Benson and Proctor, 2010). This finding has ushered a relaxation revolution and given rise to several techniques such as Mindfulness Based Stress Reduction (MBSR). Taking cues from this research and including some time that it takes to physically and mindfully settle down, 30 minutes has been considered appropriate for Contemplation of Nature. Working with hundreds of participants of different age groups, education levels and cultural backgrounds over last 8 years; the practice generally lasts anywhere between 20 and 40 minutes depending on the situation and how the participants feel.

Only when the mind can reach a certain level of calmness, can deeper states of physiological rest be triggered; for the metabolism, blood pressure, heart rate and respiratory rate regulation. Referred to as The Relaxation Response, this state plays a vital role in preventing many diseases and maintenance of mind-body health. The Relaxation Response has also made inroads in treatment of various types of diseases and is being treated as a revolution in reducing the cost of the health care.

Conscious Living: As a modern, connected culture, we need to cultivate an attitude of care, to understand where the things that sustain us come from and go to. Our resources are not limitless – food, water and energy doesn't just appear, just as clothes and products do not just appear, just as all our waste also has inherent challenges. All our actions have an impact and an intrinsic cost that someone somewhere must pay. Every person who gets to experience the inherent nature of physical work, interdependency and interconnectivity first-hand, can keep that connection in their mind, and impact their world and everyday choices in a profound way. Going with the consumer flow is not leading to happiness and thus the Health and Wellbeing industries are exploding with all manner of products and services designed to make us feel better. No one can do the personal development 'work' for us though. Self-care is about finding the space and place for each of us to be our natural and authentic selves, as human beings in an interconnected world.

Community and team-building: Mindfulness can also be a very powerful personal and group experience, even for complete beginners. Community and group-based

mindfulness meditation training activities have a proven track record of developing team cohesion, improving morale and motivation, while making a substantial contribution to personal growth and stress management as we learn from each other. Moreover, the sessions are also just really fun and enjoyable, and become a new type of relaxed social practice; the more you practice the more satisfying mindfulness is, and the more you experience the positive effects. This journey is fun to share and discuss with others.

Cognitive Abilities: The Foundation welcomes professionals working with cognitive health, MBSR/ MBCT instructors, and Mindfulness-Based Program Professionals and clinicians. We are not a facility that works directly with patients, but we offer a top up certificate in the Contemplation of Nature for practicing healthcare and wellbeing professionals. Our environment plays an important role in the way we think, behave and work and the Foundation offers a place, away from home, for learning and mindfulness practice.

A study from the Journal of Environmental Psychology found that individuals with a closer connection to nature are more innovative-oriented and have higher holistic perspectives. Providing encouragement and opportunities for employees to foster a deeper connection to the natural world can enhance productivity, positive mood and cognitive abilities and help people make significant lifestyle changes to reduce their stress.

Nature contemplation and immersion in nature also contributes to 'mindfulness-based stress reduction' (MBSR), which already has a proven track record for improving well-being and psychological health. Meditation needs to last for more than 20 minutes for MBSR to occur. Peace of mind, well-being and mindfulness are all interrelated and can be induced though a connection with natural surroundings and community.

Mental Health: An experimental study published by the Proceedings of the National Academy of Sciences provides one example of the positive impact nature has on mental health. The researchers found that participants who went on a 90-minute walk through a natural environment, when compared with an urban environment, reported lower levels of rumination; repetitive thoughts focused on negative aspects of the self. Given the well-established link between rumination and the risk for mental illness, connecting with nature on a regular basis is a known pathway to improved mental health. Exposure to the natural world decreases negative behaviour and negative states such as aggression, anxiety, depression, and illness, and increases positive states such as health, cognitive capacity, peace of mind, subjective well-being, quality of life, and overall positive effect.

The contemplative subject feels very tranquil, devoid of many thoughts and happy just being with oneself. This wonderful feeling is also characterised by a sense of

simplicity and deep silence. This happens primarily in the personal experiential domain. There are several scientific studies on why and how. Many ongoing efforts are researching measurements of brain functions, psychological states, physiological reactions and mood priming affects. A review of evidence of changes of meditation on body and brain physiology and clinical effectiveness shows:

> "The aim of meditation is to reduce or eliminate irrelevant thought processes…., thought to lead to physical and mental relaxation, stress reduction, psycho-emotional stability and enhanced concentration. Physiological evidence shows a reduction with meditation of stress related autonomic and endocrine measures, while neuroimaging studies demonstrate the functional up-regulation of brain regions of affect regulation and attention control. Clinical studies show some evidence for the effectiveness of meditation in disorders of affect, anxiety and attention. The combined evidence from neurobiological and clinical studies seems promising." (Rubia, 2009)

2.4. Why specifically nature-based mindfulness?

A question springs up: why contemplate nature when there are so many ways of meditation and mindfulness?

Resilient Thinking; Connecting the mind-body experience to sustainability: Gaining an understanding of Resilient Thinking and viewing oneself as a steward of nature is key to nature-based mindfulness. Positive health and interpersonal social outlook are some of the benefits of connectedness with nature, and these traits open up new opportunities for personal transformation connected to Resilient Thinking, as defined by our three principles, and an increased general interest in nature and sustainability.

Resilient Thinking nurtures a new set of positive leadership qualities that will be needed to drive transformation and sustainability; qualities such as critical thinking and an ability to work inteams and work with co-creative types of team leadership. Empathy to the diverse needs of others, gratitude and mindfulness, non-violent communication, and resourcefulness in the face of continuous change. Resilient Thinking can be summarized as including a deeper understanding and respect for 3 principles; The Dignity of Physical Work, Inter connectivity and Interdependence.

The Dignity of Physical Work means basically creating something of value together through physical work. It is a natural human need that promotes health, wellbeing and community. All physical work demands respect. Inter connectivity means understanding the interconnectedness of all living things. This helps us strive for a harmonious coexistence with nature. Interdependence is about people, reciprocity, solidarity and sharing. Reciprocity and solidarity is more beneficial for the individual and a smart society built around the sharing of creativity, space and resources.

Resilient Thinking can be used in organisations to consider the impact of all activities in an integrated way to result in sustainable outcomes and avoid 'trade-offs.'

The right focus: Mindfulness is not about emptying the mind to feel better, but rather about increasing awareness and the ability to just observe without judgement or knee-jerk reactions. Contemplation practice is one of the forms of meditative practice and thus makes available similar benefits as mentioned above. The important aspect to remember is that while it is easy to say 'remain disinterested' to reduce the thoughts; it is very hard to do in practice. This is why it is easier to have a focal point to return to.

Many meditative practices are either pointed attention or to 'thoughtlessness'. Several profound techniques have been devised to achieve this: breath awareness, chakra awareness, and so on. Some of them can be fairly challenging and could deter a beginner. Nature, on the other hand, is a natural aide to humans, and can lead to multiple benefits and opening doors to other practices in due course. Simply put, we put our focus where it matters.

We are a part of nature: Homosapiens' natural association with nature is rooted in the biology of evolution, as claimed by the Biophilia hypothesis. According to the Biophilia hypothesis, human beings are literally akin to other organisms (Wilson, 1984). There is a phylogenetic continuity of life and that creates a natural drive in human beings to connect to nature. However, human beings do not connect to the natural drives in the same way as other species do because of the high degree of adaptation and evolved rational thinking. The inherent natural drive and feeling of psychological wellbeing associated with nature depends on individual sensitivity. Contemplative experience enhances the sensitivity and nature helps to contemplate better. Hepburn's (1993) proposal is in line, "the more serious our engagement (with nature), the more earnest will be our regard for, and respect for, the integrity and the proper modes of beings and of the objects in nature themselves, inanimate and animate." Contemplation is an attempt to cultivate this sensitivity and commitment.

Interestingly, a view point from the field of psychology concurs with the Biophilia claim. That viewpoint is that humans have an innate natural affinity with certain natural features of the environment. We respond to natural forms. This idea has been taken up by Scandinavian designers such as Alvar Aalto.

> "Human beings, as members of a species possess innate standards of natural beauty with enormous implications. Thus, we prefer and assess as 'beautiful' those landscapes that include a series of features (in terms of both spatial configuration and specific content) that in the course of philogenesis have proved to be beneficial for the biological survival of our ancestors." (Galindo and Rodriguez, 2000)

A natural path: Affinity to landscapes is also guided by our social behaviour and so paths and trails, farms and pastures, simple houses made of natural materials and domestic animals are all a part of our conception of nature. The pace of change in our environment has been far too rapid though and these ancient manmade natural environments are also being eroded.

Many people in urban areas have to live in densely packed built environments that are devoid of any natural surroundings . Distracted by our interests and fast paced lives, we may not be aware of the impact that such an environment causes to our internal nature. Psychologists are concerned about the deep-seated stress that modern life is causing. The study of unconscious affective processes suggests that human beings need to relate to natural environments innately (Galindo and Rodriguez, 2000). It is increasingly being recognised that association with nature has positive restorative physical and mental health effects (Kaplan and Kaplan, 1989). Nature is not an instrumental resource for survival needs alone, but it plays an integral role in our emotional wellbeing. This natural affinity helps us to easily reconnect with nature and takes easily to contemplative experience where we can find a pleasant tranquil state that is conducive to nurturing our internal nature.

Tranquillity and Nature: Psychologists identify a combination of 'pleasure' and 'arousal' to account for how we feel. A situation with high level of pleasure as well as arousal creates the feeling of 'excitement'; a situation with a low level of pleasure and a high level of arousal causes the feeling of 'distress'; a situation with high level of pleasure and low level of arousal would cause us to feel 'tranquil', and a situation with low level of pleasure as well as arousal is 'boring' (Galindo and Rodriguez, 2000).

The effect of nature enhances the tranquillity factor. It creates pleasant sensations as well as arouses emotions in a subtle and delicate way. Another point of view is that tranquillity is a result of having met our unconscious needs in association with nature.

> "Aesthetic experience represents a specific emotional reaction which occurs in the beholder when he discovers an object which functions for him symbolically as a means of satisfying his unconscious emotional needs (Sirois, 2008)"

Unconscious needs lie so deep down that they may not be within our capacity of conscious efforts for fulfilment. In order to substantiate the argument that even without our conscious effort, we can meet our emotional needs:

> Without conscious perception, emotion discrimination is possible. Subjects do not consciously know what they have seen, but somehow know the affective meaning of it. The perceptual systems and the emotional systems in the brain are two separate systems working in parallel. One can give rise to unconsciously processed emotional bodily responses, the second to conscious perceptions (including cognition).

These findings support the idea that 'letting oneself go' in a gentle detachment in a contemplative stance to experience nature affects us, and the affects can be deep. A deep calmness descends on us and we feel relaxed in a natural setting. We meet our emotional needs without realising it; no conscious efforts are required. It sounds logical then, that conscious thinking could prove to be an impediment in achieving a deep soothing state. The anxiety and frustrations that may have been unconsciously pulling us down are released yielding a sense of freedom and contentment. Freedom and contentment are the key ingredients for autonomous decision making. For our further discussion on moral motivation and behaviour towards caring for nature, autonomy provides the right platform. Autonomy is all about being able to do what one believes in.

Instilling an internal belief: There are two plausible ways to start believing in something that is essentially new information. One is through direct experience and another by knowing about it. The former, called as experiential knowledge is considered superior to the later that is referred to as propositional knowledge (Clore and Gasper, 2000.) Emotions are a fairly credible source of information for us; "…because emotional feelings are directly experienced, and arise from within, the personal validity of information they appear to convey seems self-evident to person experiencing them (Clore and Gasper 2000)."

We understand that nature affects us by arousing pleasant sensations and subtle emotions that put us in a tranquil mood state. The affect, combination of mood and emotions, has a strong influence on belief development and maintenance. Of course there are several hypotheses about the factors that influence emotions and also factors that influence beliefs. The issue here is how the 'affect' during contemplative experience of nature influences us internally and how it helps us to make moral judgements that motivate us to behave in a certain way towards nature.

Deep Ecology and the Contemplation of Nature: Emotions, moods and beliefs serve as information for motivation. One of the popular views in psychology of motivation is that of 'Affect Infusion Mechanism' (AIM). "AIM suggests that affect can indirectly infuse cognitive processes by facilitating access to related memories and cognitive categories." (Forgas, 2000)

In simple terms, the affect process and related events in life are stored in the memory system which could be retrieved and used. "Priming model predicts mood congruent biases in attention, encoding, learning, memory retrieval and interpretation." (Forgas, 2000)

Deep impact: Contemplative experience creates two major impacts. First, it leads one to a state of tranquillity with finer emotional balance within oneself and also in relation to the object of contemplation. Second, it leads us to a much more enhanced level of sensitivity and awareness which could orient our beliefs and shape our attitudes. Therefore, aesthetic experience motivates one to attain the two goals together; that of higher integrity with oneself and that of commitment to the object of contemplation.

This claim can be substantiated with the help of the theory of aesthetic absorption that suggests transaction of deep constructive intimacy between the contemplator and the object:

> "What is constructed or reconstructed in these intimate moments of aesthetic absorption when self becomes other than just itself? Feelings for others and understanding of them may be altered; new registers of feeling and fresh angles of understanding may contribute to an 'expansion' of self and self-meaning; new vocabularies of experience may be acquired, and old ones extended, and there may be a special pleasure qualifying the time during which it happens." (Benson, 1993).

Deep learning: The experience of joy and emotional well-being does not fade away from our memory. Such strong mood-priming leaves a permanent mark on thinking, memory, judgements and beliefs. (Forgas, 2000)

An experience of joy and emotional wellbeing deeply influences our awareness and enhances sensitivity. Nature creates such a powerful impact on our wellbeing. Should it be considered just a set of resources? Contemplative experience cannot be instrumentally guided. "We value entering into a relationship, sink into the object so that it is experienced as if it were 'speaking' to ourselves, as if it were 'subject' like or autonomous." (Krebs, 1999) This establishes a certain profound kinship with the value of nature.

Deep self: We can find other support for similar experiences in the theory of Deep Ecology. This theory proposes a concept of 'self' which goes beyond the modern 'self' of an isolated ego. Deep ecology encourages us to begin the search for our unique spiritual and biological personhood. The search would make us realise the organic wholeness of nature. The idea of wholeness is rooted in the concept of biocentric equality. Biocentric equality claims that "all things in the biosphere have an equal right to love and blossom and to reach their own forms of unfolding and self-realisation." (Devall and Sessions, 2003). Deep ecology promoted the more meditative mode of Contemplation of Nature to experience self-realisation and wholeness.

Deep beauty: The concept of Deep ecology as defined by Norwegian Philosopher Arne Naess, promotes the idea of beauty over duty. Nature just doesn't exist for humankinds benefit alone, but its beauty is universally appealing.

Naess is appealing to the sensibilities of those human beings who may not ascribe moral status to nature; but do care about beauty and their interpersonal relationships within their community.

Deep community: Our social norms for interaction with each other in a community are directed towards influencing our behaviour in a certain way as actions of one can affect others. Members are concerned about each other's welfare because they are bound by mutual need, interests and emotions. "Morality certainly is a social phenomenon." (Krebs, 1999) We have seen substantive evidence that we have an inherent relationship with nature which can be experienced aesthetically.

Nature is, therefore, an essential component of our community structure. In some narrow sense, this is already acknowledged. We own our gardens and land and trespassing is an unsocial behaviour, but if you use chemical sprays and fertilizers to maintain that garden, which may pollute the ground water, it is not considered unsocial, despite the fact that many people in the community might suffer due to deteriorating drinking water quality. This contradiction is the result of an over-heightened sense of ownership, versus giving importance and caring about everybody in the community, a view that echoes Scanlon's view, 'moral principles are grounded in the idea of living with others on terms of mutual respect' (Devall and Sessions, 2003).

A broader notion of naturalness: In many communities, fair social norms are beginning to emerge with increasing awareness on the value of naturalness. This concept of naturalness can be further elaborated as it is not limited to promoting organic agriculture, better maintenance of gardens or enhanced protection of flora and fauna. Naturalness in essence is a process orientation of sustained effort towards recognition of a more autonomous life. According to Ridder (2007):

"Naturalness can be explained by the contrast between what a man wants simply in virtue of being the kind of organism he is – and what this or that man learns to want by being luxurious, fanciful or fashionable. The latter describes people whose wants have been conditioned to a greater extent by the influence of the society. The former, who is considered more natural, retains a greater degree of autonomy from the influence of the society."

Naturalness is therefore an internal phenomenon, akin to a character trait. This brings us to another dimension of morality from social to the psychological state. An autonomous person treats others with respect and cares for the other's autonomy. Naturalness advocates for another level of autonomy. An autonomous person also follows a life of greater integrity between what she believes in and what she does. It is the force of this integrity that we are seeking in support of nature.

Naturalness is a source of moral motivation and influences our behaviour in several ways. Those, who are under our care, treating them with respect means facilitating their natural behaviour; and adjusting ours. A good example is the way dairy cows are being facilitated to access open pastures for grazing. Another example is how agricultural operations can be manoeuvred to facilitate the breeding cycle of local birds who are nesting in the farms. 'Bird friendly coffee' is already a branded product in the market. 'Happy prawns' are ecologically-conscious farmed prawns. These are practical examples. These examples are about enhanced sensitivity and awareness to animal welfare.

It is fairly evident that in terms of environmental impact the whole globe is interconnected. Therefore, concern for social justice as well as environmental justice is inherent in 'naturalness' orientation. Experiencing nature in a contemplative way gives one joy and arouses positive emotions. One makes a deeper contact with oneself and enhances the intimacy with the object of contemplation, increasing a sense of connection and community. This judgement of maintaining an integrated self and respecting independent status of others creates moral motivation and influences our behaviour. "In order to behave truly in the sense of morality your action has to be moved by a genuine interest in the well-being of the other." (Wolf, 1999)

Conclusion

Fragmentation in the individual, communities, and societies is a global health issue. The Contemplation of Nature is a holistic approach to address a common and fundamental issue that everyone faces; the pursuit of happiness versus rising consumption levels, environmental destruction and social inequity.

This crisis of consumerism is not about basic human needs but about emotions rooted in our changing perception of who we are as individuals and how we fit into the world. Consumerism is shaping how we think about ourselves and our lives, how we empathise with others, and how we develop an overall aesthetic sense of beauty. This is reflected in every aspect of life, from food, clothing and buildings to the many lifestyle products we are seduced into buying. Most of the plastics that are polluting the world today were manufactured in the last 20 years. It is important to remember that the consumer culture is a relatively new culture, and only existed since the 1950's or 60's. Above all, it is worth remembering that despite the many positive traits of human creativity, consumer culture exists in almost in complete defiance of the agricultural and biological roots of our cultural traditions. (Sandrisser, 1998)

At the Foundation we have worked on the innate human need to connect with nature. We are positive that mindfulness practice can radically improve health, increase empathy and sensitivity to our surroundings as well as cultivate a larger sense of purpose in life, with a few accessible and transferrable techniques and frameworks that have been proven to shape our subtle positive emotions.

Contemplative ways are increasingly being recognised as an important tool for integrative learning and teaching. Meditative practices, akin to contemplation have become is subject of immense research showing promise of human wellbeing. Connecting these with a concrete framework for resilient thinking is very powerful.

It was discussed that Contemplation of Nature provides the same benefits as meditative practices; and deeper connection with nature puts us in a tranquil mood state, but also mindfulness as purpose and applied ethics, not just wellbeing and switching off from the troubles of the world.

The tranquillity and subtle pleasurable positive emotions deeply influence our beliefs and open up to new possibilities of being happy- to bridge the gap between our inner pursuit of happiness and our place in the world.

The 'naturalness' connection motivates us to lead a simple and richer life, enjoying natural surroundings, and thinking about our actions to reduce our impact on the planet and its environmental resources. A shift in mindset can occur, where individuals go out into the world, daring to gain deeper insights into the processes and a type of facilitation needed to tackle global and societal challenges. A 'naturalness' connection means that value creation is viewed as more than just profit, financial growth and the acquisition of things, but considered to be wide-ranging, sustained and not existing at the expense of the environment or our global neighbours. We hope that the Contemplation of Nature can provide tools for this awakening.

Aknowledgments

References

Anonymous (2008), "Mindfulness" In Contemplative Practices Handbook in Higher Education: A handbook of classroom practices. The Centre for Contemplative Mind in Society, Northampton, pp 152.

Baxley, A. M. (2005) "The Practical Significance of Taste in Kant's Critique of Judgement: Love of Natural Beauty as a Mark of Moral Character" Journal of Aesthetics and Art Criticism, Vol 63, No 1, pp. 33-45

Benson, C. (1993) The Absorbed Self: Pragmatism, Psychology and Aesthetic Experience, Hertfordshire: Harvester Wheatsheaf, pp. 210

Benson, H. and W. Proctor. (2010), "Relaxation Revolution", New York: Scribner

Brady, E. (2003) Aesthetics of the Natural Environment, Edinburgh: Edinburgh University Press, pp. 287

Budd, M. (1998) "Delight in the Natural World: Kant on the Aesthetic Appreciation of Nature", British Journal of Aesthetics, Vol 38, No 2, pp. 117-126

Bush, M. (2008) "Introduction" In Contemplative Practices Handbook in Higher Education: A handbook of classroom practices. The Centre for Contemplative Mind in Society, Northampton, pp 152.

Clore, L. G. and Gasper, K. (2000) "Feeling is Believing: Some Affective Influences on Belief", In Emotions and Beliefs: How Feelings Influence Thoughts,Frijda, N. H.; Manstead, A. S. R. and Sacha B. (eds) Paris: Cambridge University Press, pp. 10-44

Crompton, T (2008) Weather Cocks and Signposts: Environment Movement at Crossroad, WWF UK, pp. 39

Devall B. and Sessions G. (2003) "Deep Ecology" In Donald Vandeveer and Christine Peirce (eds) The Environmental Ethics and Policy Book. Thomson Wadsworth Canada, pp. 263-268

Forgas, J. P. (2000) "Feeling is Believing? The Role of Processing Strategies in Mediating Affective Influences on Beliefs", In Emotions and Beliefs: How Feelings Influence Thoughts,Frijda, N. H.; Manstead, A. S. R. and Sacha B. (eds) Paris: Cambridge University Press, pp. 249

Frijda, N. H.; Manstead, A. S. R. and Sacha B. (2000) "The Influence of Emotions on Beliefs", In Emotions and Beliefs: How Feelings Influence Thoughts,Frijda, N. H.; Manstead, A. S. R. and Sacha B. (eds) Paris: Cambridge University Press, pp. 1-9

Galindo G. M . Paz and Rodriguez J. A. C. (2000) "Environmental Aesthetics and Psychological Wellbeing: Relationships between Preference Judgments for Urban Landscapes and Other Relevant Affective Responses" Psychology in Spain, Vol. 2000, No, 4, pp. 13-27

Guyer, P. (1993) Kant and the Experience of Freedom: Essays on Aesthetics and Morality, Cambridge University Press, pp. 449

Hepburn, R. W. (1993) "Trivial and Serious in Appreciation" In Salim Kewal and Evan Gaskell (eds), Landscape, Natural Beauty and the Arts, Cambridge University Press, pp. 65-80

Hutcherson, C. A., Seppala, M. E., and J. J. Gross (2008) "Loving-Kindness Meditation Increases Social Connectedness", Emotions, Vol. 8, No. 5, pp. 720–724

Jacobs, M. H. (2006) Production of Mindscapes: A Comprehensive Theory of Landscape Experience PhD Dissertation, Wageningen University, pp. 268

Kaplan R. and Kaplan S. (1989) The Experience of Nature: A Psychological Perspective, Cambridge University Press, pp. 340

Krebs, A. (1999) Ethics of Nature: A Map, Berlin: Walter de Gruyter, pp.162

Rastogi, A. (2008) "Experiencing Nature Aesthetically: A Means and an End", Master's Thesis, Utrecht University, Utrecht, p 54

Ridder, B. (2007) "An Exploration of the Value of Naturalness and Wild Nature" J of Agricultural and Environmental Ethics, 20: 195-213

Rubia, K. (2009) "The Neurobiology of Meditation and its Clinical Effectiveness in Psychiatric

Salzberg, S. (1995) "Loving-kindness: The revolutionary art of happiness", Boston: Shambhala

Sandrisser, B. (1998) "Cultivating Common Places: Sophisticated Vernacularism in Japan" J of Aesthetics and Art Criticism, Vol 56, no 2, pp. 201-210

Sirois, F. J. (2008) "Aesthetic Experience" Int J Psychoanal, No. 89, pp. 127-142

Wilson, E. O. (1984) Biophilia, Harvard University Press, pp.157

Wolf, U. (1999) "Emotions and the Foundation of Morality" In Ethics and Emotions, SocietasEthica, pp. 86-93

Zajonc, A. (2008) "What is Contemplative Pedagogy" In Contemplative Practices Handbook in Higher Education: A handbook of classroom practices. The Centre for Contemplative Mind in Society, Northampton, pp 152.

2.2 Eco sapiens: Master Keys to Understanding and Healing the Relationship between Humankind and the Natural Environment in the Anthropocene

Thomas J. Burns

Using the acronym Eco sapiens, the paper explores ten master keys (Ecology; Culture; Organizations & institutions; Space & time; Affluence & inequality; Population; Illness & health; Energy & sustenance; Natural technological constraints; and Solutions to wicked problems), all of which are necessary to understand and appreciate humankind's relationship with the natural environment. Each of these master keys represent collections of related variables, or factors, and each can be conceptualized and operationalized in numerous ways (e.g. Population as total numbers of people, density, urban/rural ratios, age pyramids and sex-ratios; Technology as leading-edge, subsistence technology as the main arbiter of ultimate social organization, Jevons Paradox, tech as solution vs. tech as problem, lags between various technologies and outcomes, etc.). In addition to looking at their main effects, it is crucial, particularly from a broader ecological view, to consider many of the interactions among these factors. Building on earlier models (e.g. POET, IPAT and STIRPAT), I make a case that this broader and more robust model can offer a comprehensible roadmap for civil discussions of the human-environment interface that is useable to a wide array of audiences, including civic groups, academics, political leaders, social movement organizations, and citizens wishing a balance between a deep dive into something narrowly focused and the broader view.

Keywords: Eco sapiens; natural technological constraints; environmental health; cultural lag; civil discourse

Eco sapiens: Master Keys to Understanding and Healing the Relationship between Humankind and the Natural Environment in the Anthropocene

In discussing the pressing, sometimes overwhelming, ecological problems in contemporary society, it is often the case that people 'talk past' one another. This is as true for citizens and policy makers as it is for natural and social scientists studying the problem. One major reason for this is the lack of a common vocabulary and a haziness about what variables even are important to consider, much less some of their nuances and how they interact over time.

In this paper, I set out to do something that at first blush may look simple and commonplace--that is, to specify the major forces at play in the human-environmental interface. After a comprehensive review of several literatures surrounding these problems, it is possible to condense the discussion down to ten 'master variables' whose roles show up time and again and are crucial to consider in any analysis.

By using the term master variables, it is important to acknowledge at the outset that any of the ten can and have had multiple operational definitions in research and discussion. While the subsequent text goes into a bit more detail, a small example is in order here at the outset. Consider "Population" which has been measured in one way or another for thousands of years. It continues to be an important focal point for research linking humankind with the environment. Population can take on an operational definition in a given study in literally dozens of ways. Some of the ways population or demographic variables are measured include, for example: overall world population, national or regional population, age pyramids, gender ratios, population density measures such as person per unit space, rural/urban dichotomies, fertility, fecundity, birth and death ratios, population transitions in traditional to modern societies, population growth or decline, migration patterns (including, but not limited to, immigration, emigration, in-migration, circular migration), and the list goes on.

Which aspect of a variable is the focus of the study may well influence the outcome and conclusions of the study. Just to follow one aspect of the above example to one more level of complexity, we note that research shows that rural population growth in forested regions tends to predict deforestation but not greenhouse gas emissions, while urban growth tends to predict greenhouse gas emissions and climate change more reliably that rural population growth. But here, we may want to shift attention to what outcome is being measured in the Ecology part of the equation. Carbon dioxide and methane are the two biggest drivers of greenhouse gas emissions (albeit by no means the only ones, neither are they the most potent), and yet research shows that the organizational and cultural factors surrounding runaway carbon dioxide emissions are distinct from those producing methane.

So the modest proposal in this paper is to do several things. First, it is useful to give a list of the most important collections of variables to consider when trying to make sense of the human interface with the natural environment. By collections, of variables, one can characterize these as Master Variables. So doing carries the implicit acknowledgement that each of these variables can be measured and even thought of in a variety of ways. Far from this being a counsel to throw up our collective hands and say the task is impossible, it is, inter alia, an invitation to be mindful of how they are measured in a given study, and how that might affect the conclusions of the study itself.

It is also important to move beyond optimizing on one variable—however crucial, and they all are--and ignoring the ecological nature of the problem, and therefore how that variable necessarily needs to be considered in light of the others. What does it mean to measure population, for example, when the population of one country, on average, uses somewhere between one and two full orders of magnitude more energy than the population of another country? The variable that acknowledges the effects of affluence and inequality, or an ecological footprint or uneven ecological exchange as it may be characterized in some studies, is crucial to consider as well, if

for no other reason than that virtually every ecological exchange involves unequal exchange.

And so a strong case can and should be made that each of the variables in the Eco sapiens model is crucial to consider—that any model that leaves even one of them out is lacking. It is further important to consider higher order effects—how these variables interact and influence one another, and do so as the scale over space and time.

The current paper will by necessity only scratch the surface. It will, I hope, serve as a roadmap for discussions among people of good will, including scientists and laypersons, policy makers and citizens. It may, if nothing else, serve as a reminder for what is not being considered in any given discussion, thereby inviting deeper consideration.

Introduction

One of the defining characteristics of the culture of late modernity is humanity's insatiable propensity to exploit the environment. Older ecological models have proven useful in explaining and understanding humankind's relationship with the natural world. However, these models are not entirely adequate, nor are they the best tools available, for the exploration of humankind's relationship with the earth—and the formulation of much needed solutions to the existential environmental dilemma that we find ourselves in today.

Human ecologists are no less adept than other academics at finding and pointing out problems. At this point in time, the problems are well known—even if some choose to ignore or deny them. Workable alternatives to business as usual are needed now. Ideally, these alternatives will help guide nations and individuals in research, discourse and action in establishing a sustainable balance between people and the earth.

To realize this goal, the previous models developed by early human ecologists need to be updated in order to better understand and solve human-environmental problems. In this paper, we build on older models, such as the POET (Population, Organization, Environment, Technology) and IPAT (where environmental Impact is a function of Population, Affluence and Technology) models.
To this end, let us consider a more comprehensive, pragmatically useful model, characterized by the acronym Eco sapiens:

Eco Sapiens: Master-keys for Understanding Human Ecological Systems

What are the master-keys that, when taken together, can help provide insight and suggest strategies for healing the relationship between humankind and the natural environment? Each of these master-keys, or master-variables, can be thought of as a

collection of related variables under a broader rubric. They are not intended so much to be mutually-exclusive (which they are not), as they are to focus attention on ten of the very most important aspects of the problem. In many ways, considering one requires taking account of all of them. They each in turn offer a unique lens into the human-environmental interface.

A handful of (ten) variables, singularly and in combination, emerge time and again across a wide array of empirical and theoretical studies in Human Ecology and Environmental Social Sciences. Prior work has identified some of these variables, but have left other crucial considerations by the way, or have tried artificially to "fit" some of the ignored variables into these smaller models, perhaps in premature attempts at parsimony. These include the POET (population, organization, environment, technology), and IPAT/Stirpat (where Impact is a function of population, affluence and technology; the Stirpat variation of IPAT leans heavily toward stochastic models) frameworks.

These prior models have been highly useful at times to guide numerous empirical and theoretical studies and policy discussions. They have, nonetheless have proven limited. For example, they leave out the crucial variables of culture, and issues of scale, space and time, inter alia. The Eco sapiens model builds on these earlier pioneering works. It seeks to keep the considerable strengths of these earlier models, while ameliorating the most glaring omissions.

This paper lays out a framework for the Eco Sapiens model, in which the master-variables are… Ecosystems (E); Culture (C); Organizations & institutions (O); Scale, space & time (S); Affluence & inequality (A); Population & demography (P); Illness & health (I); Energy & sustenance (E); Natural technological constraints (N); and Solutions to wicked problems (S).

While a close consideration of any of these variables, operationalized as it may be in a given group of studies, offers a view into ecological problems. While consideration of each is crucial, outcomes typically are not reducible to one cause, and often the attempt to do so can be misleading. It is therefore important to consider them not just individually but together. These are all necessary components to help us understand and appreciate humankind's relationship with the natural environment. When considered together, they offer powerful lenses for analysis.
When leaving something out of consideration in a given study, which happens regularly, perhaps in order to focus on some part of it, it is still crucial to consider a study in light, not only of what it includes, but what it does not include. This model can then, among other things, serve as a check for important scope conditions of a line of research.

Having given a brief overview of the master variables, it is time now, subject to space constraints, begin to unpack each. The bulk of the rest of the paper will be devoted

to this. It will then look at some important higher order effects when some of the variables are considered together. Interactions, tipping points, indirect and feedback effects are all crucial parts of any viable model. Thus, after considering the variables themselves, it considers some of these higher order effects.

Ecosystems

An ecosystem is a community of interdependent life forms, and of the non-living things that are important for those life forms to continue. Ecosystems have countless interdependent parts. Changing one part affects the others.

By staying within the natural cycle of an ecosystem and keeping the disruptions in its balance to a minimum, people often can live with it indefinitely. Ecologists warn of overshoot, when the natural biodiversity is pushed beyond its limit. This can occur when small imbalances increase in magnitude until reaching a tipping point. Due to the heavy load of environmental degradation, pollution, and the overall demand on the resources of the system, it may collapse, in which case it is no longer able to sustain life to the extent it had.

While humankind has always interacted with ecosystems, the fragile balances are often threatened more profoundly in the Anthropocene age than in prior eras. Much of this load is attributable to conditions addressed by the other variables in the model. The world now has more people than ever before in history, has more extensive and intensive technologies than ever before, and the scale and scope of these have reached proportions that can be characterized as global and beyond.

Culture

What makes human communication and action meaningful is a common ethos, or set of values, norms and beliefs. Culture can be seen as a way of organizing and prioritizing thought, value, belief and action around an ethical framework. With the norms, values and priorities it carries within it, in many ways culture is the master variable in people's interactions and decisions.

Much of the power of culture lies in its taken-for-granted quality. Institutions and actions may be judged relative to culture, but rarely is the converse true. Put another way, culture and the values and norms it contains, is the standard against which the quality and rightness or wrongness of actions, including those involving the natural environment, are gauged.

If institutions are where individuals and society come together, culture is the milieu in which those interactions occur and have meaning. An important aspect of culture is that it often serves as the backdrop against which judgments of appropriateness are made.

Organizations & Institutions

Organizations are collections of people with "emergent" properties, which is to say they tend to have a life independent of the people in them. Organizations and institutions are sometimes thought of interchangeably; but more precisely, Institutions can be thought of as Organizations that become routinized and relatively stable, socially legitimate ways of organizing activity, including acting upon nature and its ecosystems. These qualities tend to give them staying-power over time, well beyond the lives of the individuals who come and go in them, and act according to their institutional cultures and mores.

Some common institutions Include: The Economy, the Military; Political systems; Family; Education systems; Health care systems; Religion; Legal systems; and rationalized Social Movement Organizations. Individuals often act within the context of institutions, typically doing so through the mediating context of social roles (e.g. parent, child, student, officer, voter, etc.).

Scale, Space & Time

Problems occur at all levels of analysis and spread out over time, from the immediate to the very long-term. A useful framework of analysis and discourse necessarily recognizes this crucial fact. While the core of a piece of fruit or a plastic jar both may be seen as "litter" in the short run, (the fruit) tends to recycle easily in ecosystems (particularly in smaller scales), while the other (plastic) takes many orders of magnitude longer and can be disruptive to ecosystems in the process.

It is important to understand that the scale of a problem can make a difference in how it affects the overall ecosystem. Something that is small scale may work in concert with the ecosystem, while larger systems may not. This is sometimes characterized as the "Small Is Beautiful Principle"…while large scale systems may be attractive from a strictly economic view, they almost never are in concert with the ecosystem.

Consider how ecological process unfold over time. How long does it take the natural system to recycle? One such cultural alternative consider the 7th generation model of sustainability. Can a process that may seem like a good idea by some standard in a given time or place (e.g. fracking) be extended more broadly unto the 7th generation? If not, it is wise to rethink its use and find a better alternative beforehand, and in lieu of, degrading the environment with it.

Affluence & Inequality

We can look at affluence in the overall and relative senses. As overall affluence goes up, so do demands on resources and the generation of waste. As affluence of one group goes up relative to another, this skews the demand for certain environmental

resources and the generation of waste, privileging the haves relative to the have-nots.

Currently, fewer than 400 people control more wealth than the entire poorest half of the world's population…this has tremendous consequences on how the environment is degraded. There is the potential for a pernicious interaction with the political system. With affluence comes the ability to affect politics disproportionally. This anti-democratic trend allows those able to control the wealth to sway political outcomes in ways that optimize their selfish interests at the expense of the overall good of the society and the natural environment.

Most environmental extractions or waste have social repercussions…almost everything affects people unequally, with the poor and disenfranchised suffering the downstream effects. Environmental Inequality is found locally, nationally and around the world. Toxic waste facilities tend to be cited in places near where there are concentrations of poor, minority, or other disenfranchised people.

Population & Demography

Demography is the study of large aggregates of people (or "populations") with some common characteristics. Some ways of thinking about and studying populations include: Total numbers of people; People in a bounded area or region (e.g. a nation-state); People per unit space ("Population Density"); Distributions of people (e.g. Urban/Rural Ratios); and Sex Ratios (number of females relative to males).

Important questions may arise around some specific groupings of human populations based on more general theories of Behavioral Ecology. Consider questions about Age Distributions. Other things held equal, for example, many species tend to put the biggest strain on resources when coming into reproductive age and establishing a new niche. How does this play out with human populations? Does this prove to be true for some but not all human populations? If so, how are effects enhanced or moderated by other considerations, such as culture and technology, scale and time?

While it is true that "population affects ecosystems," such a statement is imprecise and often misleading, so it needs to be qualified. This is so because while all of these sub-variables under the master variable of population impact the ecosystem, they do so in a variety of ways.

While issues of population present any number of key questions, it is also important to keep in mind that many of the effects are not confined to isolated influences (or "main effects"). Like virtually all of the variables in the model, population also works interactively in a variety of ways. One such example would be sex-ratios by age distributions.

To follow just one instance of that example raises challenging social and ecological issues. The cohorts born under the one-child policy in China, may be at social and ecological risks for a plethora of problems including human trafficking and gender-related violence as they age. The problem itself does not arise in isolation. There is robust evidence of persistent cultural lag of favoring sons over daughters. Demographic pressures of being the world's most populous country, combined with such cultural considerations and the technologies for sex-selective abortion, point out the importance of considering more complex interactions.

Illness & Health

An Ecosystem out of balance leads to people and other living creatures having physiologies out of balance. This in turn can increase prevalence of a number of maladies, sometimes characterized as Diseases of Civilization. These include problems such as High Blood Pressure, Stroke and Heart Attacks; Depression; Type II Diabetes; Allergies; and Many Types of Cancers.

Three major causes of maladies include the Environment, in addition to Genetics and Lifestyle. It is often the case that standard medical models of health and illness focus attention and research on Genetics and Lifestyle; Environmental causes are often ignored or dismissed, and under-researched.

This is particularly true in the case of disenfranchised people who may have suffered significant environmental exposure. It is crucial to consider many of the ways this variable interacts with others, including Affluence and inequality. Addressing these issues can sometimes threaten entrenched interests (e.g. shareholders in chemical or fossil fuel companies) who may exert disproportional influence in the political, legal and economic systems.

Energy & Sustenance

Much of environmental degradation comes from how societies and the individuals in them extract and use energy. Thus, it is important to be aware of energy regimes because some types of energy are much more sustainable than others. While any energy regime has pluses and minuses, fossil fuels are particularly problematic.

In a related vein, how societies raise and distribute food and other sustenance makes a huge difference. While Energy and Sustenance variables interact with each of the other considerations in the Eco Sapiens model, because of ways in which fossil fuels are extracted and used and because of exponential rises of large scale agricultural practices leading to dead zones and other downstream effects from pesticides, herbicides and concentrated agricultural feeding operations (CAFOs) the Scale, Space and Time aspects bear particular scrutiny in the Anthropocene.

Natural Constraints on Technology

Technology leverages how much effect humans have on the environment. Technology as a solution in one time and place, can have serious externalities, and become Technology as a problem in another time and/or place. This tends to be particularly true when scaling technology without closely considering crucial tipping points. There is a short-sighted tendency to simply consider "technology" without considering the enantiodromic (or "pushback") effects it puts into play. Thus, it is entirely more accurate to consider the natural constraints which technology is engaging than merely confining the gaze to the more facile label of "technology."

Because it can have positive or negative effects (or both), it is important to understand technology, not only as a means of using the environment, but more broadly, in terms of its short and long-term effects. In a related vein, it is thus important to consider not just manifest and expected functions of technology, but also the unplanned or "latent") functions (e.g. Jevons Paradox)

Solutions to Wicked Problems

In order to address complex, wicked and serious environmental problems, it often is necessary to approach them from the vantage point of several master variables. When looking for solutions, it is important to be aware of possible latent effects. Some "solutions" in the past have themselves caused other difficulties or have exacerbated the original problem.

As researchers and engaged citizens, we need to stay vigilant, and adjust as we go. Solutions are not such that one action fixes things once and for all time. As mistakes are made (as they are with anything involving people or social systems), it is important to acknowledge it, look for a reasonable better alternative, and move ahead.

An active, vibrant culture with people working together in good faith goes a long way, and the work is facilitated by keeping in mind the Eco Sapiens model and its various components and relationships. For each master variable, singly and collectively, it helps to unwind the processes that have led to the edge of catastrophe.

The unwinding process must itself proceed ecologically, keeping in mind that while tweaking one variable and ignoring the others can cause serious problems, finding solutions rarely is dependent on just one thing—rather it typically involves addressing problems with an awareness of several or all of the master variables, with a respect for how they may interact. When solutions don't present themselves, perhaps look at different levels of analysis, come back to the Eco Sapiens model and look through the lenses of other of the other master keys.

Important Qualifications and Scope Conditions: Interactions; Indirect & Recursive Effects; Tipping Points; Feedback Effects

None of these variables act in isolation. It is often the case that when two or more of the variables come together in certain ways, they create an "emergent" effect, not reducible to the main effects of either variable (a simple analogy would be water molecules as quite distinct from the hydrogen and oxygen atoms comprising them).

Sometimes the influence of a variable on an outcome is "mediated" by some other variable(s). Consider as well the importance of tipping points, or the "straw that broke the camel's back" effect. Adding to a variable quantitatively may appear to have little effect until such point that a major systemic reorganization occurs. At some point, quantitative changes lead to qualitative differences. These tipping points often are unpredictable, but have important considerations, such as underscoring the dangers of extrapolating predictions beyond the point of known observations and expecting those extrapolations to behave linearly.

It is also crucial to consider feedback effects. Some ("negative feedback") effects dampen naturally when there are feedback loops that counteract the original effect (e.g. a homeostatic mechanism like a thermostat where if it is too cold it kicks on the heat, while getting too hot triggers the cooling). Moving too far from some optimal equilibrium triggers a mechanism to come back toward that equilibrium point.

Other ("positive feedback") effects become self-reinforcing, which can cause problems unless some negative feedback loop counter-processes intervene. Even small effects, self-reinforcing over time, can aggregate into big, sometimes catastrophic, change (e.g. Atmospheric warming melts frozen Tundra in Siberia; this releases sequestered methane which, as a greenhouse gas more potent than Carbon Dioxide, leads to yet more atmospheric warming. As self-reinforcing processes come into play, this scenario represents a vicious cycle or "runaway" problem). Runaway cultural niches also fall into this category.

Conclusion: The Eco sapiens Model and the Long View

I have, over the years, spoken about the Eco sapiens model or some close variant, to audiences from middle-school through university graduate students and post-doctoral fellows; to citizen groups as well as to academics. If nothing else, it has never failed to serve as a catalyst for rich, and often civic, discussion.

In offering it here, the Eco sapiens model is intended to help facilitate discussions more broadly, about humankind's relationship with the natural environment. It is offered in the spirit of civic discourse as much as it is a guide for research, and in the hope of opening the discussion past what may in some instances be a truncated way of seeing ecological problems. May it do some good…

Suggestions for Further Reading:

Bazerman, Max H., and Andrew John Hoffman. 2000. "Sources of environmentally destructive behavior: Individual, organizational and institutional perspectives." Research in Organizational Behavior 21: 39-79.

Brown, Phil. 2007. Toxic exposures: Contested illnesses and the environmental health movement. New York: Columbia Uniersity Press.

Brulle, Robert J., and David N. Pellow. 2006. "Environmental justice: human health and environmental inequalities." Annu. Rev. Public Health 27: 103-124.

Bunker, Stephen G., and Paul S. Ciccantell. 2005. Globalization and the Race for Resources. Baltimore: Johns Hopkins University Press.

Burns, Thomas J. 2009. "Culture and the Natural Environment." in Alpina Begossi and Priscila F. Lopes (eds.), Current Trends in Human Ecology. Newcastle upon Tyne, U.K.: Cambridge Scholars Press.

Burns, Thomas J., Edward L. Kick, David A. Murray, and Dixie A. Murray. 1994. "Demography, Development, and Deforestation in a World System Perspective." International Journal of Comparative Sociology 35(3-4):221-239.

Burns, Thomas J., and Andrew K. Jorgenson. 2007. "Technology and the Environment." in Bryant, Clifton D., and Dennis L. Peck (eds.), 21st Century Sociology: A Reference Handbook. Thousand Oaks, CA: Sage.

Burns, Thomas J., and Thomas K. Rudel. 2015. "Metatheorizing Structural Human Ecology at the Dawn of the Third Millennium." Human Ecology Review 22(1):13-33.

Burns, Thomas J., and Beth S. Caniglia. 2017. Environmental Sociology: the Ecology of Late Modernity, Second edition. Norman, OK: Mercury Academic.

Buttel, Frederick H. 1997. "Social Institutions and Environmental Change." Pp. 83-96 in The International Handbook of Environmental Sociology, Edited by M. R. Redclift and Graham Woodgate. Cheltenham/Northampton: Edward Elgar.

Carson, Rachel. 1962. Silent Spring. Boston: Houghton Mifflin Harcourt.

Catton, William R. Jr. 1980. Overshoot: The ecological basis of revolutionary change. Urbana: Univ. of Illinois Press.

Cohen, Joel E. 1995. How Many People Can the Earth Support? New York: Norton.

Colborn, Theo, Dianne Dumanoski, John Peterson Myers, and Margaret Murden. 1997. Our stolen future: Are we threatening our fertility, intelligence, and survival?: A scientific detective story. New York: Penguin.

Crutzen, Paul J. 2005. "Human Impact on Climate Has Made This the 'Anthropocene Age.'" New Perspectives Quarterly 22(2):14-16.

Dimick, Dennis. 2014. "As World's Population Booms, Will Its Resources Be Enough for Us?" National Geographic, September 21.

Dietz, Thomas, and Eugene A. Rosa. 1994. "Rethinking the Environmental Effects of Population, Affluence and Technology." Human Ecology Review 1(2):277-300.

Dunlap, Riley E. and Aaron M. McCright. 2015. "Challenging Climate Change: The Denial Countermovement" in Dunlap, Riley and Robert J. Brulle (eds.), Climate Change and Society: Sociological Perspectives. NY: Oxford University Press.

2.3 The Wounded Hero's Quest in the Anthropocene Era: Reconnecting with the Ecosystem and Healing Within

Tim Davidson & Thomas J. Burns

Abstract

The negative technological impact of human beings on the planet in the Anthropocene Era introduces an ecological challenge characterized by two levels of alienation. The first alienation is distinguished by separation from the natural order, as the planet is objectified and treated with indifference or contempt. The other alienation is within human nature itself-- on a social, physical, psychological and spiritual dimension—typified by a species increasingly artificially separated from its natural surroundings, with ill effects, and/or devastatingly exposed to the ravages of nature triggered by damaging, planet-wide human influence. We identify reflexive processes, in which alienation from nature tends to build on itself through self-reinforcing feedback loops, offering some ways in which these processes can instead be turned towards healing. This paper explores how reconnecting with the ecosystem can be one path of an important quest, to commune with nature as a way of healing on a personal level, while promoting ecological regeneration on a larger, global scale.

Key Words: Transcendence, Nature Deficit, Alienation, Well-being, Confucian Ethic, Hermeneutics, Commodification of Nature

The Wounded Hero's Quest in the Anthropocene: Reconnecting with the Ecosystem and Healing Within

I. The inner and outer journey of the wounded hero

In 12,000 years, we have gone from a post-glacial to a post-digital existence. In so doing, we have all become wounded as natural beings. In the past 200 years, through industrialization, and expanding populations, we have put an indelible stamp on the natural world. The previous geological era was known as the Holocene. Now we live in a human-dominated, shaped, and altered geologic era known as the Anthropocene. We are wounded in the Anthropocene because, as a species, we have inflicted the natural order of which we are a part. Two journeys need to be made to address our woundedness: the first one inner (by re-communing with nature) and the other outer (through praxis, wherein we work together to address crucial ecological concerns, to engineer green solutions and to promote biodiversity while allowing nature to exist in as pristine a form as possible, and not continually be rolled up for further development).

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These two journeys of communing with and caring for the natural world are consistent with the underlying message of myth (in particular, see the works of Joseph Campbell 1973; also see Vogler 2007) that is common in various cultures, often expressed through world religions, and recognized by outdoor adventures. The inner journey can be characterized as a pursuit of personal enlightenment and connectedness and the outer journey as a search of collective survival and renewal. The "wounded heroes" who are needed for this "quest" are people of all genders; scholars in academic towers and laborers in the fields; rich and poor; people of every race and place; researchers in corporate laboratories and free spirits who hug trees; young and old; the privileged and the marginalized. It should be noted, too, that a paradox surrounds the idea of a solo hero because, in this case, we know we need to build better systems of human ecology consisting of many heroes.

The inner journey is primarily spiritual or transcendent (with psychological undertones). The outer journey requires support of and/or participation in (i) global, highly-advanced, technical, managerial and political engineering and research and (ii) simple, old-fashioned, maye ancient, unsophisticated ways to protect and preserve the earth. The first journey calls on the heart and taps into a basic kind of yearning to be outdoors in a natural environment, and thereby interrupt individual alienation from nature. The second journey calls on the world of thought, mankind's brainpower--what Paul Crutzen (2000) described as the "noosphere", following Teilhard de Cardin's classic formulation—with the challenge to engineer a world that grows instead of depletes the Earth's richness (Schwargel, 2014). The first journey finds harmony and joy while creating connection to the natural world. The second journey designs technology and plans solutions to undo or repair some of the damage already inflicted on the natural world. Both journeys (inner and outer, romantic and practical, individual and collective) envision the Universe, as Thomas Berry wrote in The Dream of the Earth as "a communion of subjects, not a collection of objects [for] I am not myself without everything else." (Berry, 1988/2015, p.)

II. Reframing "nature-deficit" as existential alienation

Richard Louv (205) made a positive impact on how we understand the separation of humans from the natural world in his popular text, Last Child in the Woods: Saving Our Children from Nature-deficit Disorder". In this work, Louv problematizes a "shortage of time spent in nature" and prescribes exposure to more natural settings "as a cure" (Dickinson, 2013, p.5). Louv did two very practical things for mental health and emotional well-being in his works: (i) he set a vision of how symptoms associated with mental and behavioral problems, like attention-deficit disorder (ADD) and attention deficit disorder with hyperactivity (ADHD) can be managed better, and symptoms reduced, by letting children play, relatively unfettered, outdoors, in natural settings; and; (ii) he highlighted how creative, unstructured exploration of nature contributes greatly to learning by triggering imagination, exploration, and

wonder. A quote from Louv (2005) shows the rich way he captured these important themes: "Nature inspires creativity in a child by demanding visualization and the full use of the senses. Given a chance, a child will bring the confusion of the world to the woods, wash it in the creek, [and] turn it over to see what lives on the unseen side of that confusion" (p. 7).

A. The impact on well-being of a child's separation from nature

Louv's ideas fit well with long established knowledge about attention. Over 100 years ago, William James (1950) identified two primary forms of attention: "direct" and "involuntary". Direct attention becomes fatigued after prolonged exposure to the object of concentration. In contrast, involuntary attention is more effortless and helps a person recover from too much direct focus. Natural settings are known to be full of stimuli that generate involuntary attention as well allowing moments of mental release and relaxation. For all ages, the restorative elements of involuntary attention when surrounded by nature can occur through leisure activities or during reposed, reflective times.

Many other scholars have pursued the importance of immersion in nature particularly in reference to children's well-being. Some of the topics researched include: 1. The overly programmed child who feels too "busy" to interact with nature (Veselinovska (2009; Clements, 2004); 2. The indoors child who is at increased risk for distress and feelings of low self-worth relative to their peers who spend significant time in outdoors in natural settings (Driessnack 2009; Ginsburg 2007; Wells and Evans 2005) ; 3. The inattentive child, in which children deracinated from natural settings display decremented ability to focus attention (Kaplan 1995; Taylor, Kuo and Sullivan 2001; Burdette and Whitaker 2005); 4. The inactive child, where a sedentary indoor lifestyle is linked to obesity, depression, and diabetes in children (Kinsburg 2007; Taylor, Kuo and Sullivan 2001); and 5. The detached child, where children do not attach to the natural, and thus do "not reap the psychological and spiritual benefits they can glean from nature, nor will they feel a long term commitment to the environment, the place" (Louv 2005:159 ff.; also see Bowlby 1969; Eckstein 2012).

B. A broader view of alienation from nature than a diagnosis allows

Louv's theory of "nature-deficit disorder" has not made its way into the International Classification of Diseases or the Diagnostic and Statistical Manual of Mental and Emotional Disorders. From a clinical perspective, trying to cast the idea of nature-deficit disorder into a psychiatric diagnosis will likely continue to be viewed as a mistake (Dickinson, 2013), even though exposure to nature is one of many healthy and adaptive ways to address emotional, mental and behavioral problems. A psychiatric diagnosis is really too small a frame of reference. "De-naturation" is systemic and takes its toll on a physical, mental, social, geological, atmospheric, and ontic level. That is

why we frame the problem more broadly, more ecologically--beyond medicalized or mental diagnostic terms -- and point to the disconnection from nature as a problem of existential alienation.

Elizabeth Dickinson (2013) follows this line of reasoning by describing alienation from the natural world as "a species-defining ecological crisis" –-a crisis that reflects an underlying pathology that has been developing over "a long gradual history of psychological and cultural estrangement with nature and place" (p. 15). Dickinson even recommends a "non-naming" of the problem to avoid language that poses a human-nature binary (as if we are not always a part of nature) and to avoid an emotional distancing from the natural world through scientific classifications and taxonomies.

III. The collision at the intersection of techne and ethics in the Anthropocene

Generally, as Gadamer (1995:320-321) argued, technological and ethical knowledge are set apart—"technical knowledge is particular and serves particular ends" and moral knowledge "pertains to right living in general". However, techne and ethics in the Anthropecene are now necessarily intersecting, and the two realms of knowledge are often crashing at that intersection. The human impact on geological morphology and ecosystems has been dramatic. The brunt force of post-glacial human technology has resulted in the mass extinction of many plants and animal species. Toxic agricultural and industrial signatures pervade air, water, and soil. The "particular end" of technological development is now cross-wired with a fundamentally altered and degraded natural world. Techne has raced ahead of ethics (Burns and Boyd 2018). The "right living" of moral knowledge, that would compel us to protect and preserve the natural world is coming belatedly, after the fact, with half-way measures, at best.

Thousands of years ago, our post-glacial human fight for survival against nature was necessary and understandable. Now that fight has morphed into an unnatural colonization of the earth's resources and space. Something very unnatural--often unsignified, and not treated as urgently as it should be in political and financial circles--has resulted. We, as a whole, act obliviously as we continuously shape the globe to ill effect. We routinely view nature in a dis-connected way. Words to describe the human-nature binary relationship would have to include "objectification", "commodification", "indifference" and "contempt".

A. Nature as a potential thing

Our view of nature has turned the environment, our world, into a convenience and economic given. We, as primary consumers of nature, have fetish-like attachments to commodities and irrational attachments to the produced thing. We greedily use (and use up) natural resources to make products. This now, deeply-embedded, hu-

man orientation to things introduces a recursive process. The repeated application of human-made items and surroundings to life itself has now created its own value; the human shaping of the world is now the primary state of being.

Social media replaces face-to-face small talk. So-called "moist media" is taking us to the crossroad of biological and digital expression. We may be in process of segueing from walking to non-walking on motorized Segways (i.e. two wheeled personal vehicles) that do our moving for us. Through many of our innovations, even the pleasant and convenient ones, the natural world gradually diminishes and the artificial one takes its place. In North America, going for a walk may reflexively mean going to a mall. Connecting with nature is reduced to a simulacrum, such as watching a nature show on television, or going for a car ride through the countryside, or perhaps ambling through the zoo.

Human being moves further away from its natural grounding. We become split off from the earthiness of experience. We become unmoored from our natural settings and de-familiarized with ourselves as a part of nature. We have taken over the reins, thinking of ourselves as nature's boss, without even knowing where we are galloping.

B. Human objectification

Our objectification of the natural world syncs with our objectification of humanness. Rather than constraining exploitation of earth's resources, we have boxed ourselves in. Techne, without an ethical core that persistently asks "What is good in the long run?" and "what is right for us all?" fails us, because it feeds emptiness and division "between the self (the soul) and the end in itself (right action)" (Latchford 2005:6). In the 18th Century, Prussian geographer and naturalist, Alexander von Humboldt, urged the industrial leaders of his time to adapt a viewpoint that sees human culture as part of a "world organism", thereby allowing us "to see how deeply interlinked our lives are with the richness of nature, hoping that we would grow our capacities as a part of this world organism, not at its cost" (Schwagerl 2011:4). Unfortunately, instead we have approached the natural world through discourse and actions as if nature is something "other"—alterity instead of connectivity. In so doing, we have cloaked ourselves with ontic "thing-ness". A reunification of nature's alterity and humankind's identity is needed.

C. Confucian ethical principles and green re-development

South Korea dramatically increased the proportion of its forested land in the last half of the 20th C, going from 35% in the mid-1950s to about 65% by the end if the first decade of the 21st C. Bae, Joo, and Kim (2011) attribute the success of this re-naturalizing phenomenon to a concerted planning effort on the part of the central

government, noting that South Korea was able to succeed at this long-term project with popular support, bolstered by a Confucian ethic of the common good. Even though there was a dearth of funding to accomplish this re-forestation, the collective will prevailed. The idea of the common good was strong enough to keep individual free-riding from collapsing the public project into a tragedy of the commons.

South Korea's re-appearance of untamed nature is a result of the public and politicians envisioning society's regulatory space as something more natural, and not more artificial. Such engineered development of forested land stands in direct contrast to controlled, corporate exploitation of resources that promote inequality of wealth, strip and deplete the land, and concentrate power and benefits to the few. The revived Korean forests promote a macro-collective good that now benefits society and the planet at large, while also benefitting a larger population of individuals tremendously.

This several-decade Korean project is an example of envisioning how land is best used. It promulgates ideas that Confucius articulated in the 6th C (BC), ideas that can help us today to diminish alienation and increase collective and personal well-being. Five (5) of these key Confucian ideas are (Burns, 2012):

1.   **Ren**: The sense of love, care and stewardship;
2.   **Chun Tzu**: The process of making the land more hospitable (which, in turn, helps individuals regenerate themselves and their relationships).
3.   **Li**: The piety of the collective good; Living up to one's duties
4.   **Te**: Power as the call to stewardship--the importance of upholding the common good rather than consolidating power for selfish interests; and
5.   **Wen**: The value of attending to culture and aesthetics, on both the personal and on the collective levels;

Focused ecosystem engineering allows us to reconnect with nature rather than mindlessly falling prey to the kind of engineering that exploits and distances us from the natural world.

Wounded heroes need healing spaces, where we can live, walk, swim, breathe fresh air, experience all five of our senses, let our imaginations "run wild", and feel a sense of union with nature. The produced world of things and objects does not allow us to thicken our lived experience in the same way as more natural settings and experiences. Our cell phones interrupt face-to-face social exchange. Our brains have turned to scanning information more so than thinking through information in an in depth manner. Our processed foods, full of fats and sugar, degrade our natural sense of taste. Our air and surrounding spaces are too often produced. Real, empirical, bodily being in the natural world opens us to lived-experience. Green time does not lock us out from the world but gives us a genuine sense of being immersed in it.

D. The noosphere and re-conceptualizing biomes

Ellis and Ramankutty (2008) describe human influence on the ecosystem by studying different "anthropogenic biomes". Biome systems are classified according to global population, land use, and land cover.   These human-altered terrestrial biospheres include: (i) dense urban settlements; (ii) villages; (iii) croplands; (iv) rangelands; (v) forested land, and (vi) wildlands. These biome systems differ according to how residential, or populated, or how remote they are; how irrigated or rainfed; and how wild or barren.

Eighty-percent (80%) of us live in densely populated urban and village biomes. Less than 25% of Earth's ice-free land is wild. 36% of that wild area is barren, with 20% of the wild areas hosting different kinds of forests (Ellis and Ramankutty, 2008). This biome system perspective highlights how valuable and rarified accessible wild outdoor areas are. "Indeed, wildlands now constitute only a small fraction of Earth's land" (p. 446).

Nature is being anthropized by heavy human use and occupation. We dominate natural processes with our thinking and then shaping of the world—creating a vast technological noosphere (Teilhard de Chardin 1959/2008; Bergson 1998) that often works against our survival as a species (Burns and Caniglia 2016). We need to dedicate our thinking and imagination to preserving us and the natural surroundings of which we are a part. Once a macro ecological system is valued and protected, then we, within our own micro systems can benefit from them. The biome can be wild or planned--but in all settings, wounded heroes will be needed to think through what is good for humanity, and the natural world, with technology in service to that end. Our brains and hearts must lead our hands.

Staying with the theme of forested land biomes, there are good examples of cultures around the world constructing natural healing spaces, like, "bathing projects" in wooded areas; this practice has caught on, particularly in East Asian countries including Japan, China and Korea. A growing body of research shows how forest composition and particular kinds of tree species can affect the restorative processes of those experiences (Geonwoo, et al, 2015; Kim, et al, 2014). In North America, in dense urban biomes, other kinds of healing spaces have been crafted. Frederick Law Olmsted—known as the "Father of Landscape Architecture"—spearheaded planned natural spaces, allowing people to take extended walks in the middle of major city parks like New York City's Central Park and Montreal's Mountain Royal Park. The original impetus behind Olmstead's land development was to help make dense urban biomes more humane and livable for countless people (Rybczynski 2000).

Turning the noosphere to imagining possibilities for green development requires a significant shift in ideology and perspective. Natural processes must be nurtured

and allowed to unfold. In this regard, technology will consist of "not-doing" as well as planning, crafting, and implementing sustainable outcomes. Producing energy from the sun and wind is a prime example of this principle.

IV. Acknowledging intertwined, systemic, sustained human interaction with ecosystems

As we see it, what we are calling "the wounded hero quest" is not just psychological, nor is it solely environmental. It is a problem of relationship characterized by humans alienated from the natural environment, and as such, falls squarely in the realm of Human Ecology (Bateson, 1972/1999). The mind, the body, nearby natural and social environments, and larger global spheres are inter-connected. For examples: On a macro political and financial level, there is a complex web of relations (in terms of a natural environment and a manufactured product) between a farmer picking coffee beans in a poor rural setting and an office worker in a cubicle, within a high-rise building, within a cemented city, drinking that coffee; or, on a micro-level, in terms of consumerism and returning to nature, there is a complex web of relations between a countryside hiker happily dangling her feet in a forest stream, while she eats a healthy, non-processed food, like an almond, that requires a large amount of water to mass produce, only later to find a rash caused by industrial waste that had been previously dumped into the stream.

In a vast, human-shaped world—the Anthropocene—it is next to impossible to be a pure naturalist. Most of us have a big carbon footprint. Notwithstanding, the twists and turns of returning to nature and supporting environmentalism, can begin with very simple acts to counter alienation from the natural world: from bringing a plant into the office, to hands in the soil while planting something green, to full immersion in an untamed area of land. The wounded hero's quest cannot be expected to be perfect, as an eco-friendly act, because of the overwhelming systemic ties in which it unfolds. That being said, the "quest" is likely, best defined as practical, incremental, driven by responsibility more than guilt, focused on health, social consciousness, and survival of the natural order.

Furthermore, for the quest to be truly "heroic", the solo re-connection with nature needs to be a part of the larger commitment to preserving nature. For example, snow-skiing over fragile biological environs, with the end result being depletion of the soil and diminution of biodiversity, brings people outdoors but does not get to the core issue of communing with nature, while preserving natural systems.

V. Promoting ecological regeneration (on a micro and macro level)

In the Anthropocene, within this century, the globe will be populated by 10 billion people. It is realistic to say that the eco-system itself, has become largely "man-made",

with heavy human use, including our recreational terrains. Less than 25% of Earth's ice-free land is wild and 20% of that is forest and 36% is barren. More than 80% of people live in densely-populated areas (Ellis and Ramankutty, 2008). Ellis and Ramankutty (2008) described our species in the 21st C "as a force of nature, rivaling climactic and geologic forces in shaping the territorial biosphere and its processes"; we now have "human systems with natural ecosystems embedded within them" (p. 445).

Previously, we disturbed nature. Now we are trying to shape nature, taking control from "climate to DNA" (Schwagerl, 2011). If we do not acknowledge how much human systems have intermingled with natural ecosystems, we cannot have sustainable management of the biosphere in the future.

Consider Kurt Lewin's classic force field analysis as a metaphor for this point. For a long time there have been those who think it is okay to exploit natural resources they are aligned as a restraining force against sustainability and environmental progress. On the other side, there are those who want to get back to a more natural state and generate solutions to the problems we have created, resulting in a driving force for progressive, environmentally-friendly change. In the middle is the status quo, those of us caught up in recursive patterns of objectification of, and alienation from, the natural world. The wounded hero's quest is to acknowledge the Anthropocene is already our era, that natural ecosystems are already largely shaped and infiltrated by us. Interactions between human and natural systems cannot really be avoided. They can only be distorted even further, or we can change the status quo to relate differently to the precious ecosystems we have left.

VI. Eco-optimism and solution-oriented, strength-based thinking

Problem-solving in the Anthropocene cries out for infusions of eco-optimism. The distress of the human-altered environment is so troubling that it is easy to succumb to despair. Alienation from nature and environmental crises must be faced squarely for what they are, but, after remedial care, toxic cleansing, and restoration, most of our "imported energy" into the open system needs to be directed to what can make things better in the future.

Solution-oriented and strength-based principles (Davidson 2014) will help shed some some light. Solution-oriented thinking challenges us not only to talk but to act--to do things differently, rather than continuing on with the same dead ends that have compounded problems. It also propels us to imagine possibilities, when the problem is solved or improved, and then use those visions of a preferred future as motivation and empowerment. Solution-oriented thinking also requires us to value natural resources as part of the long-term solution and not something to be used up. Strength-based thinking challenges us to find ancient and contemporary exceptions to the problem that work and, then, to reproduce those exceptions consistently on

a larger scale. It also obliges us to notice when something good is happening and when situations are getting better, and reinforce those efforts, while building on the strengths and human potential that emerge as problems are turned into solutions.

Particularly, with personal and planetary well-being at stake, the wounded hero is faced with the "categorical imperative" that framed Viktor Frankl's logotherapy (which was developed while enduring Nazi death-camps): 'Live as if you were living for the second time and as if you had acted as wrongly the first time as you are about to act now (Frankl, 1959, p. 107)--and then do something different. Do the right and necessary thing by answering to our alienated state in a communal, nature-loving, accountable way. After surviving Auschwitz and being awash with grief and loss, Frankl later coined the term "tragic optimism" in which he advised us to say "yes" to life under any conditions. His idea was that we have the capacity to creatively reverse life's negatives and, at least, to make the best of any given situation by taking responsible action.

Paul Ricouer (1970) in his influential book, Freud and Philosophy, crafted a dynamic between two seemingly disparate ideas—suspicion and hope. The inner and outer journey we have proposed is caught up in Ricouer's dynamic. On a subjective level, we need to reconnect with nature—to unmask (be suspicious of) the slippage of culture and humanity from our natural moorings. On an objective level, we need to expose (critique) the political, economic, non-scientific, and complacent views that have led to the current distressed natural world. After a critical consciousness, some revelations should emerge—demystified views that clear the horizon for future actions.

References:

Bae, Jae Soo, Joo, Rin Won, & Kim, Yeon-Su. 2012. Forest transition in South Korea: Reality, path and drivers. Land Use Policy, 29(1): 198-207. https://doi.org/10.1016/j.landusepol.2011.06.007.

Bateson, Gregory. 1972/1999. Steps to an ecology of mind: Collected essays in Anthropology, Evolution, and Epistemology. Chicago, IL: University of Chicago Press. https://doi.org/10.7208/chicago/9780226924601.0001.

Bergson, Henri. 1998, Creative Evolution, unabridged edition. Mineola, N.Y: Dover Publications.

Berry, Thomas. 1988/2015. The dream of the earth. Berkeley, CA: Counterpoint Press. Originally published by The Sierra Club.

Bowlby, John. 1969. Attachment and loss, Volume I. New York: Basic Books.

Burns, Thomas J. (ed.). 2012. Canonical texts: Readings from the world's wisdom traditions. San Diego, CA: Cognella.

Burns, Thomas J., and Tom W. Boyd. 2018. Flaws in the Scientific Method and Their Relevance for Energy Research: A Cautionary Tale. Journal of Energy Research and Reviews, 1(3):1-14.

Burns, Thomas J., and Beth Schaefer Caniglia. 2016. Environmental Sociology: The Ecology of Late Modernity, 2nd edition. Norman, OK: Mercury Academic.

Campbell, Joseph. 1973. The Hero with A Thousand Faces, 21st edition. Princeton, NJ: Princeton University Press.

Clements, R. 2004. An investigation of the state of outdoor play. Contemporary Issues in Early Childhood, 5(1): 68-80.

Davidson, Tim. 2014. STRENGTH: A system of integration of strength-based and solution-oriented principles. Journal of Mental Health Counseling, 36(1): 1-17.

Dickinson, Elizabeth. 2013. The misdiagnosis: Rethinking "nature deficit disorder". Environmental Communication, 203, 1-21. http://dx.doi.org/10.1080/17524032.2013.802704

Driessnack, Martha. 2009. Children and nature-deficit disorder. Journal for Specialists in Pediatric Nursing,14(1), 73-75. doi.org/10.1111/j.1744-6155.2009.00180.x

Eckstein, Barbara. 2012. Child's play: Nature-deficit disorder and Mark Twain's Mississippi River Youth. American Literary History, 24(1): 16-33. doi: 10.1093/alh/ajr054

Ellis, Erle C. & Ramankutty, Navin. 2008. Putting people in the map: Anthropogenic biomes of the world. Frontiers in Ecology and the Environment, 6(8), 439-447. doi:10.1890/070062

Frankl, Viktor. 1959. From death-camp to existentialism: A psychiatrist's path to a new therapy. Boston, MA: Beacon Press.

Gadamer, Hans-Georg. 1995. Truth and method, 2nd revised edition. New York, NY: Continuum.

Geonwoo, Kim; Park, Bum-Jin; Joung, Dawou; Yeom, Dong-Geol; and Koga, Shinya. 2015. Healing environments of major tree species in Kyusha university forests: A case study. Faculty of Agriculture Kyusha University, 60(September 1):477-483.

Ginsburg, K. R. 2007. The importance of play in promoting healthy child development and maintaining strong parent-child bonds. Pediatrics, 119(1): 183-191.

James, William. 1950. The principles of psychology, Volume I, reprint edition: Mineola, NY: Dover Publications.

Kaplan, S. 1995. The restorative benefits of nature: Toward an integrative framework. Journal of Environmental Psychology, 15, 169-182.

Kim, Jin-Seon; Kim, Eui-Gyeong; Kim, Dong-Hyun; and Shin, Hye-Jin. 2014. Valuing estimation of healing function of Jangseong healing forest. Journal of Korean Forest Society, 103(September 30), 453-461. https://doi.org/10.14578/jkfs.2014.103.3.453

Lewin, Kurt. 1951. Field theory in social science. New York, NY: Harper and Row.

Louv, Richard. 2005. Last child in the woods: Saving our children from nature-deficit disorder. Chapel Hill, NC: Algonquin Books.

Ricoeur, Paul. 1970. Freud and Philosophy: An Essay on Interpretation. New Haven, CT: Yale University Press.

Rybczynski, Witold. 2000. A Clearing in the Distance: Frederick Law Olmsted and America in in the 19th Century. New York: Scribner.

Schwagerl, Christian. 2011. Living in the Anthropocene: Toward a new global ethos. Yale Environment E360, (January 24, 2011): 1-5.

Schwagerl, Christian. 2014. The anthropocene: The human era and how it shapes our planet. Santa FE, NM: Synergistic Press.

Stavreva Veselinovska, Snezana. 2009. Why children need nature and nature needs children. Curriculums of early and compulsory education, 1(1):455-466.

Taylor, A.F., Kuo, F.E., & Sullivan, W. C. 2001. Coping with ADD: The surprising connection to green play settings. Environment and Behavior, 33(1):54-77.

Teilhard de Chardin, Pierre. 1959/2008. The Phenomenon of Man. New York: Harper Perennial Modern Classics.

Vogler, Christopher. 2007. The Writers Journey: Mythic Structure for Writers, 3rd edition. Studio City, CA: Michael Wiese Productions.

Wells, N. M., and Evans, Gary. 2005. Nearby nature: A buffer of life stress among rural children. Environment and Behavior, 35(3), 311-330.

2.4 Affiliation with nature: learning to read with dogs in the school ecosystem in Portugal

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Abstract

Our studies intends to contribute to the understanding of how the Biophilia hypothesis can improve the learning outcomes of reading in a school context, through the presence of a dog. It is a fact that Humans have an innate attraction towards animals as an intrinsic part of nature. Literature also refers that engaging a dog in schools settings can foster motivation and improve students' performance with challenging tasks. Therefore, one of the studies intends to assess how an Animal Assisted Education (AAE) program would benefit children between 8 to 10 years providing from Portuguese-speaking African countries (PALOP), through the acquisition of the Portuguese language. Reading sessions will be conducted to test the hypotheses that AAE will contribute to a smoother integration of the same children by promoting an increase in self-esteem and a decrease in anxiety with the help of a therapy dog. The other study proposes to understand how AAE contributes to overcome reading difficulties in children of the 2nd year, in an early stage of the acquisition of this skill. According to the bioecological theory of Bronfenbrenner there are 4 systems in which human development is the result of complex interactions between the individual and various systemic factors that influence each other. This theoretical approach allows a holistic view on the factors that facilitate or hinder students' evolution.

Keywords: Animal Assisted Education, Animal Assisted Therapy, Biophilia hypothesis, Bronfenbrenner bioecological system.

1. Biophilia and its implications on Animal Assisted Education (AAE)

Human beings, as social species, have evolved by understanding the environmental cues and by paying attention to animal signals as a source of food, safety, danger or as an indicator of a threat, namely predators, forest fires, earthquakes, among others (Anderson & Serpell, 1988; Wilson, 1984). Humans should, therefore, be attentive and harmonize with nature, in particular with animals in order to increase their chances of survival. However, a significant detachment from the natural world and from animals has apparently occurred with the development of technology, mainly in the 19th and 20th centuries, and the growth of big cities with places without any elements of nature where humans started to spend the bulk of their time.

Despite this separation from the natural world, the biologist E. O. Wilson (1984) has advanced on his book Biophilia that humans are innately enticed towards animal life and nature as part of the human evolutionary heritage (Kellert & Wilson, 2013). This attraction has been named as the biophilia hypothesis and consists not on the love

for animals but simply on an innate interest in living things (Fine, 2006). According to this hypothesis, humans have evolved by observing animals as environmental diagnosis that communicate signs of safety or danger (Kahn, 1997). This suggests that, on one hand, friendly and calm animals have propensity to cause a calming effect upon human mood and, on the other hand, agitated and aggressive animals have propensity to cause the opposite effect (Fine, 2006).

Moreover, biophilia suggests that animals enhance alertness and attention in humans, which can strengthen concentration and task persistence in the presence of an animal (Fine, 2006). Although it can be assumed that people would have an equal response to interactions with other humans, and that these interactions would have the same effects compared to those of the animals, several studies provide evidence of the unique effects animals have on human behavior, that go beyond the interactions with other humans (A. M. Beetz, 2017).

Biophilia plays a very important role on the approach of humans with other living organisms (Kahn, 1997), especially children who have, according to Kahn (1997), an endless bond with nature. To merge the therapeutic value animals have with nature exploration can result in a very effective approach (Fine, 2006). In general, therapeutic interventions engaging animals have, quoting Fine (2006, page 207), "a powerful assumption: There is something about animals that powerfully attracts and motivates humans".

In fact, research shows that the presence of pets can reduce stress levels and blood pressure (Allen, 2003). In addition, the simple act of petting an animal produces an automatic relaxation response (Halm, 2008). Children also tend to be more interested and pay more attention to animals than to objects (DeLoache, Pickard, & LoBue, 2011). The presence of animals releases endorphins (oxytocin), which have a calming effect (A. Beetz, Uvnäs-Moberg, Julius, & Kotrschal, 2012; Nagasawa et al., 2015). Interacting with animals also helps improve social and communication skills, reducing anxiety, elevating mood, and increasing empathy. Problems like addiction, depression, sexual abuse, anxiety, schizophrenia or autism spectrum disorders can benefit from this type of interventions (Bánszky, Kardos, Rósza, & Gerevich, 2012). Some children having autism spectrum disorders or learning disabilities are able to interact better with animals than with humans. Children carrying this type of disorder often rely on non-verbal communication signals, similar to animals. Therefore, learning to communicate with a dog, for example, can help an autistic child in his human-human interactions (O'Haire, McKenzie, Beck, & Slaughter, 2013; Solomon, 2010). Children with cancer show signs of overcoming the treatments in a more motivated and optimistic way (Jenkins, Ruehrdanz, McCullough, & Fluke, 2012). Patients with heart failure improve levels of cardiopulmonary function and neurohormones by decreasing anxiety (Cole, Gawlinsk, Steers, & Kotlerman, 2007). When an animal interacts with a human being, a person's mind is occupied at that moment. This interaction may be very valuable with a patient with signs of dementia to remember a memory or may

even help him to visualize the future. The person stops focusing on his pain, sadness or illness and the animal helps to bring the mind, body and spirit into the present (Richeson, 2003).

Nevertheless, it is important not to forget that biophilia assumes that animals who are not comfortable and display stress signals, send clear messages that the setting is not reliable and therefore may even increase the individual's distress. This means that it is mandatory to monitor the animal's behavior and temperament, not only for the implicit responsibility, but also for the animal's welfare and ensuring that the right messages are being sent. For this reason, Animal Assisted Interventions (AAI) play a very important role as in these kind of interventions, the animal must display calming signals. According to the Pet Partners Association, AAI are structured, goal-oriented interventions that intentionally incorporate animals in the areas of health, education and human service for therapeutic purposes. The aim is to promote physical, social, emotional and/ or cognitive well-being of the person involved by integrating a multidisciplinary team. The AAI comprises the Animal Assisted Activities (AAA), the Animal Assisted Therapy (AAT) and the Animal Assisted Education (AAE). AAA, intend to improve people's quality of life through motivation and/ or social aspects without established goals. AAT is a therapeutic intervention with defined, structured, planned and documented goals that are directed and/ or performed by health professionals to improve client's health through therapy animals. Finally, on the AAE interventions, the goals for each student are set by an education professional and in coordination with the AAT specialist, they design specific activities to achieve the proposed educational objectives. (AAII, 2016, IAHAIO, n.d., Pet Partners, n.d.).

Moreover, Le Roux, Swartz, & Swart (2014) have studied the effects of animal assisted reading, using the Reading Education Assistance Dogs (R.E.A.D.) on the reading rate, accuracy and comprehension of 3rd grade students from a low socio-economic community. Students were randomly assigned to three experimental groups and one control group (group 1 - read to a dog, group 2 - read directly to an adult, group 3 - read to a teddy bear in the presence of an adult, while students in the control group were not part of the program and continued with their normal school activities). The results revealed higher scoring in the "dog group" rather than in the other three groups.

The R.E.A.D. program exists since 1999 in the U.S.A. and has experienced constant growth since then. It is now emerging in Europe as an educational holistic methodology. With a trained animal, the R.E.A.D. teams work an unusual concept in the school setting: children can be the "teacher" of "someone" who knows less than them, the dog. Each child reads to "someone" who does not judge or criticize. On the contrary, the dog is always happy to see the child, to listen very carefully and is never intimidating. Besides, the animal is able to relax the child and create a special bond between them. R.E.A.D. is the first and foremost program that relies on therapy animals

to help kids improve their reading and communication skills and also teaches them to love books and reading. As it works on a one to one basis, the results can be easily observed and recorded. The experience of the R.E.A.D. program shows that in general the children who integrate this program tend to feel proud to belong to the selected group that will read to the dog. Among peers, these children will be seen as the lucky ones, and usually communication begin to flow naturally when explaining how the sessions are carried out. In addition, with the progress of the reading sessions with the dog and the increase in vocabulary, these children tend to feel more self-confident and it starts to show up in the classroom as well. They tend to forget about their difficulties and the presence of the dog have a calming effect, reducing anxiety. Therefore R.E.A.D. program might be an alternative solution to the education system, since therapy dogs and their handlers work with teachers and therapists as a supplemental program to help children achieve an educational goal. The therapy dog is a non-judgmental supplement to an intervention; unlike humans, dogs have no prejudices. They don't make any distinctions based on ethnicity, religion or social class. R.E.A.D. program is also helpful in the educational context, making work easier for teachers. Its method is aimed to prevent discrimination, segregation and bullying, to eliminate inequalities in learning performances and to prevent early school drop-out (Friesen & Delisle, 2012; "ITA," n.d.; Levinson, Barker, Van Zandt, Vogt, & Jalongo, 2017).

The essence of the R.E.A.D. program is the bond established between the dog and the child. Reading to a dog is not just reading to a dog, but a growing companionship encouraging children to love books and turning it into a positive experience. Children tend to forget their struggles and focus on the pleasure of the moment and the joy of reading. It is also an opportunity for the child to feel useful and competent helping the dog with its "reading struggles". In addition, the dog makes a powerful vehicle for communication since the handler can speak with the child through the dog. In truth, the dog does not criticizes or judges being a calm and attentive listener, not as intimidating as peers ("ITA," n.d.).

2. The use of animal-assisted therapy in overcoming children´s reading difficulties

In the beginning of education, reading and writing skills are introduced, since they are fundamental novelties for having implications in all school subjects (Buescu, Morais, Rocha, & Magalhães, 2015). At this stage, many children learn to read without difficulty. However, others are not capable to learn through conventional education, despite having normal learning potential (Fonseca, 2007). It is important to find a solution for these students, before the onset of school failure. As Lyon (2001) pointed out at the end of primary school, children with reading difficulties show negative feelings about themselves that increase throughout schooling, affecting the self-esteem, and reducing motivation to overcome difficulties.

As we have seen, the AAT may benefit these students since the animal's presence reduces the levels of anxiety and agitation creating affective complicity (Dotti, 2014). Despite the report on the positive effects in school settings, there are no studies that document the pedagogical value of these activities (Hall, Gee, & Mills, 2016) and further investigation should be conducted (Nimer & Lundahl, 2007), as the question on the importance of the animal in this type of context is still unanswered (Marino, 2012).

2.1 Brief Understanding Of The Bioecological Theory Of Bronfenbrenner

Bronfenbrenner states that it is only possible to understand human development if we consider the entire ecological system in which it occurs (Urie Bronfenbrenner, 1994). Although theorists mention that their theory is contextual and that it has been revised and altered, Tudge, J. R., Mokrova, I., Hatfield, B. E., & Karnik (2009) state that at no time did it stop being an ecological theory since it was always very marked by the interaction between the individual and the environment that surrounds him. It was in the first stage of his theory that Bronfenbrenner developed concepts such as the ecological environment of development, which he described as nested structures within others. The structures to which he referred are four contextual systems that he called the microsystem, mesosystem, exosystem, and macrosystem. The microsystem consists of all the closest scenarios (proximal contexts) where the child is an active member and interacts with the people closest to him. The mesosystem involves the microsystem and is constituted by the interactions between the various microsystems to which the child belongs. The exosystem involves the previous ones and is not regularly attended by the child nor is the child an active member in it. It is described as an extension of the mesosystem, which is composed by several social structures with the capacity to influence what happens in the systems closest to the child. The macrosystem is the one that involves all the others. It doesn't apply a specific context, but a culture or subculture that influences how the country's institutions and structures function (Urie Bronfenbrenner, 1977).

In an intermediate stage, the chronosystem emerges, which is defined as change or consistency over time, not only in the child's (aging) life but also as a characteristic of the surrounding environment, namely chronological time (Urie Bronfenbrenner, 1994). It was also defined that the general ecological model is based on two theoretically interdependent propositions. The first states that in the earliest stages, human development is derived from the progressively more complex interactions between the developing individual and the people, objects, or symbols in their closest environment. To be effective, the interaction must happen regularly in a considerable period of time. These interactions are called proximal processes. The second asserts that the shape, power, content, and direction of proximal processes varies according to the characteristics of the developing person, the environment (closest or distant) and the nature of the results under consideration (Urie Bronfenbrenner & Ceci, 1994).

The movement of proximal processes is bidirectional since they constitute primary mechanisms of human development and have the ability to affect each other (Urie Bronfenbrenner & Ceci, 1994). As mentioned, these processes (P) may vary substantially from individual to individual, due to the individual characteristics of the developing person (P), the closest or most remote contexts (C), and the time (T) in which they occur (Bronfenbrenner, U. & Morris, 2006). Bronfenbrenner (1994) mentions that investigations that simultaneously study the two propositions should be referred to as Process-Person-Context-Time (PPCT) model.

In the last phase of his work, Bronfenbrenner considered that the focus should lie on processes, which became the core of the model (Bronfenbrenner, U. & Morris, 2006). It is at this stage that the theory is called bioecological model of human development (Rosa, E. M. & Tudge, 2013), since three personal characteristics come to be considered in the development of the child: dispositions, resources, and demand. These characteristics have the power to influence the proximal processes, as well as the result of development, and are integrated into the microsystem as characteristics of the people with whom the child interacts. It was also considered that the child interacts not only with people but also with objects and symbols. Finally, Bronfenbrenner & Morris (2006) state that conducting scientific research using the bioecological model should be based on the four components (PPCT) in order to show their interdependence.

Jaeger (2017) mentions that the bioecological model of Bronfenbrenner is not widely used in literacy-related research, although it considers that this model gives greater visibility to individuals' characteristics, proximal processes, context, and time in order to understand what happens during the learning process. However, in an older text, Bronfenbrenner (1967) expressed concern about the lack of equity and quality in the education of African-American children, linking how the family, social environment and historical heritage affected their academic general performance, and the acquisition of reading skills in particular. The author also refers to the specific characteristics of these children which affect schooling and finishes the text concluding that the education system should be improved for all children because if it helps children with difficulties it will simultaneously help those who do not have them, and they will benefit from a quieter environment. The data collected in this study will be analyzed according to the more mature phase of the bioecological theory since this will allow us to understand how the acquisition of the reading of the children who participated in the investigation took place. Bronfenbrenner (1986) states that in order to consider that development has actually occurred, it is necessary to obtain evidence by observing patterns of behavior with some continuity over time and space. An investigation should be based on the components of the PPCT model that theoretically best answer the question under investigation (Bronfenbrenner & Morris, 1998). Based on the study of this theory, Tudge, J. R., Mokrova, I., Hatfield, B. E., & Karnik (2009) report that it is possible to conduct investigations that partially

test the PPCT model, pointing out as minimum requirements the study of how the proximal processes are influenced by at least one demand characteristic, by two microsystems or two macrosystems, and collected data analyzed longitudinally (time). Interdisciplinarity and the integrative focus of the bioecological model have an explicit interest in the application of policies and programs that favor development (Bronfenbrenner, U. & Morris, 2006).

2.2 Comprehension Of The Animal-Assisted Reading Process Through The Bioecological Theory

The seven-year-old children with difficulties in reading acquisition guided the study, based on the PPCT model. Like Jaeger (2017), children will now be referred to as the developing reader who is at the center of the bioecological model. In this study, it was intended to understand, in particular, the functioning of the microsystems in the Animal Assisted Reading sessions (AAR). To reach this goal, five developing readers attended AAR sessions in the presence of a dog and their handler with a Reading Education Assistance Dogs (READ) program. Another group of five readers with similar difficulties attended reading sessions in all identical but only in the presence of a teacher. It was also interesting to understand how the family microsystem affected the developing reader (prior to the intervention with the reading sessions) and how this microsystem was reciprocally affected. Each group of developing readers interacted with various people, objects, and symbols, establishing proximal processes. The objects used in the sessions were the books, and since Bronfenbrenner never referred to proximal processes between humans and animals, it was considered that the dog was a symbol and that the interactions that involved it would be understood according to the biophilia hypothesis. As previously mentioned, in the bioecological model there is reciprocity in all interactions, which means that in the AAR group there was one more element of interaction (the symbol) than in the sessions of the other group.

An inherent characteristic of the proximal processes is the regularity with which it happens: both groups had individual reading sessions for eight months, on a weekly basis and with the duration of twenty minutes each session. Because the sessions took place individually, it is assumed that the proximal processes have been reinforced and that the students have been given the best possible assistance in overcoming the difficulties.

Data collection was done using different instruments in order to obtain information from various microsystems to which students belong and to holistically understand the role of reading in their lives. Jaeger (2012) conducted a study on literacy development with vulnerable readers, using Bronfenbrenner's bioecological theory. Their data collection also sought to gain an overview of the development of literacy by the PPCT model. For this reason, the methodology followed was partially adopted

and the necessary adjustments were made due to the inclusion of the group who developed their reading abilities in the presence of the animal.

Taking into account the PPCT model, the data were collected as follows:

- Person: pre-intervention semi-structured interviews were carried out to the students of the AAR group to know the individual perceptions related to the task of reading aloud, coming from experiences in different microsystems (family and school). These perceptions allowed to infer about the school self-concept, and to know the expectations on the AAR sessions. With the post-intervention interviews, it was intended to know the opinion regarding the current reading ability, and about the sessions performed: what help is perceived in the presence of the animal and other indirect benefits from that contact.

- Process: Currently the recordings are being analyzed and coded using the Elan software to understand the proximal processes in the sessions, and how they evolved over time in order to obtain behavioral patterns that allow understanding how the readers influenced the adults and simultaneously as the readers were influenced by the adults and the dog, as well as the evolution of their reading abilities and the complexity of the work done.

- Context: through semi-structured interviews conducted before the intervention, with parents, and teachers of the students who participated in the AAR sessions, it was possible to detect behavioral patterns and complete the information about the proximal processes in the microsystems of the family and the school.

- Time: the reading sessions took place over 8 months and once a week. In order to understand the evolution of reading over this time, the quality was analyzed in the recordings. Reading tests were also applied at 3 different times: before the study, during and in the follow-up phase. Like Jaeger (2017), historical time was taken into account in this study, since the curriculum goals of the Ministry of Education clearly indicate what capacity a reader should have at the end of each year of schooling, but there is no early structured support for children with reading difficulties.

3. How Biophilia Will Affect Self-Esteem And Anxiety On The Acquisition Of The Portuguese Language Among Children Of African Immigrants In The Lisbon Metropolitan Area Through The Support Of Animal Assisted Education

In the field of education, it is now recognized that environments that promote a positive mood, motivation, concentration and attention along with an absence of stress and fear, provide optimal and more successful learning experiences (Wohlfarth, Mutschler, Beetz, & Schleider, 2014). Dogs may support all of the above requirements, including the impulse control, self-awareness, self-motivation or the working

memory, all of which are negatively influenced by high levels of stress (Diamond & Lee, 2011; Miyake et al., 2000). It is most likely that some children have had negative experiences about their difficulties and have therefore developed fears, expectations of failure and negative feelings towards the demanded task. Dogs have the ability not only to disrupt this vicious cycle but also to promote the involvement on the tasks that were previously avoided (A. M. Beetz, 2017). Furthermore, dogs can also not only stimulate reliable relationships towards children but also towards teachers, a relevant attribute for successful learning (Friesen & Delisle, 2012).

Several studies have shown that including a therapy dog when children read aloud may promote a more pleasant reading environment (Smith & Meehan, 2010), which will have positive impacts as reported by their educators and teachers. Namely, they noted an increment in self-confidence and esteem, an improvement in reading attitude and a decrease in absences (Levinson et al., 2017). Moreover, when compared to traditional reading programs, interventions with therapy dogs show an increase in reading fluency (Litzinger, 2014), as well as an enhancement in motivation, individual instruction, and the amount of time children spent reading on their own (Lenihan, Mccobb, Diurba, Linder, & Freeman, 2016). Besides that Friedmann, Katcher, Thomas, & Lynch (1983), showed that the presence of a dog was associated with a lower blood pressure and heart rate during reading and rest for children, thus reducing their anxiety.

According to Hergovich et al. (2015), the presence of a dog in the classroom had positive effects on field independence, social competence, empathy with animals and social-emotional atmosphere. This study has been carried out with first-graders, mainly immigrants, from two school classes (control and experimental) over three months. The experimental group showed a significant enhancement of field independence and empathy with animals in comparison to the control group (no dog). Thus, the presence of the dog fostered the development of autonomous functioning and a better segregation of self/non-self, which is the foundation of sensitivity towards the needs and moods of other people. Moreover, according to the views of the teachers, the children in the experimental group exhibited higher social integration, and there were fewer aggressive children in that group, as compared to the control group. In sum, the results indicate that a dog can be an important factor in the social and cognitive development of children.

AAE presents itself as an alternative solution, a complement to teachers, in order to help children achieve an educational goal. The dog would help to unlock the children emotionally, since it does not judge, does not distinguishes ethnicities, religions or social classes empowering the communication and the motivation to read. The purpose of the present research is to assess how an AAE program would benefit the integration of children from Portuguese-speaking African countries (PALOP), with which our country has a very strong historical liaison. In fact, these children repre-

sent the majority of educational failure among foreign students and it is of highly importance to respond properly to the linguistic heterogeneity and to create the conditions to ensure the full and effective integration of these children. In fact, these children have to face several challenges in their new environment, involving adaptation, language difficulties, discrimination or bullying. These struggles, directly or indirectly compromise their self-esteem. It is intended by this study to test the hypotheses that AAE will contribute to a smoother integration of the same children by promoting an increase in self-esteem and a decrease in anxiety. It is documented that the implementation of such innovative and holistic biophilia-based interventions promotes the enhancing of the self-esteem and the decreasing of the associated anxiety contributing, therefore, for a proper integration.

3.1 Research Design

This experimental project will be primarily quantitative having a qualitative component on the perception of parents and teachers regarding the effects of the Animal Assisted Education on the children. The R.E.A.D. method will be conducted throughout one school year, using registered therapy teams, composed by the AAE specialist and the therapy dog. The child will read individually to a dog for about 20 minutes, the goals will be defined by the teachers and the evolution on the Portuguese language can be monitored and measured by the teachers as well.

The schools involved will be in the Lisbon Metropolitan Area where PALOP students are highly concentrated with 85,8% of students (Oliveira & Gomes, 2016). The selection of the schools depend on their approval to integrate the current project, but the main goal would be to have different municipalities covered, such as Cascais, Oeiras, Amadora, Odivelas and Sintra.

Three groups of 5 to 10 children will be considered: the studied group with the dog, a group with the support of a teacher and the control group, without any intervention. The selection of the children will be randomized, according to their proficiency, and the exclusive criteria will be allergies or phobia to dogs. Given the fact that some cultures do not consider dogs as special animals, this will be respected. Sessions will be videotaped after the proper consent of parents or guardians and the images will serve as a pedagogical evaluation material. An informed consent from parents or guardians will be signed at the beginning of the program for the participation of their children.

References

AAII. (2016). Retrieved December 10, 2017, from http://www.aai-int.org/aai/animal-assisted-intervention/

Allen, K. (2003). Are Pets a Healthy Pleasure? The Influence of Pets on Blood Pressure. Current Directions in Psychological Science, 12(6), 236–239. https://doi.org/10.1046/j.0963-7214.2003.01269.x

Anderson, M., & Serpell, J. A. (1988). In the Company of Animals: A Study of Human-Animal Relationships. Contemporary Sociology. https://doi.org/10.2307/2069456

Bánszky, N., Kardos, E., Rósza, L., & Gerevich, J. (2012). [The psychiatric aspects of animal assisted therapy]. Psychiatria Hungarica, 27(3), 180–190. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/22781543

Beetz, A. M. (2017). Theories and possible processes of action in animal assisted interventions. Applied Developmental Science, 21(2), 139–149. https://doi.org/10.1080/10888691.2016.1262263

Beetz, A., Uvnäs-Moberg, K., Julius, H., & Kotrschal, K. (2012). Psychosocial and psychophysiological effects of human-animal interactions: The possible role of oxytocin. Frontiers in Psychology, 3(JUL), 1–15. https://doi.org/10.3389/fpsyg.2012.00234

Bronfenbrenner, U. (1967). The psychological costs to quality and equality in education. Child Development, 38(4), 909–925. https://doi.org/10.2307/1127092

Bronfenbrenner, U. (1977). Toward an Experimental Ecology of Human Development. AMERICAN PSYCHOLOGIST, 32(JULY), 513–531.

Bronfenbrenner, U. (1986). Ecology of the Family as a Context for Human Development : Research Perspectives, 22(6), 723–742.

Bronfenbrenner, U. (1994). Ecological models of human development. Readings on the Development of Children. https://doi.org/http://www.psy.cmu.edu/~siegler/35bronfebrenner94.pdf

Bronfenbrenner, U., & Ceci, S. J. (1994). Nature-Nurture Reconceptualized in Developmental Perspective : A Bioecological Model. Psychological Review, 101(4), 568–586.

Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. In W. Damon & R. M. Lerner (Eds.), Handbook of child psychology, Vol. 1: Theoretical models of human development (Sixth Edit, pp. 793–828). New York: Wiley.

Buescu, H. C., Morais, J., Rocha, M. R., & Magalhães, V. F. (2015). Programa e Metas Curriculares de Português do Ensino Básico. Ministério Da Educação e Da Ciência, 101.

Cole, K., Gawlinsk, A., Steers, N., & Kotlerman, J. (2007). Animal-assisted therapy in patients hospitalized with heart failure. Am J Crit Care, 16(6), 575–85; quiz 586; discussion 587–8.

DeLoache, J. S., Pickard, M. B., & LoBue, V. (2011). How very young children think about animals. How Animals Affect Us: Examining the Influences of Human-Animal Interaction on Child Development and Human Health, (May 2017), 85–99. https://doi.org/10.1037/12301-004

Diamond, A., & Lee, K. (2011). Interventions Shown to Aid Executive Function Development in Children 4 to 12 Years Old. Science, 333(6045), 959–964. https://doi.org/10.1126/science.1204529.Interventions

Dotti, J. (2014). Terapia & Animais. (Alexandre & . Terapia & Animais: 1 (Locais do Kindle 8). . Edição do Kindle., Eds.) (Editora Li). São Paulo: Donizete . Terapia & Animais: 1 (Locais do Kindle 9). . Edição do Kindle.

Fine, A. H. (2006). Handbook on Animal-Assisted Therapy. Elsevier. https://doi.org/10.1016/B978-0-12-381453-1.10003-0

Fonseca, V. da. (2007). Dificuldades de Aprendizagem: Na Busca de Alguns Axiomas. Revista Psicopedagogia, 24(74), 135–148.

Friedmann, E., Katcher, A. H., Thomas, S. A., & Lynch, J. J. (1983). Social interaction and blood pressure. Influence of animal companions. J Nerv Ment Dis., 171(8), 461–5.

Friesen, L., & Delisle, E. (2012). Animal-Assisted Literacy: A Supportive Environment for Constrained and Unconstrained Learning. Childhood Education, 88(2), 102–107. https://doi.org/10.1080/00094056.2012.662124

Hall, S. S., Gee, N. R., & Mills, D. S. (2016). Children reading to dogs: A systematic review of the literature. PLoS ONE, 11(2), 1–22. https://doi.org/10.1371/journal.pone.0149759

Halm, M. A. (2008). The Healing Power of the Human-Animal Connection. American Journal of Critical Care, 17(4), 373–377.

Hergovich, A., Monshi, B., Semmler, G., & Zieglmayer, V. (2015). The effects of the presence of a dog in the classroom, 37–50.

IAHAIO. (n.d.). Retrieved December 10, 2017, from http://iahaio.org/new/index.php?display=declarations

ITA. (n.d.). Retrieved from http://www.therapyanimals.org/Read_FAQ.html

Jaeger, E. L. (2012). Understanding and Supporting Vulnerable Readers: A Ecological Systems Perspective (Doctoral dissertation, UC Berkeley). UC Berkeley.

Jaeger, E. L. (2017). Negotiating Complexity : A Bioecological Systems Perspective on Literacy Development. Human Development, 59(4), 163–187. https://doi.org/10.1159/000448743

Jenkins, M., Ruehrdanz, A., McCullough, A., & Fluke, J. D. (2012). Canines and childhood cancer: Examining the effects of therapy dogs with childhood cancer patients and their families. American Human Society. Washington, DC. Retrieved from http://www.americanhumane.org/assets/pdfs/children/ccc_digitalbook_r19.pdf

Kahn, P. H. (1997). Developmental Psychology and the Biophilia Hypothesis: Children's Affiliation with Nature. Developmental Review, 17(1), 1–61. https://doi.org/10.1006/drev.1996.0430

Kellert, S. R., & Wilson, E. O. (2013). The Biophilia Hypothesis edited. Washington, DC: Island Press.

le Roux, M. C., Swartz, L., & Swart, E. (2014). The Effect of an Animal-Assisted Reading Program on the Reading Rate, Accuracy and Comprehension of Grade 3 Students: A Randomized Control Study. Child and Youth Care Forum, 43(6), 655–673. https://doi.org/10.1007/s10566-014-9262-1

Lenihan, D., Mccobb, E., Diurba, A., Linder, D., & Freeman, L. (2016). Measuring the Effects of Reading Assistance Dogs on Reading Ability and Attitudes in Elementary Schoolchildren. J Res Child Educ., 30(2), 252–259. https://doi.org/10.1080/02568543.2016.1143896.Measuring

Levinson, E. M., Barker, W. F., Van Zandt, P., Vogt, M., & Jalongo, M. R. (2017). Effects of Reading with Adult Tutor/Therapy Dog Teams on Elementary Students' Reading Achievement and Attitudes. Society & Animals, 25, 38–56. https://doi.org/10.1163/15685306-12341427

Litzinger, J. M. (2014). Using therapy dogs to improve reading fluency of children who are deaf or hard of hearing: Is it effective? Independent Studies and Capstones.

Lyon, G. R. (2001). The educational, emotional and social effects of reading problems.

Marino, L. (2012). Construct Validity of AnimalAssisted Therapy and Activities: How Important Is the Animal in AAT? Anthrozoos: A Multidisciplinary Journal of The Interactions of People & Animals, 25(3), 139–151. https://doi.org/10.2752/175303712X13353430377219

Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. H., Howerter, A., & Wager, T. D. (2000). The Unity and Diversity of Executive Functions and Their Contributions to Complex "Frontal Lobe" Tasks: A Latent Variable Analysis. Cognitive Psychology, 41(1), 49–100. https://doi.org/10.1006/cogp.1999.0734

Nagasawa, M., Mitsui, S., En, S., Ohtani, N., Ohta, M., Sakuma, Y., … Kikusui, T. (2015). Oxytocin-gaze positive loop and the coevolution of human-dog bonds. Frontiers in Neuroscience, 348(6232), 333–336. https://doi.org/10.3389/fnins.2016.00155

Nimer, J., & Lundahl, B. (2007). Animal-assisted therapy: A meta-analysis. Anthrozoos, 20(3), 225–238. https://doi.org/10.2752/089279307X224773

O'Haire, M. E., McKenzie, S. J., Beck, A. M., & Slaughter, V. (2013). Social Behaviors Increase in Children with Autism in the Presence of Animals Compared to Toys. PLoS ONE, 8(2). https://doi.org/10.1371/journal.pone.0057010

Pet Partners. (n.d.). Retrieved December 10, 2017, from https://petpartners.org/learn/terminology/%0B

Richeson, N. E. (2003). Effects of animal-assisted therapy on agitated behaviors and social interactions of older adults with dementia. Am J Alzheimers Dis Other Demen, 18(6), 353–8.

Rosa, E. M. & Tudge, J. (2013). Urie Bronfenbrenner ' s Theory of Human Development : Its Evolution From Ecology to Bioecology. Journal of Family Theory & Review, 5(December), 243–258. https://doi.org/10.1111/jftr.12022

Smith, M., & Meehan, C. (2010). All Ears Reading ® Program and Home-Schooled Youth. UCD Veterinary Medicine Extension.

Solomon, O. (2010). What a dog can do: Children with autism and therapy dogs in social interaction. Ethos, 38(1), 143–166. https://doi.org/10.1111/j.1548-1352.2010.01085.x

Tudge, J. R., Mokrova, I., Hatfield, B. E., & Karnik, R. B. (2009). Uses and Misuses of Bronfenbrenner ' s Bioecological Theory of Human Development. Journal of Family Theory & Review, 1(December), 198–210.

Wilson, E. O. (1984). Biophilia. Cambridge: Harvard University Press.

Wohlfarth, R., Mutschler, B., Beetz, A., & Schleider, K. (2014). An investigation into the efficacy of therapy dogs on reading performance in 6-7 year old children. Hum Anim Int Bull, 2, 60–73.

2.5 Lipka and its gardens

Pavla Švecová, Dana Křivánková, Jana Dvořáčková

Abstract

Lipka – school facility for environmental education is one of the oldest and largest organizations in the Czech Republic that focuses on public environmental education. As an environmental organization Lipka has five certified nature gardens used either during educational activities or leisure time activities of countless kids clubs organized by Lipka or other organizations in Brno. This paper aims to introduce you the uniqueness of these natural gardens and to point out the possibilities of their use in horticulture therapy.

Keywords: nature, horticulture therapy, garden, nature garden, certified garden, Lipka

1. Introductiion

As an educational institution for environmental training, Lipka focus on public environmental education. Under its wide range of activities Lipka offers one-day or longer environmental educational programmes in schools and preschools whose student attendance is over 200 000 students every year. In the afternoons, Lipka's five training facilities buzz with children fully engaged in science and art courses as well as adults enjoying their handicrafts courses.

Our organization also safeguards teaching of environmental-based subjects at several universities and promotes the systematic training of pedagogues in the field of environmental education. In addition to this, a number of public events for families with children are organized by our employees yearly. We are doing our best to be a refuge for perceptive children and adults who are interested in the future development of the environment and who are willing to play an active role in making the world a better place.

Since its establishment in 1991, the organization sought to promote environmental activities and outdoor learning. The garden around the first facility (Lipová) was wildly used for both educational activities and leisure time activities. How the organization grew, we set up new facilities and every single one of them had (at least small) garden.

In this paper we present five certified natural gardens managed by Lipka – school facility for environmental education, their uniqueness and possibilities for use in horticultural therapy.

2. Certified natural gardens

The concept of natural garden can be tracked back to the 19th century, when William Robinson (1838-1935) started planting wild plants into his orchard. His orchard modifications were based on an observation that the living space for animals of all kinds (and especially of insects) disappears. This phenomenon is observed nowadays too. That is why the concept of natural gardens is currently in such a boom.

In South-Moravian Region the certification process confirming that your garden is really natural ensure ecological institute Veronica since 2009. To get this certification you need to meet specific criteria. The three main ones are no artificial pesticides, herbicides or chemical spraying, no artificial mineral fertilizers and no peat for soil treatment. Then there are two other focus groups – natural elements in the garden and garden management.

The natural elements in the garden are designed to increase the amount of animals that live or find food in your garden. Examples of such elements are hedges of wild shrubs, pile of stones near the pond for amphibians or a small meadow for butterflies and other insects. If we talk about garden management, we mean for example compost, use of rainwater, mulching or mixed plant cultures.

2.1 Certified natural gardens of Lipka

The first certification of a natural garden was granted to Lipka in 2008. Currently we have five natural gardens with certificate and they are used not only for education and free time activities, but as a demonstration gardens for the general public. Each garden is unique and focuses on specific target group. Each garden is also open for public.

Figure 1 The first certified natural garden of Lipka, facility Lipová, photo by Tomáš Siničák, 2018

2.1.1 Facility Lipová

Facility Lipová is the oldest facility of our organization. It is situated near the city centre in functionalist villa surrounded by a rugged garden. The garden is designed to meet needs especially of blind and partially sighted people. The elements in the garden focus on the involvement of all senses. You can find there items that produce different sounds – suspended slate stones, wooden sticks with notches or wooden rattles filled with small stones. There are also items that engage your touch, like wooden box divided into three parts. Each part is a piece of a picture and your task is to match these parts to create correct image. The sense of smell and taste are greatly represented. A huge amount of aromatic herbs has been planted in the garden and you can find there also bushes with edible fruit, like currants and raspberries.
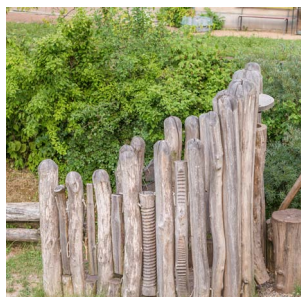

Figure 2 Wooden sticks with notches (involvement of hearing), Touch box; photo Tomáš Siničák, 2018

2.1.2 Facility Rozmarýnek

The garden of facility Rozmarýnek was officially open in 2014, after a complete reconstruction. It is designed as a permaculture garden and is often use for permaculture design workshops. The facility is situated in one district in Brno called Jundrov, right across the street of two elementary schools. The garden is therefore used not only by Lipka but also by teachers of nearby schools and even by Jundrov's residents. The garden is unique also because our employees breed there different animals (rabbits, ducks, chickens, etc.)

Figure 3 Facility Rozmarýnek, photo Tomáš Siničák, 2018

The small pond situated just behind the building serves as habitat for amphibians and water insects, as well as a drinking fountain for birds or other animals. It is also used for observation of water life during educational programmes. Considering the permaculture design of the garden, you can find there green roofs and even solar shower and composting toilet. The fruits from the garden are dried in solar fruit dryer. For the reason the garden is open to a general public, the playground and information tables are situated there as well.

Figure 4 The solar fruit dryer, the green roof top; photo Tomáš Siničák, 2018

2.1.3 Facility Jezírko

Facility Jezírko is located north of Brno, in the part called Soběšice. The main focus is on forest pedagogy and outdoor learning. The garden naturally passes into the forest and employees also take care of nearby orchard and beehives. The name Jezírko stands for a small pond and you can find one just in front of the main building. It is used during educational programmes and serves as a place of life for many species of amphibians and water insects.

Figure 5 Facility Jezírko, photo Tomáš Siničák, 2018

In the garden you can find raised vegetable beds maintained by kids, root wastewater treatment plant, tepee or outdoor oven for bread or pizza baking. Because the garden is both natural and therapeutic with the main target group partially sighted and physically disabled people some of the elements in the garden are adapted for that purpose. Therefore you can find there raised flower bed for various herbs, sensory pavement or outdoor musical room.

Figure 6 The outdoor oven, the outdoor musical room; photo Tomáš Siničák, 2018

2.1.4 Facility Kamenná

The smallest garden of all Lipka's gardens is in facility Kamenná. This facility is situated nearby city centre of Brno and there is small space in front and behind of the building. This small space was transformed into the garden used as a demonstration of small space gardens and urban gardening.
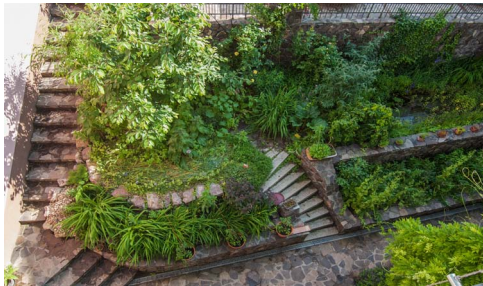
Figure 7 Facility Kamenná, photo Tomáš Siničák, 2018

When visiting this garden you can easily get the idea that no spot is too small for a garden. Plants can be found in such unlikely places as wicker basket, concrete sculptures, plastic containers, old frying pans or a stroller. Our gardener also built a vertical garden on the wall to show that a bit of greenery can be at every home. Besides these unique items you can find there the usual parts of natural garden like insect hotel, fruit tree, herbs or a small pond.

Figure 8 The plant beds out of stroller and old frying pans, photo Tomáš Siničák, 2018

2.1.5 The "New Garden"

The "New garden" is being built within the project "EDUGARD". The main aim of this garden is social rehabilitation of people with mental or health disabilities and will therefore used as a training working place for people with different needs. Currently we work with four people with mental disability and create a training workplace for one person undergoing the rehab treatment for alcohol.

Figure 9 The "New garden", photo Tomáš Siničák, 2018

3. Conclusion

This paper intended to introduce you the gardens of school facility for environmental education Lipka. These gardens are certified as natural gardens and are used as a demonstration that gardening has different faces but one common goal - to improve life of both people and animals.

Our mission is to promote natural gardens as much as possible and to inspire people to build their own natural garden. It really does not matter whether the garden is in an old yellow stroller or covers several hectares. What matter is that it is enjoyable and beautiful for people and welcoming for animals. So grab an old frying pan and build your own isle of greenery.

Aknowledments

The grates thanks goes to Tomáš Siničák for his most beautiful photos of our gardens.

References

Lipka – school facility for environmental education, the Czech Republic; https://www.lipka.cz

2.6 Erasmus+ Project: Towards mutual understanding with nature

Pavla Švecová, Dana Křivánková, Jana Dvořáčková

Abstract

This paper introducing the project "Towards mutual understanding with nature" within the Erasmus+ project. It explains the difference between horticultural therapy and simple stay in the garden, describes benefits of such therapy and provides four examples of horticultural therapy with various target groups (people with mental disabilities, prisoners, refugees, children with specific educational needs) from four countries (the Czech Republic, the United Kingdom, Italy, Slovenia). The project Towards mutual understanding with nature is implemented by seven organizations, each from different country (the Czech Republic, the United Kingdom, Italy, Slovenia, Portugal, Switzerland, Slovakia) and with financial support from the European Union.

Keywords: nature, horticulture therapy, Erasmus+ project, garden, excluded groups, best practice

1. Introduction

The project "Towards mutual understanding with nature" is held within Erasmus+ projects and is implemented from December 2016 until June 2019. Main aims of the project are networking of horticultural therapy organizations across Europe, held meetings in different countries focused on various target groups and education in the field of horticultural therapy. Involved organizations are Lipka – school facility for environmental education (as a leader partner) from the Czech Republic, Henry Doubleday Research Association from the United Kingdom, SOSNA Slovakia, Co.M.P.A.S.S. Social Cooperative Society Onlus Italy, Universidade Nova de Lisboa Portugal, Foundation Seiler Schloessli Ins. Switzerland and Arboretum Volčji Potok Slovenia.

The project is co-financed by the European Union Erasmus+ programme and by the Ministry of Education, Youth and Sports of the Czech Republic. We already managed to visit four countries (the Czech Republic, the United Kingdom, Italy and Slovenia) and familiarize with their approach towards different target groups. During the period July 2018 till June 2019 we are planning to visit Portugal, Switzerland and Slovenia.

In this paper we present the definitions of horticultural therapy, its benefits and beneficiaries as well as the examples from different countries focused on various target groups.

2. Horticultural therapy

The concept of horticultural therapy is as old as humanity itself. The first use of horticulture to calm people can be traced to the ancient Mesopotamia almost 2000 years BC. The first mention of horticultural therapy in modern history is from the 19th century, when Dr. Benjamin Rush observed positive outcomes in clients with mental illnesses that worked on a farm fields. This lead to a very first greenhouse used for therapy. It was built in 1879 in the Asylum for Persons Deprived of Their Reason (so called Friends Hospital).

The American Horticultural Therapy Association (AHTA) defines horticultural therapy as "a treatment, therapy and relaxation through contact with nature in the garden, with a clearly defined goal and provided by a trained person." This definition is very important for understanding of the whole concept. Horticultural therapy is not a mere stay in the garden, but a visit with specific plan a purpose. The therapy is designed by specially educated and trained professionals and with cooperation with doctors, psychiatrists, psychologists and occupational therapists.

The benefits of horticultural therapy are among all speeding up of healing processes, relaxation, teaching through experience, inclusion, promotion of creativity, memory training and development (or maintenance) of fine motor skills. The choice of specific activities is highly dependent on the target group, experience of the therapist and finally on the possibilities of the garden (e.g. its size, location, accessibility). Although every person can benefit from horticultural therapy, it is, according to our experience, focused on a specific target groups, such as people with disabilities (both mental and physical), elderly people, children with specific educational needs or with behaviour disorders, unemployed people, prisoners, refugees or abused people.

2.1 The influence of horticultural therapy

It is proofed that horticultural therapy has a great influence on lives of people involved. Gardening (as well as managed stay in the garden) can improve physical and psychic condition of both single individuals and whole communities. Wide range of activities improves physical condition of clients. The activities are always adapted to their possibilities. In one of the facilities we visited during the project, the strong young men with mental disabilities helped build vegetable beds and generally took part in heavy work in the garden. It cannot be expect that old fragile woman can do the same job, but she can improve her physical condition by walk in the garden on different surfaces.

Many long-term hospitalized patients agreed that when they were allowed to go outside of the hospital room, even to the hospital garden, they felt much better,

more optimistic and believed more in restoration of their health. In project we visited facilities that used so called floramobile for their immobile patients. It is a kind of trolley with drawers and large workspace. You can put different flowers and even soil to the workspace and bring garden directly to the patient into his or hers room. It is successfully used when working with elderly people, immobile patients and patients in hospice services.

Figure 1 Floramobile, photo by Tomáš Siničák, archive of Lipka, 2018

When working with elderly people you can use horticultural therapy also as a form of socialization and to improve social behaviour when working with kids with behavioural issues. Elderly people can find new friends during their stay in the garden or, at least, they can talk to new people and therefore be jolted from their stereotype. Kids that have behavioural issues when working in classes can immediately become leaders of group when it comes to build something in the garden.

Horticulture therapy with elderly people or people with Alzheimer's disease can be focused also on improving cognitive functions (recalling scents, shapes, colours or even names of flowers). And last but not least the horticulture therapy influences our senses. Colourful garden with thousand different sounds and smells is much more pleasant place to spend your time than austere hospital room or office.

2.2 Hhorticultural therapy - Places

Sometimes we are under the impression that horticulture therapy is quite space-demanding. The opposite is true. You can perform horticulture therapy almost everywhere, if you have access at least to soil or cut flowers. We or our partners have experience with horticulture therapy at both spacious garden and tiny balcony (or even at the hospital bed). Lipka has five facilities and each of them has different garden dispositions – two are huge gardens with orchards, two are small gardens inside the city and one is mostly vertical and balcony garden. At you can provide horticulture therapy at every single one of them.

Figure 2 Horticulture therapy can be perform everywhere, photo archive of Lipka, 2018

2.3 Hhorticultural therapy – Examples

One of the main aims of the project "Towards mutual understanding with natures" are meetings in different countries focused on various target groups. At the time of presenting this article we successfully organized four meetings – in the Czech Republic, in the United Kingdom, in Italy and in Slovenia. Presented examples are a summary of these meetings, always with consideration of a specific target group.

2.3.1 The Czech Republic

The target group of our visit in the Czech Republic were people with mental disabilities. This meeting lasts for 9 days, during which we visited numerous institutions that focused on people with different kinds of mental disabilities. Among others we visited year-round residential service "Domov na Zámku" (Home in the Château) at Nezamyslice. The clients (in this specific facility mainly young men with mental disabilities) are involved in building and maintaining of the garden. They also take care about animals (lamas and sheep). The other facility was atelier Samuel – daily social rehabilitation where clients are part of handicraft activities, such as book binding, basket weaving or sewing. Interesting was also our visit to special school Velká Bíteš, where we looked under the lid of education of kids with special needs. We mostly enjoyed special sensory room called "snoezelen", used for relaxation and basal stimulation of kids. We also drew inspiration from the garden for the blind people by Kuštát and from the garden used by clients of psychiatric clinic of the Faculty Hospital Brno.

Figure 3 - Snoezelen, source: www.specskolabites.cz/specialne-pedagogicka-pece/snoezelen, 2018

2.3.2 The United Kingdom

Meeting in the United Kingdom was focused mainly on the target group prisoners. This is one of the reasons we visited HM Prison Rye Hill. In this prison are situated adult males convicted of sexual offences. The Rye Hill prison is so called training prison, which means that there is a prisoner management system allowing prisoners to educate themselves in new fields or learn some new skills. Horticulture therapy is used as a tool for improving mental status of prisoners and their behavioural issues. It also provides a place to learn new skills useful when looking for a job after leaving prison.

Figure 4 HM Prison Ray Hill, photo archive of Lipka, 2018

2.3.3 Italy

In Italy we focused mainly on the target group refugees. This meeting was designed for five days and above all we visited Refugees Shelter Vegetable Garden at "Villa Serena" and "Il Pungiglione: the Acceptance Village". Refugees work there in a beeswax processing company.
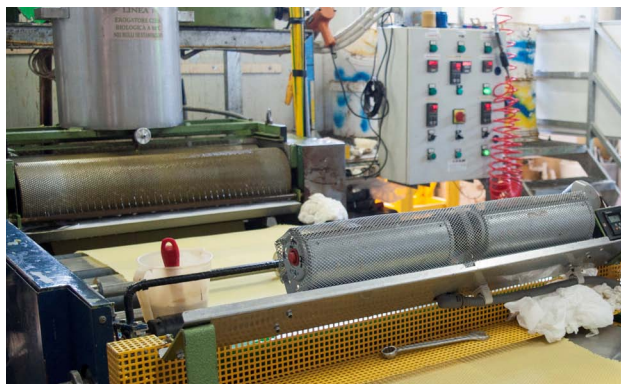
Figure 5 Beeswax processing company, photoy archive of Lipka, 2018

2.3.4 Slovenia

The programme in Slovenia was scheduled for five days and the group we focused on were children with specific educational needs. During this meeting we visited Social Farm Korenika and Social Farm Šalovci, Educational, work and care centre Draga and Youth Climate Restort Rakitna. Part of this meeting was also a field work in Arboretum Volčji Potok with the topic "Nature stimulates the learning and development of children with special needs". In this workshop we had the opportunity to try some activities used during education of children with special needs.

Figure 6 Hippotherapy in Slovenia; Sample from the workshop; photo archive of Arboretum Volčij Potok, 2018

3. Conclusion

This paper intended to introduce you the project "Towards mutual understanding with nature". In this project seven organizations from seven different countries cooperate to fulfil the aims of the project, namely networking, sharing of experience and education in the field of horticultural therapy. We already managed to organize four meetings (in the Czech Republic, in the United Kingdom, in Italy and in Slovenia). To the end of June 2019 we will have three other meetings (in Portugal, in Switzerland and in Slovakia).

After the project is over we would like to start a new one, focusing more on education of horticulture therapists. At each meeting we discuss our possibilities and visions and create appropriate starting point for this new project.

Aknowledgments

References

Lipka – school facility for environmental education, the Czech Republic; https://www.lipka.cz
Arboretum Volčji Potok, Slovinia; http://www.arboretum-vp.si/
Henry Doubleday Research Association, the United Kingdom; https://www.gardenorganic.org.uk/
SOSNA, Slovakia; http://www.sosna.sk/
Co.M.P.A.S.S. Social Cooperative Society ONLUS, Italy; http://www.coopcompass.it/
UNIVERSIDADE NOVA DE LISBOA, Portugal; https://www.unl.pt/
Foundation Seiler Schloessli Ins., Switzerland; http://www.schloessli-ins.ch/

3. Use of Natural Resources

3.1 Indigenous people in the hinterlands of the sao francisco river: dynamic of occupation and uses of natural resources

Edivania Granja da Silva Oliveira, Roberto Remígio Florêncio, Carlos Alberto Batista dos Santos

Abstract

This paper aims to present the processes of ethnic mobilization concerning the socioenvironmental issues in the São Francisco River Basin, in the Hinterlands of the State of Pernambuco, from the context of Environmental History and Human Ecology, bringing reflections based on human beings' relations with the environment in which they live physical and symbolically in relation to Nature. The Hinterlands have been a space of intense human occupation since the colonial period, a local of entrepreneurship of agricultural activities and cattle raising, producing conflicts with Indigenous populations that lived on the banks of the São Francisco River, and live until the current days. The objective of this paper is to understand the dynamics of occupation and the use of natural resources by the Indigenous peoples called Pankará and Truká. It is an attempt to highlight social and environmental continuities and discontinuities in their physical and symbolic territories, respectively the Serra do Arapuá in the city of Carnaubeira da Penha and Ilha de Assunção, in the city of Cabrobó, both in the state of Pernambuco, Brazil.

Keywords: Native peoples; Territoriality; Socioenvironmental conflicts; Environmental History; Ethnoecology.

1. Introduction

The Sao Francisco River Basin encompasses an area of 634,000 km2, with an extension of 2,700 km, from its spring in Minas Gerais to its mouth spread between the states of Alagoas and Sergipe, with an estimated population of more than 15 million people (SANTOS, 2008). Concerning its physiographic aspects, the San Francisco River is split into four main regions, Upper, Medium, Lower Medium, and Lower Sao Francisco (FERRAZ & BARBOSA, 2015).

The so-called Hinterlands of the State of Pernambuco has been a space of intense process of colonial occupation, undertaking the activity of livestock, and the stage of intense conflicts with the various Indigenous populations that inhabited the region, mainly the area of influence of the Sao Francisco River. In order to facilitate the occupation of the region by the settlers, aiming to Christianize the Indians, several religious missions have been undertaken, thus resulting in significant amounts of villages. Nowadays, it is the area that house several Indigenous populations in the State of Pernambuco, such as Atikum, Entre Serras, Kambiwá, Kapinawá, Pipipã, Pankararu, Pankaiuká, Pankará from Serra do Arapuá and Serrote dos Campos, Truká and Tuxá. In the savage desert climate of the State, we can found the Fulni-ô, Xukuru from Ororubá and from Cimbres.

2. Indigenous populations from the hinterlands of the state of pernambuco, struggles and identities

Since the Colonial Period, the Hinterlands are a sociocultural construction, as well as an important space socially constructed following the conception of a historical domination. The occupation of the Northern Hinterlands has used the Sao Francisco River as an important outlet into the inner parts of the Region. The expansionist process of entrepreneurship of the Portuguese settlers in America, especially in the Hereditary Captaincy in the Northern part of Brazil has initially occurred under the auspices of the Roman Catholic Church, mainly through the Jesuits, as well as the Capuchins and the Oratorians missionaries. The actuation of these religious has seriously contributed to the process of settlement of these Indigenous populations deemed to be "hostiles", which has favored the Colonial expansionism (SILVA, 2004). Thereby, since the beginning of the Colonization, the Sao Francisco River basin has been the place of installation of several settlements. In especial the settlement in the Island of Pambu, also known as "the settlement of Assunção", founded by some French Capuchin Missionaries by the middle of the XVII century, in a region that now is inhabited by the Truká Indigenous people in the State of Pernambuco, and the Tumbalalá Indigenous people in the State of Bahia.

The date of foundation of this settlement is inconsistent in the literature of the period. It is observed the year 1722 as a probable date of foundation. In 1761 it is recorded the existence of two villages, i.e. Pambu and Assunção. In the same year, the Indigenous people have been assembled in one only settlement and constituted the Village of Assunção. From the middle of the XIX century, with the establishment of the Land Act 1850, there have been many conflicts in the Island of Assunção with an accelerated process of dispossession, which resulted in the appropriation of the Island embodied to the property of the Catholic Church by the bishop of Pesqueira (BATISTA, 2005). This way, at the end of the XIX century, the Indigenous peoples in the Northeast part of Brazil have "disappeared" as communities, being dismantled from their territories, being recognized individually as "remnants", "descendants" or even the so-called "caboclos" (OLIVEIRA, 2004).

From the 1920s, there was a new process of ethnic affirmation, with the recognition of the descendants of the Carnijós Indigenous population by the Indian Protection Service (IPS) with the creation of an Indigenous Health Post in the area of the old settlement of Missão Ipanema. Nowadays live the Fulni-ô in the municipality of Águas Belas, the State of Pernambuco. In the XX century, from the 1930s through 1950s, various interethnic articulations and other Indigenous populations have requested the recognition of their old settlements and the installation of Indigenous Health

Posts, as it happened with the Truká. Since 1940 have taken part in some mobilizations together with other ethnic groups and the IPS in order to conquer their ethnic recognition (OLIVEIRA, 2014).

The Pankará from Serra do Arapuá have made public their ethnic resurgence at the "First National Meeting of Indigenous Peoples in Struggle for Ethnic and Territorial Recognition", held in 2003 in Olinda, State of Pernambuco. At this meeting, they affirmed their ethnic identity and called themselves "resistant peoples", mobilized by demands and guarantees of their territories, their socio-cultural expressions, as well as the achievement of differentiated health and education rights (SILVA, 2004). This process of affirmation of the ethnic identity of the Pankará people was supported by the Toré[1] : "the tradition maintained by the elders for more than a century in the Serra do Arapuá" (SANTOS, 2011, 40). In that regard, they have their social and territorial organization represented by the leadership, in this case, represented by pajés[2] and caciques[3]. The Indigenous Pankará has an estimated population of 5,000 people distributed along 53 villages that occupy a privileged territory: a countryside swamp nested at the municipality of Carnaubeira da Penha in the State of Pernambuco.

This study considers the conceptions of the anthropologist, João Pacheco de Oliveira, to understand the process of territorialization of Indigenous peoples in the Northeast part of Brazil, considering them from the point of view of the colonizing process in Portuguese America and the relations with the "native" society. In this way, the colonial presence has inaugurated a new relationship between the Indigenous peoples and the territory they occupied, based on complex transformations of their socio-cultural existence. Demanding reflections about these peoples and their territories to understand the changes occurring in their social organizations and the meanings attributed to their cultural expressions. Thus, the territorialization of Indigenous peoples must be considered as a process of social reorganization involving "a new socio-cultural unit through the establishment of a differentiating ethnic identity," a needing for specialized political elements, or rather a "redefinition of social control over environmental resources" and "the re-elaboration of culture and the relationship with the past "(OLIVEIRA, 2004: 22).

This process of territorialization was initiated with the accomplishment of religious missions, especially in the Hinterlands of the São Francisco River, is important in the composition of the political enterprise of the Colonial State in the work of the missionaries for the "training" of the Indigenous populations. The missionaries used as a strategy the catechesis, discipline, and accommodation of different Indigenous groups, in a homogenizing way in villages, with the "first mixture" occurring, thus contributing to a territorial occupation and the economic production (OLIVEIRA, 2004). This process is marked by conflicts and distinct interests between "curraleiros", missionaries and Indigenous people, being spaces of new strategies of utilization of the environment of recreation of identities and traditions. The "second moment

of the mixture" occurred from the alteration in the missionary settlements, from the assimilationist and preservationist political perspective impressed by the religious through measures implemented by the "Directory of the Indians" with the incentive to the interethnic marriages, the stimulus to the practice of the and settlement of settlers in the areas of old settlements and the management of civilians in the villages. However, the impact of these measures was not sufficient for the total withdrawal of the Indigenous populations from the old settlements, as these areas continued to be occupied by the "descendants of the Indians of the missions, at the same time collectively identifying themselves with references to the original missions, patronages or geographical accidents "(OLIVEIRA, 2004, p. 25).

From the XIX century onwards in the São Francisco region, there has been a marked Indigenous mobility, pressured by the occupation of spaces through the expansion of agropastoral enterprises. This compelled the Indians to pursue refuge in places of difficult access, such as the mountains, especially in the Serras Negras, Umãs, and Arapuá, areas of heathland heights, considered as "green islands" in the Hinterlands, favoring in these spaces interethnic relations, as well as the installation of new settlements.

The region currently occupied by the Pankará Indians and other groups was occupied in the XIX century by a diversity of peoples, such as "Pipiães, Avis, Xocós, Carateus, Vouvês, Tuxás, Aracapás, Caripós, Brancararus and Tamaqueús" (SANTOS, 2011). , p.16) and covered the region of the present Municipality of Floresta, as well as several islands along the São Francisco River. Italian Capuchin Missionaries organized new villages in this region in the XIX century, with the aim of establishing the "wandering" natives to make them obedient and serve as labor available to the farmers. The religious served in the "pacification" of the Indians of diverse ethnic groups, such as Pipipã, Chocó, Oê, and Umã, besides founding the Village of Jacaré in Serra Negra in 1802, where the Pipipã have been settled. In 1804 through 1806, they have founded the Aldeia do Olho da Gameleira located on the Mountain Umã, as well as Aldeamento Baixa Verde at the Pajeú, where the Chocó and Umã have been settled. These religious have also exerted efforts to "educate" the Indians in the Catholic faith, introducing them into the practice of agriculture subsistence, and in forming a contingent of work force available to stimulate agro-pastoral development in the region (SANTOS JÚNIOR, 2014).

Therefore, in the context of the Hinterlands in the State of Pernambuco, the São Francisco River is part of the physical and symbolic universe of the Indigenous population, as the mountains have always been and still are spaces of resistance, besides of being a mean of survival through the use of natural resources in a historical, socio-cultural and identity affirmation. Therefore, in the context of the backlands of Pernambuco, the São Francisco River is part of the physical and symbolic universe of the Indigenous population, since the mountains have always been and still are spaces

of resistance, besides being a means of survival with natural resources in a historical, sociocultural and identity affirmation.

Despite the settlements established in the mid-1850s, the Serra Negra continued to serve as a refuge for the so-called "Nomadic Indians" and other villages due to land pressures. At that time, the idea that the Serra Negra Indians were causing acts of violence and disorder was propagated. In order to contain these "disorders" and appease the region, the Public Administration in Pernambuco decided to endorse the sending of more missionaries, as well as the creation of new settlements, that was the case of the Aldeamento no Brejo dos Padres, to bring together Indians from the old settlements and the nomadic Indians (ARRUTI, 1996; SANTOS JÚNIOR, 2014).

At the same time, the process of regularization of rural areas has been launched, defined in private properties and areas of vacant lands belonging to the Government. Therefore, non-Indigenous farmers and small farmers who established control of the lands established a new configuration by means of the incorporation of areas of former settlements considered extinct by the City Councils. Considered by the anthropologist João Pacheco de Oliveira the moment of the "third mixture" and most striking process for the Indigenous peoples in the Northeast part of Brazil by limiting their possessions, "leaving engraved marks on their memories and narratives". Consequently, at the end of the XIX century, Indigenous peoples in the Northeast part of Brazil "disappeared" as a collectivity following the destruction of their territories, becoming individualized as "remnants", "descendants" or "caboclos" (OLIVEIRA, 2004). The anthropologist João Pacheco de Oliveira has also considered that since the 1920s, with the recognition of the "descendants" of Carnijós by the Indian Protection Service (IPS), by means of the creation of an Indigenous Health Post in the area of the former village of the Ipanema Mission. In this place, the current Fulni-ô are located in the Municipality of Aguas Belas, State of Pernambuco. From that time on, several interethnic articulations have taken place in the 1930s and 1950s, with other Indigenous peoples asking the recognition of areas of former settlements. They have also requested the installation of some Indigenous Health Posts, such as the Atikum in the Serra Umã, besides the invested ones of the Pankará, in the Mountain range of Arapuá, a moment that marks the second process of territorialization (OLIVEIRA, 2004, p.26).

It is also worth mentioning that the Toré ritual became the triggering, mediating and legitimating ethnic element connecting the past to the present through the "enchanted" as a condition of remoteness from the condition of a mixture. This serves as a reconstruction of identity relating to the mythical ancestors of a metaphorical form of "old trunks" to rediscover the "tips of the foliage" (ARRUTI, 1996; OLIVEIRA, 2004). It is also noted that for the Truká the 1970s marked a process of ethnic affirmation, also recognized by the Truká as a "resumption" movement. A new sense has become part of the process of Truká ethnic mobilization, which has been marked by the conflict

between squatters and the Indigenous people. This has been set under the intervention of the State through a state company, the Company of Resale and Colonization (CRC) and other departments and programs to stimulate the establishment of new settlers with the objective of agricultural "development" of the Island. After the accentuated process of mobilization during the 1970s and 1980s, the Truká conquered the recognition of the territory of the Island of Asuncion by the National Indian Foundation - FUNAI. On August 17, 1993, through the Administrative Ordinance 315, it was defined the territorial delimitation of the Truká on the Island of Asunção in the Municipality of Cabrobó in the State of Pernambuco.

Nowadays, the Truká population living on the Island of Assunção is estimated to be more than 4,000 Indigenous. It is worth noting that, due to historical processes of squabbling and squandering of their lands by non-Indians, the Truká currently occupy other areas, such as the islands in the Municipality of Orocó, State of Pernambuco, and in the rural area of the Municipalities of Paulo Afonso and Sobradinho, both in the State of Bahia (SANTOS & ALVES, 2016).

The conception of territoriality affirmed by Oliveira (2004) and Arruti (1996), as well as the notion of ethnic borders from Fredrik Barth (2000), takes into account the sense of reflecting the forms of appropriation of the environments, besides the notions of ownership and identity affirmation. It turns out that even if these groups maintain a long relationship with the so-called surrounding society, as well as with other Indigenous groups in the region, the ethnic boundaries remain, even if there are "changes of participation and ownership throughout individual life histories, these distinctions are maintained." In this sense, cultural differences persist even with the occurrence of "inter-ethnic contact and interdependence between ethnicities". Therefore, "ethnic groups are attributive and identifying categories employed by the actors themselves" (BARTH, 2000, p.26 and 27).

3. Conclusion

We emphasize that the purpose of the exercise of historiographical reflections proposed is to understand the sociocultural construction of Natural Environments, as an attempt to highlight an Environmental History in the Hinterlands of the Sao Francisco River. It focus on the dynamics of occupation and the use of natural resources for the affirmation of Indigenous identity, from the perspective of understanding the local knowledge about the Environment is a result of the strategies adopted to guarantee the survival and the mobilizations for ownership by the Indigenous population (CAMPOS, 2006).

In this study, we will use Oral History for research on Indigenous memories, once this technique enables the understanding of subjectivity and past representations, based on lived situations and understanding of the past (ALBERTI, 2004). In this sense, the

methodological option for Oral History aims to understand the history of the Indigenous people through oral reports in order to understand the historical, sociocultural and environmental processes experienced by these same Indigenous people.

The memories will be understood in this study from the conception of Maurice Halbwachs, when he said that remembering is not to revive, but to remake, reconstruct, rethink, with images and current ideas the experiences of the past (HALBWACHS, 2004) and Pollak's reflections), when he pointed out that the learned, the lived and the inherited occur through permanent interactions in both individual and collective memories.

The relationship of the Indigenous peoples with nature is part of the sociocultural, economic, political and cosmological universe. In this sense, the natives of the Hinterlands of the Northeast part of Brazil attach great importance to their physical and symbolic territories. For this reason, it is possible to understand the meanings attributed to Nature as forms of being part of the Environments, in order to show the existence of studies of the Indigenous question as attempts to intervene in the current ecological crisis.

Finally, with this study, we also aim to contribute to the affirmation and valorization of the knowledge that Indigenous people in the Hinterlands of the State of Pernambuco possess, especially in relation to the traditional knowledge and techniques of the region's inhabitants.

Notes:

[1] Collective dance and ritual practiced by the Indigenous Pankará, as a form of ethnic affirmation in public spaces and sociopolitical mobilizations (SILVA, 2017).
[2] Medical and spiritual leaders (SANTOS, et al, 2016).
[3] Chiefs of the villages whose function is organize, articulate, guide and represent the village or its people before other peoples (SANTOS, et al, 2016).

Referências

ARRUTI, J. M. (1996). O reencantamento do mundo: trama histórica e arranjos territoriais Pankararu. Rio de Janeiro, UFRJ/Museu Nacional (Dissertação Mestrado em Antropologia Social).

ARRUTI, J. M. (2004). A árvore Pankararu: fluxos e metáforas da emergência étnica no sertão do São Francisco. In: Oliveira, J. P. (Org.). A viagem de volta: etnicidade, política e reelaboração cultural no Nordeste indígena. Rio de Janeiro: Contra Capa Livraria/LACED, p. 231-279.

BARTH, F. (2000). O guru, o iniciador e outras variações antropológicas. Rio de Janeiro: Contra Capa Livraria.

BATISTA, M. R. R. (2005). Construindo e recebendo heranças: as lideranças Truká. Rio de Janeiro, UFRJ/Museu Nacional. (Tese Doutorado Antropologia Social).

CAMPOS, C. S. (2006). Por uma antropologia ecológica dos Fulni-ô de Águas Belas. Recife. (Dissertação Mestrado em Antropologia).

FERRAZ, S. & BARBOSA, B. F. Sertão: fronteira do medo. Recife: UFPE, 2015.

HALBWACHS, M. (2004). A memória coletiva. São Paulo, Centauro.

MENDONÇA. C. F. L. (2003). Os índios da Serra do Arapuá: identidade, território e conflito no Sertão de Pernambuco. Recife (Dissertação Mestrado em Antropologia).

OLIVEIRA, E. G. S. (2014). Os índios Pankará na Serra do Arapuá: relações socioambientais no Sertão pernambucano. Campina Grande. UFCG. (Dissertação Mestrado em História).

OLIVEIRA, J. P. (2004). A viagem de volta: etnicidade, política e reelaboração cultural no Nordeste indígena. 2ª ed. Rio de Janeiro: Contra Capa Livraria.

POLLAK, M. (1989). Memória, esquecimento, silêncio. Estudos Históricos. 2(3): 3-15.

REESINK, E. (2002). Raízes Históricas: a Jurema, enteógeno e ritual na História dos povos indígenas no Nordeste. In: Mota, C. N. & Albuquerque, U. P. (Orgs.). As muitas faces da jurema: de espécie botânica à divindade afro-indígena. Recife, Edições Bagaço.

SANTOS, C. A. B. & ALVES, R. R. N. (2016). Journal of Ethnobiology and Ethnomedicine 12(6): 1-10. DOI 10.1186/s13002-016-0078-y.

SANTOS, C. A. B., ALBUQUERQUE, U. P., SOUTO, W. M. S. & ALVES, R. R. N. (2016) Assessing the Effects of Indigenous Migration on Zootherapeutic Practices in the Semiarid Region of Brazil. PLoS ONE 11(1): e0146657. doi:10.1371/journal.pone.0146657

SANTOS, J. M. (2008). Cultura material e etnicidade dos povos indígenas do São Francisco afetados por Barragens: estudo de caso dos Tuxá de Rodelas, Bahia, Brazil. Salvador: UFBA/PGCS. (Tese Doutorado em Cultura e Sociedade).

SANTOS, J. R. S. (2011). Povos indígenas em Pernambuco: o povo Pankará e suas especificidades geográficas. Recife, UFPE (Monografia Conclusão Licenciatura em Geografia).

SANTOS JÚNIOR, C. F. (2014). Os índios nos vales do Pajeú e São Francisco: historiografia, legislação e a política indigenista sobre os povos indígenas no Sertão de Pernambuco (1801-1845). Recife: UFPE, (Dissertação Mestrado em História).

SILVA, E. (2004). "Os caboclos" que são índios: História e resistência indígena no Nordeste. In: Portal do São Francisco–Revista do Centro de Ensino Superior do Vale do São Francisco/CESVASF. Belém de São Francisco, 3(3): 127-137.

SILVA, E. (2007). Os restos dos índios Sukurú de Cimbres: cultura material, história e identidade indígena no Nordeste entre os anos 1930 e 1950. In: CLIO: Série Arqueológica, 22, 149-176.

SILVA, E. (2017). Índios no semiárido nordestino: (re)conhecendo sociodiversidades. CLIO: Revista de Pesquisa Histórica, 35, 254-272.
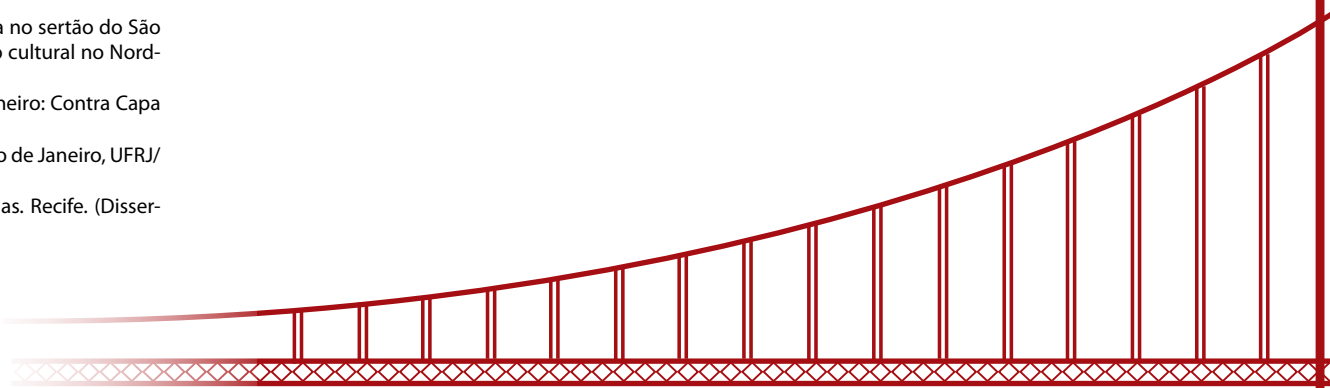
3.2 Shipwrecks as substrate for artificial reefs: representations of biology and history undergraduate students and the cultural heritage and marine biodiversity imaginary

Giulianna Saggioro Loffredo, Luiz Afonso V. Figueiredo, Amanda Gomes Alves

Abstract

Artificial reefs such as wrecks either intentional or accidental have biological characteristics similar to the natural reefs environments, serving as substrate for many species. Our goal was to identify and analyze the social representations on the relationships between shipwrecks, marine biodiversity and cultural heritage among students of Biology and History from an university in São Paulo State, Brazil, comprising a sample of 53 individuals, first and last year studies, 36 being from Biology course and 17 from History. The Free Word Evocation technique was applied, asking the interviewees three words that came to their minds when they thought about the term "shipwreck", and, finally, complementary questions addressing more specific knowledge about shipwreck's benefits and harms to marine ecosystems. An analysis was performed about the representativeness of the words, and the most cited words were: "Sea, Titanic, Accident, Contamination, Disaster and Water". We found no significant differences between undergraduate student's answers, which can be justified by the fact that the subject is not properly addressed in the curriculum and receives little attention in the training of these students or even in the media and publications.

Keywords: Marine biodiversity, Shipwrecks, Artificial reefs, Social representations, Undergraduate students (São Paulo, Brazil)

1. Introduction

The natural reefs are undergoing a rapid process of degradation through human activities around all the world. In this context, the artificial reefs emerged as an alternative serving as a substrate for the development, reproduction and shelter of the fauna and flora typical from rocky environments. (ALENCAR, SILVA and CONCEIÇÃO, 2003). Many materials can be used as artificial marine reefs, but in this research only shipwrecks were treated whether accidental or intentional.

In this perspective, this concept allows us to reflect about the fact that a ship is introduced into the marine environment which is not part of this habitat, being naturally introduced as part of that ecosystem and becoming a propitious substrate for the development, reproduction and shelter of the fauna and flora which is typical from rocky environments. (MOSCOVICI, 1978).

For a better understanding of this theme, the Theory of Social Representation was used. This theory is based on a set of explanations, beliefs and ideas about a particular person or object common to a group of individuals, in this case a shipwreck. This study is closely related to symbologies and how they influence the shared knowledge construction. (MOSCOVICI, 1978).

2. Objectives

The purpose was to identify and analyze the social representations of undergraduate students from Biology and History courses on the relationships between shipwrecks, marine biodiversity and cultural heritage, in order to understand the interrelationship between these students and the studied objects, and how it works with the common sense construction.

3. Methodology

The study was performed with undergraduate students (first and last years) from Biology and History courses from a university of São Paulo State, Brazil (Centro Universitário Fundação Santo André). The choice of these courses was based on its relationship with the studied objects. In order to investigate the social representations, we performed interviews with 53 students based on a questionnaire containing the following question: "Name three words that come to your mind when you think about the inductor term shipwreck".

The free word evocation technique was applied, which computes the frequencies and meaning order of words allowing the distribution of terms produced, according to the importance attributed by subjects (VERGÈS, 1992).
Then, the Central Core Theory of Social Representation was applied and according to it, all representation is formed by two systems of cognitive units: the central nucleus and the peripheral system. (ABRIC, 1998).

Besides the use of words, images were also used to identify which discourse the students have about their reality allowing access to contents not expressed verbally and even though they are present in the structure of the representation. (TERRA; NASCIMENTO, 2016). They were intentionally chosen to induce the interviewees and the wrecks were not identified in order to avoid biased responses. (Images 1 to 4) In addition, respondents answered the question: "Which of these images represents a shipwreck to you? Why?" (Graphics 1 to 4).

4. Results and discussion

In order to identify the central nucleus, a tabulation was done for of all the words mentioned by undergraduate students of Biology and History and then distributed

in four quadrants. The Frame 1 shows the central and peripheral nucleus obtained from Biology and History courses.

An analysis was performed about the representativeness of the words, and the most cited were: Sea, Titanic, Accident, Contamination, Disaster and Water.

Frame 1 - General Distribution of the Central Nucleus of the Social Representation by undergraduate students (first and last years) from Biology and History courses from the following question: "Name three words that come to your mind when you think about the word shipwreck"

SHIPWRECKS AS SUBSTRATE FOR ARTIFICIAL REEFS: REPRESENTATIONS OF BIOLOGY AND HISTORY UNDERGRADUATE STUDENTS AND THE CULTURAL HERITAGE AND MARINE BIODIVERSITY IMAGINARY		
	FREE WORD EVOCATION - 2017	
	Average order of less than or equal to 1,99	Average order greater than 1,99
Frequency greater Than or equal to 6	(19) Sea/Ocean (1,68) (11) Titanic/Movies/Poseidon/Wilson (1,77) (11) Accident (1,91) (10) Contamination/Pollution/Degradation (1,80) (9) Disaster/Tragedy(1,78) (6) Water (1,83)	(15) Deaths/Mortality (2,13) (12) Life/Marine life/Fishes/Corals (2,33) (7) Impact/Environmental impact/ (2,29) Ecological imbalance
Frequency less Than 6	(3) Diving (1,33) (2) Artifacts/Archaeological remains(1,00) (2) Island/Ilha Bela (1,00) (2) Pirates/Vikings (1,50)	(5) Sink/Drowning (2,20) (5) Destruction/Wreckage (2,40) (5) Iceberg (2,40) (4) Climate/Cold/Freezing/Storms (2,25) (3) Despair/Fear(3,00) (3) Oil spill (2,33) (3) Stories (2,00) (3) Treasures (2,33) (2) Boat/Ship (2,00) (2) Beat/Collision (2,00) (2) Particular goods/Property(2,00) (2) Rust (2,50)

Picture 1 - Shipwreck of the Prince Albert in the Atlantic Ocean.

Picture 2 - Shipwreck of the Cargo "Giannis D" in the Red Sea.

Picture 3 - Shipwreck of Andre Doria in the Atlantic Ocean

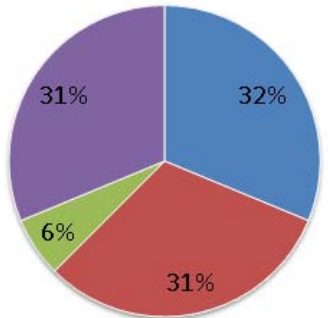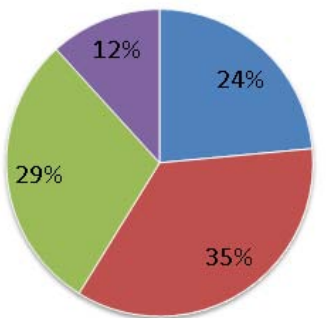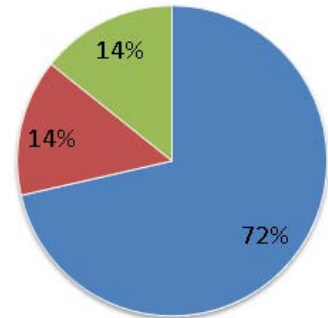Picture 4 - Shipwreck of Titanic in Atlantic Ocean.
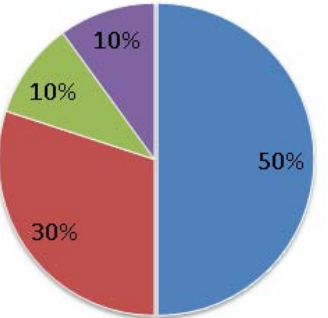
Graph 1 – Underclassmen of Biology

Graph 2 – Upperclassmen of Biology

Graph 3 – Underclassmen of History

Graph 4 – Uperclassman of History

5. Conclusion

The words mentioned by undergraduate students refer predominantly to the negative aspects caused by the shipwrecks. On the other hand, in the image representation study, the students saw the beauty behind the shipwrecks citing positive aspects.

Their knowledge about the theme comes from the experiences acquired through movies and documentaries involving the most known shipwrecks explored by the media and the popular imagination, such as the RMS Titanic that was featured in the Central Core;

The knowledge is generic among the students, without much wealth and exploitation in the results as expected because the subject is not properly addressed in the curriculum and receives little attention in the training or even in the media and publications.

Acknowledgment

References

Alencar, C.A.G.; Silva, A.S.; Conceição, R.N.L. Texto básico de nivelamento técnico sobre recifes artificiais marinhos. Secretaria Especial de Aquicultura e Pesca da Presidência da República (SEAP-PR), Brasília, DF, 51 p., 2003. Disponível em:<http://www.adital.com.br/banners/Texto%20b%E1sico%20sobre%20Recifes%20Artificiais>. Acesso em: 04 ago. 2016.

Abric, Jean Claude. Pratiques sociales et représentations. Paris: Presses Universitaires de France, 1994.

Moscovici, S. A representação social da psicanálise. Tradução de Álvaro

Cabral. Rio de Janeiro: Zahar, 1978.

Terra, Izabela Gonçaves; Nascimento, Adriano Roberto Afonso. Imagens e representações sociais: contribuições da análise semiótica. Psicologia em Estudo, v. 21, n. 2, 2016. Disponível em: <http://www.periódicos.uem.br/ojs/index.php/PsicolEdud/ article/view/29783/pdf>.

Vergès, Pierre. L'évocation de l'argent: une méthode pour la définition du noyau central d'une représentation. Bulletin de Psychologie, 45 (405), 1992, p.203-209.

3.3 A fractured land: ethnographic approaches in exploring perspectives and perceptions toward hydraulic fracturing in New Zealand

Anna Bettini

Abstract

Taranaki represents a place charged with Maori cultural history and values, and the centre of oil and gas production in New Zealand. In the last few decades, hydraulic fracturing has been used extensively in the region, allowing oil and gas industry to access more and larger oil and gas deposits. With a total of 65 hydraulic fracking operations conducted in 39 different wells, companies have established their presence with production stations and well sites, sharing land with dairy farms and residential neighbourhoods. A growing body of research has explored the potential impacts of this controversial practice, focusing on the ecological and human health concerns, such as water quality, discharges of toxic substances, and air emissions released during processing (Adagate et al.,2014; Perry, 2013). However, the associated risks and impacts are still unclear and need to be thoroughly investigated. Fewer studies have considered the changes that fracking causes on how people relate to their landscape and experience their sense of place and belonging (Sangaramoorthy et al., 2016). Drawing from my preliminary doctoral fieldwork, this paper explores perceptions toward this practice. I focus on how this extractive process impacts the relationship people have established with their landscape and between them, discussing on the lack of proper communication between industry and locals, and underlining the importance of ethnographic research to understand extractive practices processes and their impacts better.

Keywords: community-based research; human-landscape dynamics; hydraulic fracturing; sense of place; New Zealand.

1. Introduction

When thinking of New Zealand, often the perceptions that many have is of a country with pristine landscapes, organic farming, and sustainable ways of living. In 2001, a report commissioned by the Ministry for the Environment to estimate the economic value of the country's green and clean image, described New Zealand as an environmental paradise to escape to. They described the following image:

"Imagine that you live in Asia, or Britain or perhaps the US. You have driven home through the smog to your cramped apartment, and as you eat your dinner, you see on TV images of snow-capped mountains reflected in crystal-clear unpolluted lakes.

Cows graze in lush green pastures, native birds sing in the forests, waves thunder onto deserted beaches, and happy, healthy people are having fun. It is New Zealand…" (Ministry for the Environment 2001).

Now, try to picture this. You are driving up and down those hills, across those green pastures, near streams and near snow-capped mountains. As you turn along the road, the metal structure of an oil rig comes into view. You continue driving, and text and bright cautious signs, concrete, and fences replace that green. Standing tall as the mountains were previously before your eyes, you see now chimneys, releasing in the air their white smoke, while not far from them, on those same green lush pastures, cows are grazing peacefully. This is an image itself that not many associate with paradise as described by the Ministry for the Environment, but which is a reality itself within a country often branded through place images such as 100% PURE and 'beautiful New Zealand' (Coyle and Fairweather 2005). The image described above was the landscape I was presented with when I started my ethnographic fieldwork in Taranaki, New Zealand. Located in the southwestern part of the country, Taranaki is a region that has been considered for years the centre of oil and gas production. It is also a region that offers a varied landscape, ranging from "the dissected hill country to the east to the marine terrace formations to the south and, to a lesser extent, the north" (Taranaki Regional Council, 2011, p.8). Home to a significant indigenous flora and fauna species, including series of threatened species, Taranaki is a place charged with Maori cultural values and traditions. Many traditions are linked to the dominant geographical feature of its landscape, Mt Taranaki/Egmont (2, 518 mt). It is a geographic feature to which all the eight iwis (tribes) within the area attribute a high cultural and spiritual significance. Mt Taranaki is an ancestor providing spiritual and physical sustenance, his beauty and mystique inspire and guide members' narratives. This connection shows the importance that the mountain himself has had in shaping their personal history (Smith, 2004). Like most of New Zealand, this region is a highly seismic area: around 200-300 earthquakes are recorded each year and account for 2% of the total number of earthquakes in the country annually.

In this region companies have extracted coal, gas, and oil since the early 20th century, and in recent years new practices have been applied to reach fossil fuels that are in deeper deposits.

Among these new practices, hydraulic fracturing or fracking has been more extensively used in the country. A process that ethnographers and anthropologists have documented it in more recent years in other regions of the world from the United States to South Africa and Asia, bringing into the discussion not only concerns related to the unclear and potential environmental impacts (such as increased seismic activity, pollution, and water contamination), but also the socio-cultural effects that this specific practice has had on the communities living in the area. Willow and Wylie (2014) underline the need for a "new and urgent lens through which to explore the

diversity, dynamism, and politics of human-environment relationships" (p.224). Ethnographic approaches, as Perry (2013) asserts, "offer a way to collect data on the cumulative impacts of industrialization and chemical pollution on local communities" (p. 47). These are valuable tools for evaluating not only the possible health outcomes of a community in relation to this unconventional extractive activity and its development, but also to contribute in helping both health practitioners, researchers, and government agencies to identify the steps to follow to maintain the well-being of a community itself.

For this article, I will first define and discuss hydraulic fracturing and effects linked to it, summarizing what regulations are used in New Zealand. I will briefly discuss the importance of conducting anthropological and ethnographic research to collect data regarding the changes and perceptions members of the communities as well as changes professionals working in this industry may have experienced. Drawing from my preliminary fieldwork conducted as part of my doctoral project, I will present some of the findings I gathered in relation to the loss and deterioration of their place and deterritorialization often experienced among communities and their perceptions and concerns toward hydraulic fracturing.

In New Zealand no ethnographic work has been carried out to document the effects led by this practice to date even though there is extensive industrial activity. Due to its richness in oil and gas, Taranaki has been described as the "Texas of the South Pacific" (Loomis, 2017). Since the first frack activity, Taranaki has been home to a series of oil and gas explorations that have brought a total of 65 fracking operations in 39 different wells operated by companies such as Greymouth Petroleum, Todd Energy Ltd, Origin Energy NZ Ltd, and Tag Oil (PCE, 2014). These companies have established their presence through the years with well sites and production stations around residential areas and schools and by often sharing the land with dairy farms. As mentioned above, considering the symbolic values given to the geographical features present in the region, exploring the connection that people have with the landscape can shed light on how different community members react and adapt to the presence of an unconventional extractive practice such as fracking. It can help to understand how it may have reshaped sense of place and belonging.

2. Fracturing land in New Zealand: Regulations and public concerns

Hydraulic fracturing has been seen by professionals working in the sector as the opportunity for a more economically advantageous way of extracting fossil fuels, especially when considering the high costs and low benefits associated with other common methods of producing energy from them (Todd Energy, 2012). The use of hydraulic fracturing or fracking allows the industry to reach the oil and gas that are trapped in reservoirs with low permeability and with little possibility for the fossil fuels to naturally flow to the well bore (Montgomery and Smith, 2010). In the early

1940s, when the practices first started to be used in the United States, hydraulic fracturing consisted of the injection of a liquid made of nitroglycerine (NG), to stimulate shallow hard rock wells (Montgomery and Smith, 2010, p. 27), making the practice highly illegal (Montgomery and Smith, 2010). Nowadays, a mixture of water, proppants (silica sand/or manufactured granules), and chemicals get pumped into the soil. This fluid is used to "prop rock fractures open ,and injects assorted chemicals deep into the ground at high pressure" (Willow &Wylie, 2014, p.223). A combination of vertical and horizontal drilling, consisting of "guiding wells down a kilometre[and] then bending the well bore to extend horizontally another kilometre" (Heinberg, 2014, p. 39) and allows for more oil and gas to flow from tight sands. The fracking process is initiated by the drilling of a well that is lined with steel casing to ideally prevent any leakage into water aquifers. After drilling through shallow freshwater aquifers, a pipe is immediately run through the hole and cemented into place. The next step consists of perforating the steel casing. The holes or perforations create entry points for the fracking fluid to reach the targeted hydrocarbon zones. Once the well is perforated, fracturing fluid with proppant are injected under high pressure into the reservoir creating fractures or fissures (Todd Energy, 2012).

The history of hydraulic fracturing in New Zealand is relatively short compared to countries like the United States where fracking activities have been present since the late 1940s early 1950s (AOGHS, 2007). Almost all the fracking used to gather fossil fuels in New Zealand has been exclusively carried out in the Taranaki basin. When looking at the regulations of fracking activities in New Zealand, there are five key statues that the industry is obliged to observe:

(1) Crown Minerals Act 1991;
(2) Health and Safety in Employment Act 1992 – Health and Safety in Employment (Petroleum Exploration excavation) regulations 2016 ;
(3) Hazardous Substances and New organism Act 1996 (HSNO);
(4) Resource Management Act 1991 (RMA);
(5) Historic Places Act 1993 (HPA).

 The purpose of each of these statutes is very distinct and they are applied either individually or in combination throughout the different stages of any hydraulic fracturing process. In 2014, the Parliamentary Commissioner for the Environment published a report in which stressed the confusion often resulting from the application of the different statues and recommending "guidance and direction from the Government in the form of a national policy statement, paying particular attention to unconventional oil and gas"(PCE, 2014, p.6). It also suggested focusing on effectively improving regional council plans. As reported, "virtually all of these plans have rules for drilling bores that do not distinguish between drilling for water and drilling for oil and gas [showing] how unprepared the country's environmental regulators are for a potentially rapid expansion of the industry" (PCE, 2014, p.6). Surprisingly in Taranaki,

drilling for oil and gas does not require consent for conventional extractive practices. Outside Taranaki, where drilling an oil and gas well generally does require a consent from the regional council, "the council does not have the option of saying 'no'" (PCE, 2014, p.6). Prior to July 2011, the Taranaki Regional Council did not require resource consents also for the more than 50 fracks that were performed up to that year (PCE, 2014).

 After the legality of unconsented fracking was put into question (PCE,2014), Taranaki Regional Council has required resource consent for hydraulic fracking. A resource consent is now needed for injecting fracking fluid, and it is done for a 'discharge to land', except where the fracking is being done to extract gas from a coal seam. This is because "water that lies within a coal seam is usually regarded as an aquifer, injecting fracking fluid into a well drilled into a coal seam is a 'discharge to water'" (PCE 2012). The drilling process is subject to certain standards. The well, for example, must be "cased and sealed to prevent the potential for aquifer cross-contamination or leakage from the surface" (TRC, 2012, p.30). Nonetheless, as reported by the Parliamentary Commissioner for the Environment, the council thinks that they have no need to check compliance with this rule, because "[t]he reality is the requirements associated with environmental protection that relate to well integrity are precisely those that relate to health and safety addressed in the petroleum regulations" (Taranaki Regional Council, 2013, p.8). As of May 2011, where resource applications for fracking are required, these must always be accompanied by an Assessment of Environmental Effects, which details the effects that activity could have on the environment. When granting consent, the council sets conditions including specific baseline standards of measurements or the monitoring of local wells, and groundwater.

In the Taranaki area, most fracking operations have used water-based gels, typically made up of more than 97% water. The fluid composition varies from pure water to water mixed with solvents or gel and in some instances diesel oil. Diesel contains benzene, toluene, ethylbenzene, and xylenes, giving it the acronym BTEX (PCE 2012). Between 2001-2005, the Parliamentary Commissioner for the Environment reported that diesel was used as the base for the fracking fluid in 17 fracks in Taranaki. BTEX compounds are substances that are also released during the fracking process as they occur naturally in underground water sources, and the fracks created facilitate the release of these compounds into the surrounding water sources. These volatile compounds are "well-known contaminants of soil and groundwater near oil and gas production sites and petrol stations" (PCE 2012, p. 40), and as the Department of Environment and Science of Queensland, Australia reports "benzene is a known carcinogen (cancer-causing)". As published in Forbes Magazine, there has been a growing health and safety concerns with chemicals and potential water contamination (Stone 2017). Like Finkel et al. (2013) discuss, a myriad of contaminants is released during fracking operations. Studies have shown how exposure to volatile organic compounds like benzene is associated with low birth weight, an increased risk of

childhood leukaemia, and other birth defects such as cleft palate and spina bifida (Lupo et al., 2011; Tanner et al., 2015). Exposure to high concentrations of toluene has been associated with preterm birth, growth retardation, and spontaneous abortion and reduced fertility. In a recent study conducted in the US, Elliott et al (2017) have determined that 95 out of 240 chemicals often present in hydraulic fracturing fluids and wastewater are linked to developmental toxicity. Health concerns were pointed out to me by community members in the area as well. Toward the beginning of my fieldwork phase, I often had conversations with individuals from other parts of the country or other parts of the world and they all seemed surprised to hear that hydraulic fracturing was present in the region, questioning the safety of this practice.

Oil and gas companies often tend to minimize the impacts that the chemicals might have on the people's health, stating how the percentage of the fracking fluid to the water used is very minimal, or, as Todd Energy NZ reports in its submissions to the Parliamentary Commissioner of the Environment, how "[t]he additives used […] are largely those found in everyday products including food" (Todd Energy, 2012, p. 17) and therefore to be considered harmless. Among these components we can find antifreeze, glutaraldehyde, guar gum and biocides, that are found in common household products. While before companies would not disclose information on the fracking fluids used, this position has been challenged, bringing to almost total disclosure or at least use of less toxic chemicals. The Taranaki Regional Council (2013) reports how "[t]he typical percentage of additives in the fracking fluid is 2% with the water carried drawn from municipal supplies or consented river sources" (p.139). John Pfahlert, former chief executive of the Petroleum Exploration and Production Association in New Zealand stated in 2012 how the BTEX cocktail is not used by frackers in New Zealand (Macfie 2012). Although the BTEX cocktail has been not used as base for the fracking fluid in the past ten years, no regulation in the country has officially banned its use, nor the government has set a regulatory plan toward its use. A lack of clear regulations, consents, and policies soon became a recurrent theme in conversations with my informants.

When addressing the environmental and health concerns expressed by community members to professionals in the sector, I often received mixed responses in my interviews. A senior environmental engineer at a consulting firm in New Plymouth delineated to me the safety of the procedures in comparison to countries like United States, describing how the probability for water contamination is unlikely, since the "bearing strata with oil and gas it's about 3500 meters in depth and at times deeper" (A.Bettini, personal communication 2017). However, unlikely doesn't result in being impossible. "[I]f a situation where there is continuous fracturing occurs, contamination could happen. But so far in New Zealand I never heard of that" [A.Bettini, personal communication 2017]. He stressed his point saying how the opposition locally carried in New Zealand toward fracking it is mostly against the problems caused by traffic, pollution, and noise: "having a wellsite on your land... it smells bad and looks bad. If I were a land owner, I'd never agree to have a well on my land. I mean, that if I

live a mile down the road, I'd not necessary observe those effects so I will be fine..."(A. Bettini, personal communication, 2017). However, he repeated how he would never choose to live near a fracking well sites:

> "I wouldn't want somebody to drill next to my house, but I don't know how to live far from those at the same time. But I think the sooner we transition to EV (electric vehicle) and cleaner energy the better off we will be. As soon as we don't need oil and gas. But for a while we will still need it for the electrical power network.... if we want car, plastic, electricity... as soon as we can come up with a better way of doing it, we are kinda stuck. That means we got to do a lot to make the transition quicker" (A.Bettini, personal communication, 2017).

As I only have carried preliminary fieldwork, a more in-depth investigation is still required, knowing how these concerns and the health problems that might have risen due to the fracking process present in the area might have shaped individuals and their relationships. In many occasions I was reminded and told by some of my informants how often those affected are less willing to discuss their health matters in detail due to the social and emotional effects their health conditions have brought to them and/or their families.

3. Ethnographic methods: A tool for evaluating impacts of extractive practices

Ethnography can be used as a tool for understanding social dynamics within communities affected by hydraulic fracturing. In this context, ethnographic approaches have been limited, and within disciplines like sociology, the research to date focuses mainly on quantitative methods rather than qualitative ethnographic enquiry. Ethnographic approaches, including tools like participant observation, focus groups, and interviews, provide a way to evaluate not only possible health outcomes of a community concerned with this activity, but also helps health practitioners, researchers, and government agencies identify the steps to follow to maintain the well-being of the community. As Perry (2013) explains, these approaches offer the possibility to reach out and to inform local public health research agenda, making culturally appropriate policy recommendations, and shed light on the psychosocial stress factors involved in it.

During my preliminary fieldwork I soon found from casual conversations that, especially with young adults living in the Taranaki region, there is a lack of awareness of the practice itself and the time it had been present in the area. In my interviews with professionals and community members, it was often a topic of discussion, revealing an uncertainty in the information offered by companies or local councils to the general public. Another senior manager for an engineering consulting firm in New Plymouth expressed to me his belief that fracking had been only around for less than ten years in Taranaki. He was quite surprised with the information I gave him based on documentation available through the Ministry for the Environment website. His

perception was not completely incorrect: hydraulic fracturing operations have been intensifying since 2005, but as the Parliamentary Commissioner for the Environment reports, the first known frack was carried out almost 30 years ago. Indeed, the first operation occurred in 1989 at Petrocorp's Kaimiro-2 gas well in Taranaki, though there may have been earlier instances of fracking in the area. These words have led me to investigate more of what makes this extractive method so different from others and how this has been carried in the region and has been shaping the relationships people have established with their land. By providing more contact between the well bore and oil or gas bearing stratum, hydraulic fracturing gives the possibility for producers to drill horizontally beneath neighbourhoods, schools, and airports [as it has been carried out in cases like the Barnett shale, where significant gas deposits lie beneath the City of Fort Worth]. These scenarios occur in New Zealand as well, where many of the well sites are built near schools, dairy farms, or next to the main airport. It becomes then natural to ask how the closeness of this practice to residential areas shapes the way people see and relate to their landscape?

Throughout the years, members of local non-profit organizations have submitted several appeals against Taranaki Regional Council and its decisions in relation to fracking. Recently, Taranaki Energy Watch has set a court case against the regional council and appealed to the Environment Court over oil and gas rules proposed in Taranaki council's district plan (Taranaki Energy Watch, 2018). Among the many issues covered in their appeal, the group opposes the lack of controls for oil and gas activities in residential and township zones, underling the need for more adequate separation distances to ensure the health and safety of people in the vicinity. As De Rijke (2017) asserts "[a]nthropological work on fracking to date has insufficiently engaged with the technology in its global, corporate, scientific and historical contexts" (p.5). By emphasizing a more interdisciplinary research with geologists, engineers, hydrologists and experts, De Rijke (2017) stresses how this could facilitate a more informed understanding of fracking. To build upon existing anthropological work and address the insufficient engagement with the technology, I have established initial contact with professionals in the sector during fieldwork as I took into consideration the importance of exploring these aspects.

Through our interview, the senior engineer addressed to me how there is always a bit of confusion toward fracking and not how many are concerned more about water contamination, without considering also other aspects, such as well degradation and well abandonment:

> "Overall production is not just fracking. The idea of moving from one well up to another it doesn't exist...even in Saudi Arabia or in Australia... those wells deteriorate over time. I am trying to think of a good example... Basically, we have a bottle of sand, right? And it has water in it. You can take a straw and suck all the water, out right? You have to move to a new bottle to find more water...okay? Well... so they move around from bottle to bottle to bottle...there is a whole bunch of bottles... the

thing is that you can't get all the oil by staying in one place no? [...] Let's say you get very lucky and you get a thousand of barrels a day. After 20 years that will be five or 10. It is just not economic to keep that well and it is not big enough to meet the demands for all those people driving cars and trucks. So, for all those people, to meet the demand you go out and find wells. So, we need to do that though... as a society until we are able to transition over. New Zealand is positioned to do that more quickly let's say than California..." (A.Bettini, personal communication, 2017).

Despite the closeness of their houses to well sites, unclarity of information was a repeating pattern among community members who had established a long-term relationship with oil and gas companies. An old couple of former farmers who spent their entire life in the Stratford area [see fig. 1] explained to me when asking what they knew or what it was told to them about hydraulic fracturing: "we just know it is not like normal drilling. We know that something gets pumped in the ground. And that's how they get their oil and gas. That's about it" (A.Bettini, personal communication, 2017). As for the chemicals used or the steps required, the same couple revealed to me how their knowledge of this extractive practice is 'very simple'. One of my informants, a resident in Inglewood, asserted how not fully knowing what occurs could be seen as a limitation in case of a negative turn of events. She expressed how knowing about the potential effects on health and environment in relation to fracking is becoming easier since news and information are more accessible through the internet but finding the right information and trusting the sources can be, as she told me, frustrating at times. During our conversation, my informant said how on certain occasion, not knowing can be seen as a blessing: the saying 'out of sight out of mind' applies to this. She expressed that many who work or live near fracking facilities tend to avoid discuss any aspects of this practice with their families and/or pretend not to see fracking procedures happening across their fields in order to carry on a life with less tensions, conflicts, and worries. Family ties and relationships with neighbours and friends can be deteriorated as the landscape itself gets deteriorated by the practice, changing eventually the way one would relate with the place they call home.

Fig.1 Map showing a close up of Taranaki region

By carrying interviews and focus groups with school administrators and educators from different communities and counties in a fracking region like Pennsylvania, Schafft and Biddle (2014) also applied an ethnographic lens to explore the perceptions toward the oil and gas industry and hydraulic fracturing. By looking at the dynamics of "natural boomtown development, community change, and how these changes may affect educational and instructional decision making" (Schafft and Biddle, 2014, p.670). Schafft and Biddle (2014) aimed to "observe and assess rural community change, and how communities demonstrate agency in responding to change" (p.672). In rural communities, like those near the Marcellus shale region in the United States, schools play a key role in education for both younger and adult generations. Schafft and Biddle's (2014) study shined light on the stresses due to rapid and unpredictable changes that might affect rural communities and their economic conditions. As reported by the authors: "[w]hen asked about the nature of the changes associate with the introduction of the gas industry to their local area, participants often spoke first about the toll of the industrial development on the limited existing infrastructure of their communities, and particularly the effects on the conditions of the roads, increases in traffic and road safety" (Schafft and Biddle, 2014, p.675). The responses they received from participants regarding how the school can help mitigate these rapid changes due to the industry and/or adapt them was quite ambivalent. Some teachers and superintendents around the region see it necessary to integrate information about fracking in their curriculum as in the end most students living in the area will end up working for that sector. One superintendent underlined that by explaining the process of the geology, the science behind it, and jobs available with it, it provides a good background to see students succeed in that industry. On the other hand, educators are worried about the unpredictability and the environmental impacts. One educator in Bradford county expressed his concern that perhaps one day a well could be constructed near his house:

> "There's been wells around my house for the last few years, but I always wonder if one day I go home, it might be today or tomorrow or a couple years, is my water all right? I think that's the biggest thing that I worry about. I don't really worry about traffic or the air quality. I don't really worry about any of that other stuff. I just worry about the water" (Schafft and Biddle, 2014, p. 679).

Willlow's ethnographic work (2014) offers a clear insight into how the deterioration of the landscape by extractive practices can inflict distress on residents. As she underlines, "[e]nvironmental degradation disrupts geophysical processes and transforms ecosystems extending far beyond the physical and environment and into the realm of the social and cultural life" (Willow, 2014, p.240-241). Drawing a parallel with the Anishinaabe people in Western Ontario who were deeply impacted by the practice of clear-cutting for decades, Willow (2014) discusses how individuals living in a region of Ohio where shale energy is extracted through fracking have experienced similar feelings of disempowerment that have changed the way the members of communities see and relate to the environment. For members of the Grassy Narrows

First Nations, clear cutting has brought profound modifications to their landscape, threatening their land-based activities and ways of life (Willow 2009). Hunting, gathering berries and rice, and trapping are part of a "life of land-based subsistence, the cultural identity that accompanies it"(Willow, 2009,p.44) and something that as Judy DaSilva activist at Grassy Narrows told Willow are traditions that one cannot just quit "it's not just food for us; it's spiritual" (Wlillow, 2009, p. 44). This link with the land could disappear and as one of the residents in Ohio stressed to Willow, it becomes horrifying to see that the knowledge could disappear instead of being protected; "[t]he only entities that have any control over this are the oil and gas industry and the state government" (Willow, 2014, p. 247). Similar perspectives and perceptions also shared to me by community members I had a chance to interview. As I questioned them on their own understanding of sense of place and loss of that connection with the land, many community members linked back to a sense of respect toward Papatuanuku (Mother Earth) as an aspect embedded in their daily life activities. They emphasize why a practice such as hydraulic fracturing has brought them to experience several moments of emotional frustration and feelings of disempowerment toward the modifications occurring in their landscape. At the same time, some of my informants, even professionals in the sector, have argued and pointed out to me how perhaps the long presence of oil and gas industry in the region has led them to face a certain level of desensitization, to say a loss of emotional responsiveness to the negative aspects linked to the industry. This level of desensitization can consequentially shape their opinions toward extractive practices like hydraulic fracturing, as well as their sense of place and perceptions of belonging.

4. Conclusion and Future Steps

Using ethnographic research methods to study the effects of extractive practices can help to shed light on how effectively the practice is regulated, and better understand the different perspectives and the way individuals might react toward them. So far, the data I gathered is limited: while some of my informants expressed their concerns toward the environmental and health impacts associated with hydraulic fracturing, discussing the struggles that often this controversial practice has brought to their social bonds and connections. Others openly addressed to me their confusion toward the practice itself and the lack of information or mixed information often received by companies. The few professionals I interviewed so far have explained to me their view on the industry and how it can move forward. When considering anthropological engagement with extractive practices, qualitative ethnographic approaches can provide an additional perspective in analysing the impacts of the extractive process in communities (Checker, 2007). The loss or modification of certain land features can deeply impact a community's sense of belonging, leading consequently to that loss of connection with the land and to an experience of detachment or deterritorialization from one's own landscape. If a particular landscape feature disappears or is lost, the memories and stories linked to that particular rock, tree, or river could be modified or lost as well.

Going forward with this research I plan to explore further in-depth the aspects mentioned above. By using interviews, focus groups, and participant observation, I can find more answers to how extractive practice like hydraulic fracturing can shape the relations between community members and with the surrounding landscape. As many authors have pointed out (see Brown 1992; Brown and Mikkelsen, 1977; Brullel and Pellow,2006; Dove 2001; Scoones 1999), there is still a need to facilitate collaboration between anthropologists and environmental scientists to develop more comprehensive reports on the risks and impacts experienced within communities and facilitate a shared expertise. The rapid intensification of this practice across North America, South America, and Oceania has created a demand for a richer body of ethnographic data to document the ecological and human health concerns in relation to aspects of production such as water quality, discharges of toxic substances, and air emissions released during processing (Holzman 2011; Penningroth et al 2013), and consideration for the socio-cultural impacts it can leave to individuals, families, and entire community when extraction occurs so close to houses, schools, and backyards. As one of my informants mentioned to me in our interview:

> "My sense of belonging to Waitara, to the river, to the mountain...it is just as strong. Maybe stronger now. That's why I try to say something to what it is happening. […] We have my grandchild on the property and I think...how he's going to be affected?...eating the meat, eating the vegetables, drinking the water.... next to all those well sites. We could move but where to?? I have been developing a property that I want my family to occupy for centuries I believe that we will outlive them. That they will be gone, and we'll still be there. I have to think that otherwise I will get mentally unwell... I have to find some hope" (A.Bettini, personal communication, 2017).

References

Adagate, J.L. et al. (2014). Potential public health hazards, exposures and health effects from unconventional natural gas development. Environ Sci Technol. 48(15), 8307–20.

Brown, P. and Mikkelsen, E.J. (1997). No safe place: Toxic waste, leukaemia, and community action. Berkeley: University of California Press.

Brown P. (1992). Toxic waste contamination and popular epidemiology: Lay and professional ways of knowing. Journal of health and social behaviour 33,267-281.

Brullel, R. and Pellow, D. (2006). Environmental justice: Human health and environmental inequalities. Annual review of public health 27, 103-124.

Checker, M. (2007). "But I know it's true": Environmental risk assessment and anthropology. Human organization: Summer 2007 66 (2), 112-124.

Coyle, F., and Fairweather, J. (2005). Challenging a place myth: New Zealand's clean green image meets the biotechnology revolution. Area, 37 (2), 148-158.

De Rijke, K. (2017). Produced water, money water, living water: Anthropological perspectives on water and fracking. Wiley Interdisciplinary Reviews: Water, 5-18.

Dove, M. (2001). "Interdisciplinary borrowing in environmental anthropology and the critique of modern science". In New Directions in Anthropology and Environment: Intersections, edited by Carole Crumley, A. Elizabeth Van Deventer, Joseph J. Fletcher, 90-112. Landham, Md.: Alta Mira

Elliott, E.G., et al. (2017). A systematic evaluation of chemicals in hydraulic-fracturing fluids and wastewater for reproductive and developmental toxicity. Journal of Exposure Science and Environmental Epidemiology, 27, 90-99.

Finkel, M. et al. (2013). Modern natural gas development and harm to health: The need for proactive public health policie. ISRN Public Health,1-5.

Heinberg, R. (2014). Snake Oil: How fracking's false promise of plenty imperils our future. Clearview Books.

Holzman, D. (2011). Methane found in well water near fracking sites. Environmental Health Perspectives 119 (7), 289

Loomis, T. 2017. Petroleum Development and Environmental Conflict In Aotearoa/New Zealand: Texas of the South Pacific. Lanham, Maryland: Lexington Books

Lupo, P.J. et al. (2011). Maternal exposure to ambient levels of benzene and neural tube defects among offsprings: Texas, 1999-2004. Environ. Health Perspect., 119 (3), 397-402.

Macfie, R. (2012). Fracking in New Zealand. Listener, Issue 3740.

Ministry for the Environment (2001). Our cleen green image: what's it worth? MAF publication August.

Parliamentary Commissioner for the Environment [PCE].(2012). Evaluating the environmental impacts of fracking in New Zealand: An interim report. New Zealand Government.

Parliamentary Commissioner for the Environment [PCE]. (2014). Drilling for oil and gas in New Zealand: Environmental oversight and regulation. New Zealand government, Wellington

Penningroth, S.M., et al. (2013). Community-based risk assessment of water contamination from high-volume horizontal hydraulic fracturing. New Solutions 23 (1), 137-166.

Perry, S. L. (2013). Using ethnography to monitor the community health implications of onshore unconventional oil and gas developments: Examples from Pennsylvania's Marcellus shale. New Solutions 23 (1),33-53.

Sangaramoorthy, T, et al. (2016). Place-based perceptions of the impacts of fracking along the Marcellus Shale. Social Science & Medicine 151, 27-37.

Schafft, K., and Biddle, C. (2014). School and community impacts of hydraulic fracturing within Pennsylvania's Marcellus Shale Region, and the Dilemmas of educational leadership in Gasfield boomtown. Peabody Journal of Education 89 (5), 670-682.

Scoones, I. (1999). New Ecology and the social sciences: What prospects for a fruitful engagement? Annual review of Anthropology 28, 479-507.

Smith, A. (2004). A Maori sense of place?: Taranaki Waiata Tangi and feelings for place. Geographer 60 (1), 12-17

Stone, J. (2017). "Fracking and what the new EPA means for your Health". Forbes magazine. Retrieved from: https://www.forbes.com/sites/judystone/2017/02/17/fracking-and-what-new-epameans-for-your-health/

Tanner, J.P. et al. (2015). Associations between exposure to ambient benzene and PM2.5 during pregnancy and the risk of selected birth defects in offspring. Environmental Research, 142, 345-353.

Taranaki Energy Watch (2018). Court hears appeal against oil exploration. Retrieved from: http://www.taranakienergywatchnz.org/news-article-court-hears-appeal-oil-exploration/

Taranaki Regional Council. (2012). Hydrogeological risk assessment of hydraulic fracturing for gas recovery Taranaki Region. Retrieved from: www.trc.govt.nz/assets/Documents/Research-reviews/HF/hf-may2012-graphp19.pdf

Taranaki Regional Council. (2013a). Guide to regulating oil and gas exploration and development activities under the Resource Management Act. Retrieved from: https://www.trc.govt.nz/assets/Documents/Guidelines/OilAndGas/OilandgasGuid eOct2013.pdf

Taranaki Regional Council. (2013b). Future directions for the management of oil and gas operations in the Taranaki region: Review of the Regional Freshwater Plan for Taranaki. Retrieved from: https://www.trc.govt.nz/assets/Documents/Planspolicies/SoilWaterPlanReview/DraftFLMP-FD-OilGas-Nov2013-w2

Todd Energy.(2012). Hydraulic Fracturing: Submission to the Parliamentary Commissioner for the Environment. Retrieved from:https://www.toddenergy.co.nz/wpcontent/uploads/2017/07FINAL_HF_SUBMISSION_FOR_TODD_ENERGY.pdf

Werner,A.K, et al. (2015). Environmental health impacts of unconventional natural gas development: A review of the current strength of evidence. Science of the Total Environment 505, 1127-1141.

Willow, A.J. (2009). Clear-cutting and colonialism: the ethnopolitical dynamics of indigenous environmental activism in northwestern Ontario. Ethnohistory 56(1), 35-67.

Willow, A. (2014). The new politics of environmental degradation: un/expected landscapes of disempowerment and vulnerability. Journal of Political Ecology 21, 237-257.

Willow, A.J., & Wylie, S. (2014). Politics, ecology, and the new anthropology of energy: Exploring the emerging frontiers of hydraulic fracking. Journal of Political Ecology 21, 222-236.

3.4 Use of natural resources and socio-environmental conflicts in the northeast region of Brazil

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Abstract

The socioeconomic context and the quality of life of populations are strongly dependent on access to water resources. The lack of access to drinking water resulting from the diversity of water uses and inadequate forms of soil may cause socio-environmental tensions between the various segments of society in different territories. This work aims to report cases of problems associated with the social production of space and the degradation of the multiple uses of water resources in the Northeast, Brazil, focusing on environmental injustice. The study was conducted from January to March 2015 through on-line searches in the Map of Environmental Injustice and Health in Brazil. In total, there were 27 cases of conflicts arising from 12 human activities and 20 socio-environmental damages. Among the population, artisanal anglers were the most directly affected, predominating among 33% of the total number of social actors involved (total number = 83). In this context, collective initiatives (society, state and entrepreneurs) seeking to ensure a sustainable use of water sources and other water courses, as well as the use and occupation of the soil, are primordial measures. The identified social and environmental impacts were triggered by dissatisfaction and discontent of peoples and communities directly and unjustly affected by negative impacts arising from national economic development, affecting the continuation of their way of life.

Keywords: Socio-environmental tensions, Water resources, Society, Land use, Degradation.

1. Introduction

Considering the dependence of the human being on the natural environment for the occupation and organization of its territory, it is impossible not to highlight the link between society and water resources. Historically, the process of construction of past and present civilizations was directly influenced by the existence of watercourses inside their domains (TUNDISI and TUNDISI, 2011).

However, concerning this relationship (humans-water resource), the socio-economic development of a region and the quality of life of human populations, as well as the sustainability of the cycles on the planet, are fundamentally conditioned by the availability of water in adequate conditions, as stated by Tundisi (2003).

Within this perspective, one of the main problems of humanity now concerns the sustainable use of water resources in order to avoid the degradation of water sources

and ensure their multiple uses and active economic activities. In addition, Ribeiro (2014) pointed out that in the contemporary world, socio-environmental tensions due to access to water resources are increasingly frequent at different scales (internal and external). Access to quality water is one of the focal points of disputes and conflicts in recent years in Brazil. Therefore, this research was conducted based on the assumption that the aggravation of socio-environmental conflicts for water resources is the result of a process of social production of space, which gives rise to diversity in the use of aquatic systems and inadequate forms of land use, causing disputes and socio-environmental injustice, as already reported by studies conducted in the Brazilian South region (GONÇALVES and MENDONÇA, 2007; NASCIMENTO and BURSZTYN, 2010; FACCO, FUJITA and BERTO, 2014), Southeast region (SILVA, 2006; ROMANI, 2010; SOUZA and OLIVEIRA, 2010; LEAL, 2013) and Center-West region (SILVA and SATO, 2012).

This work focused on the socio-environmental conflict generated by environmental impacts involving contamination of the environment, degradation of ecosystems and depletion of natural resources, according to Little's (2001) classification. This work thus aims to report cases of problems associated with the social production of space and the degradation of the multiple uses of water resources in the Northeast, Brazil, focusing on environmental injustice.

2. Materials and methods

The survey of cases of conflicts was carried out from January to March 2015 through on-line searches in the Map of Environmental Injustice and Health in Brazil, developed by the Oswaldo Cruz Foundation (FIOCRUZ) and the Federation of Agencies for Social and Educational Assistance (FASE) with the support of the Department of Environmental Health and Workers' Health of the Ministry of Health, available at <http://www.conflitoambiental.icict.fiocruz.br/index.php>.

The Map was selected for the conduction of the research because it reports cases of conflicts related to environmental and social issues, such as socio-environmental impacts, risks and vulnerabilities resulting from human activities, and environmental injustices in various Brazilian territories. Although the website offers the mapping of conflict cases of various orders existing in all Brazilian states, only socio-environmental conflicts that portray situations/problems related to land use and interference in water resources in the Brazilian Northeastern region were selected to compose the results of this work. It involves the disputes and conflicts caused by various forms of appropriation of territory, and, consequently, degradation of water resources and loss of quality of life of populations.

After selection, socio-environmental conflicts were analyzed to record information and data pertinent to this study according to a table previously elaborated. The following topics were analyzed: identification and distribution of cases of conflicts

according among the states of the Northeast region and the human activities that caused them; record of municipalities/territories of occurrence affected by conflicts; survey of social actors involved (population affected), and existing and potential social and environmental damages and risks; examples of episodes associated with the impacts of anthropogenic actions that drive the identified conflicts.

3. Results and discussion

The results pointed to 27 cases of conflicts distributed into 85 municipalities/territories, according to Figure 01.

Figure 01- Distribution of socio-environmental conflicts per state of the Northeast region, Brazil, following the Map of Environmental Injustice and Health in Brazil. Search Jan-Mar/2015
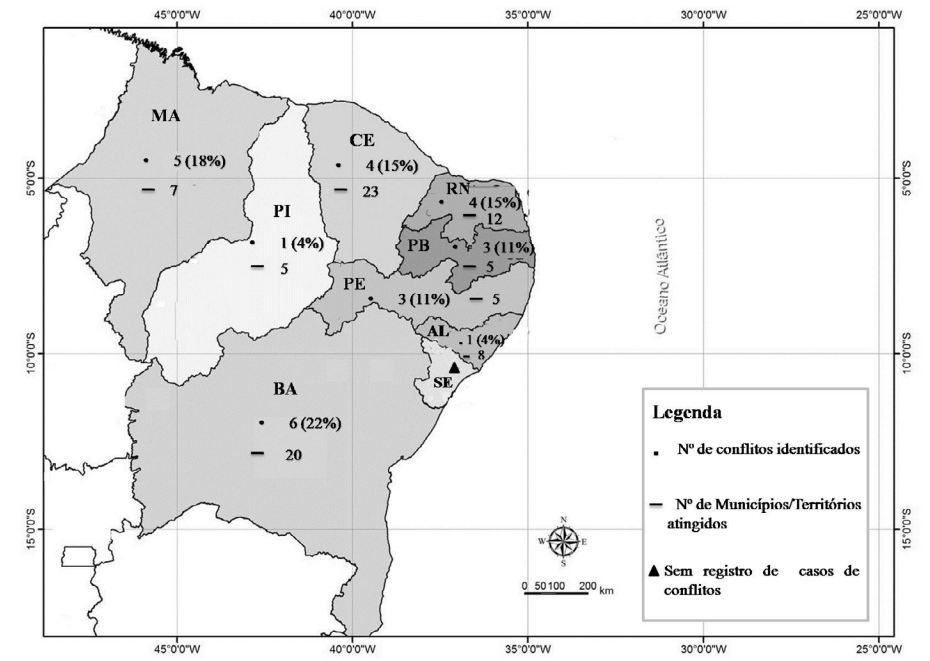
Source:
Map (Adapted by the author from the Brazilian Agricultural Research Corporation - EMBRAPA, 2015)
Conflict Data (Adapted by the author from the Map of Environmental Injustice and Health in Brazil, 2015)

Among 101 conflicts in the Northeast region, corresponding to 29.45% of the cases in Brazil, according to the Map of Environmental Injustice and Health in Brazil (2015), 27% of this total involve the problem of interference with the conservation and balance of aquatic ecosystems.

For Little (2001, 2006), Zhouri (2008) and Acselrad (2010), socio-environmental conflicts arise when a group's interaction with its territory restricts or blocks the use of natural resources by other social segments, thus affecting the coexistence of these groups as they do not allow the continuity of their own way of life. The authors add that such conflicts result from different forms of relation and meaning that each social agent maintains with its environment, which is related to interests, values or power.

In this perspective, current and growing cases of socio-environmental conflicts can be linked to a new logic of civilizational progress based on a policy of growth and development. This promotes a greater use of natural resources, and causes excessive waste production, situations that affect the socio-environmental quality aspects of the territories and of the populations, consequently generating socio-environmental tensions and impacts (MARTÍNEZ-ALIER, 2004, 2008; MUNIZ, 2009; RAMMÊ, 2010; CORRÊA; RIBEIRO and RUIZ, 2012).

Corroborating with these authors, Porto and Finamore (2012) pointed out that social-environmental conflicts represent, therefore, disputes between interests of communities, organizations and social movements allied against social agents that benefit from economic enterprises.

In this context, the socio-environmental conflicts found were associated to several different activities and sectors of the current economy. Industries, power plants and ports are considered the main anthropic causes, making up determining factors in the occurrence of 19 situations/problems, which represents 30% of the cases of conflicts identified by anthropogenic propulsive activities (total number = 63). In addition, other forms of social production of space were also responsible for the development of socio-environmental conflicts in the Northeast region related to water quality, according to Table 01.

Table 01 - Total number of socio-environmental conflicts associated with each human activity, Northeast Region, Brazil, according to the Map of Environmental Injustice and Health in Brazil. Search Jan-Mar/2015. No record (-)

Human activities	No. of associated conflicts	Territories/Municipalities of occurrence								
		BA	MA	CE	RN	PE	PB	AL	PI	SE
Industry + Plant + Port	19	Una, Salvador, Simões Filho, Lauro de Freitas, Lagoa Real	Açailândia, São Luís	Paraipaba, Fortaleza	Macau, Porto do Mangue	Goiana, Itapissuma, Sirinhaém	Rio Tinto, Bayeux	Pilar	Uruçuí	–
Sewage Evacuation	11	Una, Salvador, Lauro de Freitas	São Luís	Fortaleza	Natal, Porto do Mangue	–	Rio Tinto, Bayeux	Pilar	–	–
Agriculture	8	–	Urbano Santo, Tasso Fragoso, Loreto	Tabuleiro do Norte	Porto do Mangue	–	Rio Tinto	Pilar	Uruçuí	–
Deforestation	7	–	Urbano Santo, Loreto	Paraipaba	Macau, Porto do Mangue	–	–	Pilar	Uruçuí	–
Shrimp farming	6	–	–	Itapipoca, Paraipaba	Natal, Senador Georgino Avelino	–	Santa Rita	Pilar	–	–
Urbanization	3	Lauro de Freitas	–	Fortaleza	–	–	–	Pilar	–	–
Dredging	3	–	São Luís	–	Porto do Mangue	–	–	Pilar	–	–
Irregular deposition of solid waste	3	Lauro de Freitas	–	–	Natal	–	Bayeux	–	–	–
Animal slaughterhouse	2	–	São Luís	–	–	–	–	Pilar	–	–
Crop burning	1	–	–	–	–	–	–	Pilar	–	–

Source: Adapted by the author from the Map of Environmental Injustice and Health in Brazil, 2015

According to Martínez-Alier (2004; 2008), socio-environmental conflicts may arise at different or simultaneous stages of economic activities, for example during the extraction, processing and transportation of materials and energy, as well as during the final disposal of waste.

According to the analysis of each socio-environmental conflict provided by the Map of Environmental Injustice and Health in Brazil (2015), cases involving industrial and port activities and power plants occur due to the implantation, installation, operation and accidents with vessels by such enterprises. Such cases also result from works and services directed to their renovation, maintenance and expansion. The main contributors to this process are productive systems related to mining, petrochemical poles, alcohol and sugar mills, dredging activities and steel mills. Similar results were recorded in other studies (GONÇALVES and MENDONÇA, 2007; NASCIMENTO and BURSZTYN, 2010; ROMANI, 2010; SOUZA and OLIVEIRA, 2010; BARRETO and QUINTO JÚNIOR, 2012; MILANEZ et al., 2013).

Agricultural activities are linked to an excessive use of agrochemicals, deforestation and burning of native areas and riparian forests, contributing, together with industries, ports, power plants, slaughterhouses, urbanization processes, irregular waste disposal and domestic sewage, to the deposition of sediments and pollutants in watercourses. Studies conducted by Silva (2006), Silva and Sato (2012) and Facco, Fujita and Berto (2014) have also reported cases of socio-environmental conflicts involving these activities.

Conflicts related to shrimp farming, in addition to involving physical, chemical and biological changes of water resources, are also related to changes in water drainage patterns and introduction of exotic species, as discussed by Dias, Soares and Neffa (2012) in the Caravelas-Nova Viçosa Estuary Complex (BA).

It is worth mentioning that the cases of conflicts found were not restricted to only one type of land use and water resource. In general, there were situations/problems motivated by more than one activity and more than one economic sector. An example is the case of the conflict in the municipality of Pilar (AL) involving impacts from agroindustrial activities, urbanization, cutting and burning of vegetation, animal slaughterhouses, inland sewage dump, shrimp farming and dredging in the Estuary-Lake Complex Munaú/Manguaba (CELMM). These activities threaten the biophysical environment and endanger the lives of traditional communities in the region.

The distinct and intense uses of natural resources to meet the different needs and interests of social groups imply socio-environmental impacts and damages to the well-being and the security of populations. In this sense, Little (2006) points out that environmental degradation may lead to changes of great magnitude in ecosystems, for example atmospheric warming, increased ozone hole, changes in ocean currents etc., or intrinsically regional damages, such as water, air and soil contamination, floods, desertification, loss of biodiversity etc.

Table 02 shows the main socio-environmental problems experienced by the population in face of disordered forms of use of land and water resources according to the data obtained in this study. Table 03 contains the transcription of some episodes extracted from the files of conflicts presented by the Map of Environmental Injustice and Health in Brazil (2015), as a way of portraying the social and environmental damages caused by the non-rational use of the environmental space.
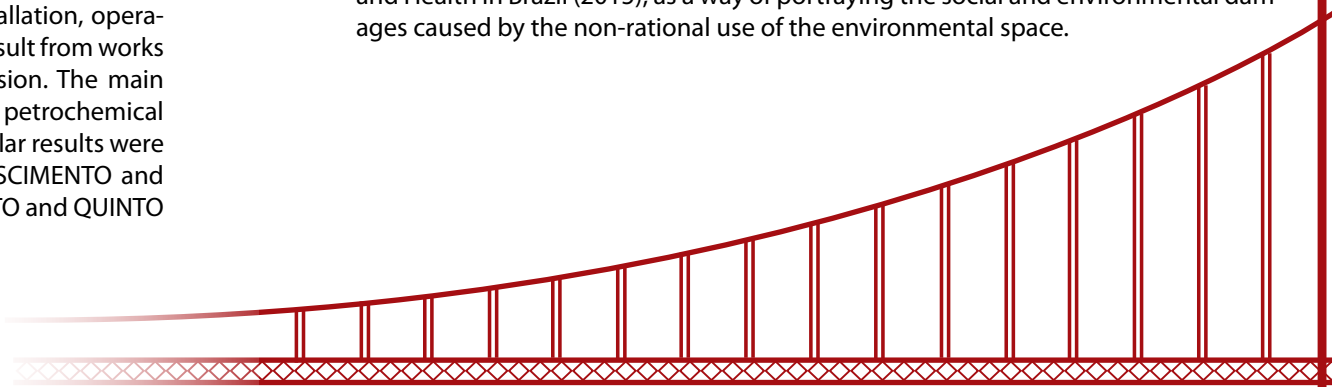
Table 02 - Socio-environmental damages that cause socio-environmental conflicts, Northeast Region, Brazil, according to the Map of Environmental Injustice and Health in Brazil. Search Jan-Mar/2015

Socio-environmental damages	Cases	%
Water Contamination/Pollution	27	39
Death of animals	14	20
Silting + grounding	12	17
Destruction of mangroves	6	9
Change in water regimes	5	7
Salinization of waters	2	3
Odor emission	2	3
Erosion	1	2

Source: Adapted by the author from the Map of Environmental Injustice and Health in Brazil, 2015

Table 03 - Episodes related to socio-environmental damages experienced by the population involved with cases of conflicts, Northeast, Brazil, according to the Map of Environmental Injustice and Health in Brazil. Search Jan-Mar/2015

Year	Event	State
1980	Irregular dumping of industrial waste has released more than 35 tons of mercury and other heavy materials in the waters of the Arataca River.	PE
2000	Deforestation and burning of about 60 thousand meters of mangrove swamps on the Ilha dos Cavalos in an attempt to set up a shrimp farming enterprise.	RN
2004	Laboratorial analyses confirmed contamination by active principles of class I (extremely toxic) and class II (highly toxic) agrochemicals along the canal that supplies the communities of Chapada do Apodi; it was caused by the development of agricultural activities with indiscriminate use of agrochemicals.	CE
2007	A shrimp farming company killed more than 40 tons of fish, crustaceans, shellfish and other living beings of the Potengi River aquatic biota.	RN
2008	A Norwegian ship, NCC Jubail, docked at the Port of Aratu, poured about five thousand liters of lubricating oil into the Baía de Todos os Santos, which caused the contamination of the fauna and the flora of an extensive mangrove area near the Bananeira beach.	BA
2008	Water wells for human consumption located 20 km from the mining area in the municipality of Lagoa Real were contaminated with uranium.	BA
2008	Degradation of the Estuary-Lake Mundaú Complex (CELMM) led to a shortage of species of great economic value; as a result, CELMM's shellfish and other seafood merchants were forced to import sururus (mollusks) from Sergipe and from the village of Taiçoca de Fora at a cost three times higher to supply the demand of Alagoas.	AL
2011	The Paraíba river was the victim of shrimp ponds leaking, and it is estimated that at least 14 tons of shrimp considered "sick" were dumped in the mangroves near Forte Velho.	PB

Source: Adapted by the author from the Map of Environmental Injustice and Health in Brazil, 2015

Zhouri and Oliveira (2010) pointed out that, in addition to being numerous, the subjects of conflicts are located and maintain unequal forms of power in society and, therefore, when conflicts arise, the damages and risks, as well as the benefits of the "progress", are not distributed homogeneously, both socially and spatially.

Thus, the most vulnerable members of society, from a social, political and financial point of view, are territorially segregated and disproportionately subjected to socio-environmental risks and problems arising from the dynamics of the economic system. They are also victims of lack of investment in actions and policies that improve the poor conditions of their social space. On the other hand, the class of individuals with the greatest economic and socio-political protection is placed in an environmentally more comfortable and safer environment, considering its influence on the decision-making spheres regarding the installation of polluting enterprises. This guarantees the control or the lower incidence of environmental risks and impacts of these activities (ASCELRAD, 2002, 2006; ASCELRAD, 2010; COPETTI and LOTTERMANN, 2010; MOURA, 2010; RIBEIRO, 2010; CASTILHO, 2012; FARIAS, 2007; PORTO and FINAMORE, 2012).

Based on this analysis, socio-environmental conflicts are categorized as ecological-distributive. They are so called because they are disputes caused by the existence of social, spatial and temporal asymmetries related to the availability and access of natural resources and services between human groups and geographic areas. This means an inequality in the equality of a healthy and balanced environment necessary for human survival and for directing socio-environmental risks and damages arising from economic growth to a certain part of society and territories (MARTÍNEZ-ALIER, 2004; MUNIZ, 2009).

There is evidence that the struggle and effectiveness of environmental justice is directly associated to this type of conflict. Such justice in turn is designated by a set of principles and practices to guarantee a collective quality of life, equality and sustainability. It thus consists in the defense of human rights regarding access to an equitable environmental protection, fight against socio-territorial segregation and interruption of the mechanisms of transfer of environmental costs of development to specific human groups or geographic areas (MARTÍNEZ-ALIER, 2014; MARTÍNEZ-ALIER, 2008; COPETTI and LOTTERMANN, 2010; ACSELRAD, 2010; MOURA, 2010; RIBEIRO, 2010; CASTILHO, 2012).

With regard to the survey carried out for the development of this study, artisanal anglers stand out (27) as the most affected population, predominating in 33% of the total number of social actors directly affected by problems (total n = 83). In fact, as reported by Silva (2012), artisanal fishing has been the victim of negative impacts exerted by various economic segments and by disordered and inadequate forms of land use and occupation. Therefore, the fishing community is more frequently framed in cases of socio-environmental conflicts.

The other affected populations were family farmers (19%), a Quilombola community (16%), residents of neighborhoods affected by accidents and/or contaminated land, indigenous communities and residents of hillsides and favelas, corresponding to 13%, 11% and 8%, respectively.

The data described point out, as in other studies (BARRETO and QUINTO JÚNIOR, 2012; CASTILHO, 2012; ALCÂNTARA and AVELINO, 2013; MILANEZ et al., 2013; ROUGEM-ONT and PÉREZ, 2013; MENDES et al., 2014), to a relationship between power asymmetries and cases of environmental injustice in socio-environmental conflicts. Considering that the inadequate use of soil and water resources in function of the current productive systems and the capitalist mode of consumption, besides affecting the maintenance of balance of aquatic ecosystems, as verified in Tables 02 and 03, exert negative impacts on the socio-cultural and economic contexts of these individuals, but with no emergent impacts on owners of large public and/or private enterprises.

With the contamination, pollution and degradation of water resources, directly affected peoples have become susceptible to the development of pathogens, causing food insecurity and emergence of diseases, as well as local cases of death. In addition, there was a reduction in the sale of products grown in the community and an impossibility of fishing, which had a great impact on the local economic viability.

In addition, the social, economic and cultural dynamics of these populations have been changed because of the private appropriation of common public spaces, increased demand for water and devaluation of territories. Thus, the socio-environmental damages experienced by the affected population change its way of life so much that in some cases populations have to abandon or sell their land because they could not continue their subsistence activities, or because of threats due to a developmental logic.

As an example of the aforementioned facts, the sale of land by farmers in Sonhem (MA) can be mentioned because of the great difficulties of maintaining their activities. Large producers within the dynamics of soybean production changed the watercourse and built channels so that irrigation water, contaminated with pesticides, was diverted to the nearest streams used by residents. There is also the case of artisanal anglers and family farmers affected by the construction of an embankment about two meters high in an area of restinga, the lowering and advancing of the coast, and the construction of roads with removal of sand from dunes during the works of Wind Power Plant Parks in Rio Grande do Norte, preventing free access to the fish area (MAP OF ENVIRONMENTAL INJUSTICE AND HEALTH IN BRAZIL, 2015).

According to Zhouri and Oliveira (2010), such asymmetries reveal the hegemony of certain categories of thoughts that seek to construct the global, universal and consensual environmental debate, obscuring the power relations that actually exist and promoting the shift of politics to economics, and shifting the debate on rights to the debate on interests.

Thus, in this perspective, development policies cause environmentally unsustainable and socially unjust situations, contributing to the emergence and intensification of socio-environmental conflicts and denunciations of environmental injustices, such as the cases mentioned in this study. This happens upon verifying that such policies have restricted economic standards based on productivist and consumerist criteria and are strongly directed towards favoring the private and profit-making interests of a minority of society to the detriment of human rights, the health of ecosystems and the culture and values of peoples (ACSELARD, 2002; PEREIRA, 2009; PORTO and MILANEZ, 2009; CASTILHO, 2012; ROUGEMONT and PÉREZ, 2013).

Also within the scope of this discussion, some socio-political mechanisms that favor market actions in the context of socio-environmental conflicts can also be included: omission of policies, tax breaks, fragility in the application of environmental legislation or its intentional noncompliance, lack of environmental supervision, and pressures exerted on employees of environmental agencies responsible for issuing licenses for works (ACSELARD, 2002; ROUGEMONT and PÉREZ, 2013).

Therefore, if economic growth is not associated with reduction of conflicts, human progress and equality, and with the maintenance of natural resources, it is difficult to consider that public policies have a truly development-oriented profile (COPETTI and LOTTERMANN, 2010; CASTILHO, 2012; ROUGEMONT and PÉREZ, 2013).

4. Conclusion

The survey carried out in this study showed that, except for Sergipe, in all other states of the Northeast region there is at least one case of conflict involving situations/problems associated to interference on land use and land occupation related to the multiple uses of water resources. Bahia is responsible for the largest number of cases of conflicts (22%) recorded in the region.

The social and environmental impacts were triggered by dissatisfaction and discontent of peoples and communities directly and unjustly affected by negative socio-environmental impacts arising from national economic development, affecting the continuation of their way of life. However, we did not intend to demonstrate the process and the mechanisms of negotiation of each recorded conflict, or to exhaust all existing cases in the Northeast.

Industries, mills, ports, sewage dump in natura and agriculture were the anthropogenic activities that caused 60% of the social and environmental tensions identified in this study. Artisanal anglers were directly affected, representing 33% of the total affected actors (n = 83).

From this perspective, undoubtedly, rethinking and reflecting the forms of land use and occupation practiced today is necessarily the most urgent problem of this process in order to mitigate or eliminate future undesirable effects, and to correct effects already recorded in the present, such as the commitment of public sources of supply.

In addition, Society, State and entrepreneurs must seek initiatives together (plans of management, supervision, monitoring, works of sanitation, rational use) that guarantee the sustainability of springs and other watercourses. This prevents qualitative water scarcity and socio-environmental impacts from becoming usual situations, as verified by the examples mentioned in this study.

References

ACSELRAD, H. Justiça ambiental e construção social do risco. Desenvolvimento e meio ambiente, Paraná, n.5, p.49-60, 2002.

ACSELRAD, H. 2006. Tecnologias sociais e sistemas locais de poluição. Horizontes Antropológicos, Porto Alegre, v.12, n.25, p.117-138, 2006.

ACSELRAD, H. Ambientação das lutas sociais: O caso do movimento por justiça ambiental. Estudos Avançados, São Paulo, v.24, n.68, p.103-119, 2010.

ALCÂNTARA, S. M. P.; AVELINO, F. R. F. Transformações socioambientais: Uma visão sobre o desenvolvimento no Pecém. Revista Gestão e Desenvolvimento, Fortaleza, v.1, n.1, 2013.

BARRETO, N. M. de S.; QUINTO JÚNIOR, L. de P. A (re) produção do espaço capitalista nas áreas de grandes empreendimentos: Uma análise comparativa entre os conflitos socioambientais nos Complexos Portuários do Açu e de Suapé. Boletim do Observatório Ambiental Alberto Ribeiro Lamego, Campos dos Goytacazes, v.6, n.1, p.57-67, 2012.

CASTILHO, A. G. de. Enfoque sociológico dos conflitos socioambientais e o movimento por justiça ambiental. Caos-Revista Eletrônica de Ciências Sociais/UFPB, n.21, p.44-58, 2012.

COPETTI, C.; LOTTERMANN, O. Em busca da justiça ambiental e do desenvolvimento sustentável na sociedade de risco. Desenvolvimento em Questão, Rio Grande do Sul, v.8, n.15, p.133-152, 2010.

CORRÊA, R.; RIBEIRO, H. C. M.; RUIZ, M. S. Perfil e evolução do tema conflitos socioambientais: Uma bibliometria dos últimos vinte anos nos periódicos da área de administração no Brasil. Revista de Administração, Contabilidade e Sustentabilidade, Campina Grande, v.2, n.4, p.58-75, 2012.

DIAS, H. M.; SOARES, M. L. G.; NEFFA, E. Conflitos socioambientais: o caso da carcinicultura no complexo estuarino Caravelas-Nova Viçosa/Bahia-Brasil. Ambiente e Sociedade, São Paulo, v.15, n.1, p.111-130, 2012.

Empresa Brasileira de Pesquisa Agropecuária- EMBRAPA. Disponível em: http://www.cnpgl.embrapa.br/nova/silpf/app.images/mapas/nordeste.jpg. Acesso em Abril 2015.

FACCO, J.; FUJITA, C.; BERTO, J. L. Agroindustrialização e urbanização de Chapecó-SC (1950 – 2010): Uma visão sobre os impactos e conflitos urbanos e ambientais. Revista do Desenvolvimento Regional, Santa Cruz do Sul, v.19, n.1, p.187-215, 2014.

FARIAS, T.Q. Considerações a respeito da injusta distribuição do dano e do risco ambiental no espaço social. Revista da Direito e Liberdade, v.7, n. 3, p.501-520, 2007.

GONÇALVES, T. M.; MENDONÇA, F. A. Impactos, riscos e vulnerabilidade socioambiental da produção do carvão em Criciúma/ SC (BRASIL). RAEGA- O espaço geográfico em análise, Curitiba, n.14, p.55-65, 2007.

LEAL, G. F. Justiça ambiental, conflitos latentes e externalizados: Estudo de caso de pescadores artesanais do Norte Fluminense. Ambiente e Sociedade, São Paulo, v.16, n.4, p. 83-102, 2013.

LITTLE, P. E. Os conflitos socioambientais: um campo de estudo e de ação política. In: Bursztyn, M. (Org.) A difícil sustentabilidade: política energética e conflitos ambientais. Rio de Janeiro: Garamond; 2001, p.107-122.

LITTLE, P. E. Ecologia política como etnografia: um guia teórico e metodológico. Horizontes Antropológicos, Porto Alegre, v.12, n.25, p.85-103, 2006.

Mapa da Injustiça Ambiental e Saúde no Brasil. Disponível em <http://www.conflitoambiental.icict.fiocruz.br/> Acesso em: Jan-Mar. /2015.

MARTÍNEZ-ALIER, J. "Los conflictos ecológico-distributivos y los indicadores de sustentabilidad". Revista Iberoamericana de Economía Ecológica, México, v.1, p. 21-30, 2004.

MARTÍNEZ-ALIER, J. Conflictos ecológicos y justicia ambiental. Revista Papeles, v.103, p.11-29, 2008.

MARTÍNEZ- ALIER, J. O. Origens e campo de atuação da ecologia política (Ecologia Política: o estudo dos conflitos ecológicos distributivos). In: Martínez-Alier,J. O Ecologismo dos Pobres: conflitos ambientais e linguagens de valoração. Maurício Waldman (Trad.). 2.ed., 1ª reimpressão, São Paulo: Contexto, p.110-114, 2014.

MARTÍNEZ- ALIER, J. O. O meio ambiente e os direitos humanos (O Estado e outros autores). In: Martínez-Alier,J. O Ecologismo dos Pobres: conflitos ambientais e linguagens de valoração. Maurício Waldman (Trad.). 2.ed., 1ª reimpressão, São Paulo: Contexto, p.274-276, 2014.

MENDES, J. de S. et al.Os grandes empreendimentos e as comunidades tradicionais: o caso da comunidade de Mundaú-Trairí, Ceará. Revista Monografias Ambientais, Santa Maria, v.14, n.3, p.3357-3365, 2014.

MILANEZ, B. et al. Injustiça ambiental, mineração e siderurgia. In: Porto, M. F.; Pacheco, T.; Leroy, J. P. (Org.). Injustiça Ambiental e Saúde no Brasil, o mapa de conflitos. Rio de Janeiro: Editora FIOCRUZ, 2013. p.175-205.

MOURA, D. V. Justiça ambiental: Um instrumento de cidadania. Qualitas Revista Eletrônica, Paraíba, v.9, n.1, p.1-10, 2010.

MUNIZ, L. M. Ecologia Política: O campo de estudo dos conflitos sócio-ambientais. Revista Pós Ciências Sociais, Maranhão, v.6, n.12, p.181-196, 2009.

NASCIMENTO, D. T.; BURSZTYN, M. A. A. Análise de conflitos socioambientais: Atividades minerárias em comunidades rurais e Áreas de Proteção Ambiental (APA). Desenvolvimento e Meio Ambiente, Paraná, n.22, p.65-82, 2010.

PEREIRA, R. R. Planejamento territorial: Suas implicações para a promoção da saúde e da justiça ambiental. GEOUSP- Espaço e Tempo, São Paulo, n.26, p.19 - 27, 2009.

PORTO, M. F.; FINAMORE, R. Riscos, saúde e justiça ambiental: O protagonismo das populações atingidas na produção de conhecimento. Ciência e Saúde Coletiva, Rio de Janeiro, v.17, n.6, p.1493-1501, 2012.

PORTO, M. F.; MILANEZ, B. Eixos de desenvolvimento econômico e geração de conflitos socioambientais no Brasil: Desafios para a sustentabilidade e a justiça ambiental. Ciência e Saúde Coletiva, Rio Janeiro, v.14, n.6, p.1983-1994, 2009.

RAMMÊ, R. S. Justiça ambiental na era do hiperconsumo: Um desafio para o estado socioambiental de direito. Revista Paradigma, Ribeirão Preto, n.19, p.33- 44, 2010.

RIBEIRO, C.W. Conflitos distributivos e divida ecológica (Apresentação). In: Martínez-Alier, J. O Ecologismo dos Pobres: conflitos ambientais e linguagens de valoração. Maurício Waldman (Trad.). 2.ed., 1ª reimpressão, São Paulo: Contexto, 2014. p.9-12.

RIBEIRO, D. M. Justiça e democracia ambiental. Revista da FA7, Fortaleza, v.1, n.8, p.47-62, 2010.

ROMANI, C. Comunidades caiçaras e expansão portuária em Santos-uma análise histórica do conflito. Revista Científica Integrada-Unaerp Campus Guarujá, ano 1, ed. 1,2010.

ROUGEMONT, L; PÉREZ, M. S. Tecendo relações entre os conflitos socioambientais territoriais provocados por megaprojetos: COMPERJ e Suape e suas implicações para pescadores e pescadoras artesanais. Campo-Território: Revista de geografia agrária, Uberlândia, v.8, n.16, p.399-426, 2013.

SILVA, M. J.; SATO, M. T. Territórios em tensão: o mapeamento dos conflitos socioambientais do estado de Mato Grosso – Brasil. Ambiente e Sociedade, São Paulo,v.15, n.1, p.1-28, 2012.

SILVA, G. C. Conflitos socioambientais e ocupação urbana no Rio de Janeiro. Cadernos metrópole, São Paulo, n.16, p.163-186, 2006.

SILVA, E. C. Territorialidades e conflitos socioambientais no cotidiano da pesca artesanal na comunidade do Porto de Jatobá, Abreu e Lima (PE). Revista Nordestina de Ecoturismo, Aquidabã, v.5, n.1, p.85-93, 2012.

SOUZA, T. N.; OLIVEIRA, V. P. S. Conflito socioambiental entre atividades de pesca artesanal marinha e implantação de atividades portuárias no Norte Fluminense. Boletim do Observatório Ambiental Alberto Ribeiro Lamego, Campos dos Goytacazes, v.4, n.2, p.219-229, 2010.

TUNDISI, J.G; TUNDISI, T. M. Recursos hídricos no século XXI. São Paulo: Oficina de textos, 2011.

TUNDISI, J. G. Recursos Hídricos. Revista MultiCiência, Campinas, v.1, p.1-15, 2003.

ZHOURI, A. Justiça ambiental, diversidade cultural e accountability: desafios para a governança ambiental. Revista Brasileira de Ciências Sociais, São Paulo, v.23, n.68, p.97- 107, 2008.

ZHOURI, A.; OLIVEIRA, R. Quando o lugar resiste ao espaço: Colonialidade, modernidade e processos de territorialização, desenvolvimento e conflitos ambientais: Um novo campo de investigação. In: Zhouri, A.; Laschefski,K. (Org.). Desenvolvimento e conflitos ambientais. Belo Horizonte: Editora UFMG, 2010, p.439-462.

4. Environmental Education

4.1 Coming to age - Experiences in (environmental) education

Mariana Valente e Maria Ilhéu

Abstract

In this time of ours we definitely need to multiply the approaches, linkages, connectedness, cross-boundaries gatherings and holistic views as soon as we talk about environmental education. Environmental education came to age integrating diversity and complexity, promoting meetings in multilevel ways, namely with other species, weaving bonds of communication and pushing thought in direct experience with the natural world. Replying to that challenges, the ID-NATURA project encourages multi-meetings between pupils of all school levels (kindergarten, elementary, secondary), teachers and researchers from different disciplinary areas and among those and the natural world, specifically the "river of my village...". This paper is inspired by J. W. Goethe's methodology of knowing nature, the delicate empiricism; Goethe's approach to nature is valued, as a way to educate for sustainability, and some important results this project are presented through pupils' voices.

Key words: nature connectedness, education for sustainability, delicate empiricism

1. Introduction

We live in times, in Western society, "characterized by a striving for outer independence, for emancipation in the broadest sense but also by symptoms of loneliness - and of increasing inability to live with others and with nature" (G. Maier, 1986, p. 117). Modern Science and the Industrial Revolution may have contributed to our finding ourselves in this separation. The senses, sensations, experiences have become disqualified by modern science. However, "if one wants to become meaningfully involved with the world, one will have no choice but to base one's efforts on what we can experience through one's senses" (id. p.116). Only thus will we be less lonely beings, beings conscious of the connections in which we are immersed and which we have forgotten, beings more aware of the problems of the world, beings inhabited by reverence and consequently by responsibility.

We live in times in which information is dispersed and no longer concentrated in "temples of knowledge". It is at our fingertips, of rapid and easy access, making modifications in processes of learning possible. Therefore, we have time to linger on the things themselves, and we have time for the narratives that surge from the direct experience of things (M. Serres, 2012). Time to be Zenon; At dawn, Zenon passes through the fields, in search of unknown wisdom that comes "from things themselves". He reflects on past times, and pictures the workings of this nature, always

in motion. The moment he lives there and then, has been shaped over centuries (M. Yourcenar, 1968). The moment Zenon lives there and then is movement, is constant creation. The time has come to learn how to revere those moments that are shaped over centuries, it is time to experience the ever-ongoing transformations of the natural world, always in a state of becoming. It is time to pay attention to the ways of being of the earth.

These various times configure needs and possibilities for a school system that shapes human beings less separated from the natural world. A school that promotes time dedicated to sensorial experience, to the development of connections with the natural world, time for the development of awareness that we are nature, time for the emergence of a caring attitude based on experience and on emerging narratives about places and other species, subject to our active observation.

It's urgent to develop an education and environmental culture in which nature is a matter of concern (in the sense of Bruno Latour), in which humans are connected to the natural world in a relationship of intimacy that overcomes the sense of separateness from nature.

It is urgent to look upon the natural/cultural world as a place of valuable learning, as a place of inspiration for the inculcation of values basic to the formation of a person and of communities; the values of diversity, of creation, of multiple solutions, of integration.

It is from this sense of urgency that the project ID-NATURA, presented further on, has been created and implemented. In this paper, we introduce some of the ideas that have guided the activities included in this project, more in particular that of delicate empiricism, and we present some of the results in an uncommon narrative composed of 4 acts.

2. Questions and concepts

"How can we understand the relationship between phenomena in a manner that is in accordance with our humanity," and joining this to analytical comprehension? "Certainly we can't go wrong if we try to understand them in the same way that we encounter them. Goethe was able to draw attention to this approach" (G. Maier, 1986, p.116). The approach to which Maier refers is the "delicate empiricism" of J. W. Goethe (1748-1832). Delicate empiricism can be a path towards meaningful education in sustainability, in which environmental education can play a determinant role. Delicate empiricism is a phenomenological way of knowing nature, that is to say, knowing in a holistic way committed with an intuitive mind, that allows us to become one with and to grow with nature. "The Goethean approach seeks to participate in the objects investigation (learning) to such a degree that the mind makes itself one with

the object, thereby overcoming the sense of separateness that characterizes our normal experience with the world" (Naydler, p.71).

As Goethe himself states in his writings, delicate empiricism is a path that has to be lived out; only then can we reach its potential value and understanding. It is not easy to speak about it, but we postulate in advance, metaphorically turning to Zenon's words, that "every moment requires centuries". We refer to the moments of relationship and knowledge in the experience of the natural world. A time for prolonged and enduring moments.

Why turn to a 19th century concept? This concept has been recovered and elaborated in the life sciences and those of landscape, ecology, and philosophy (such as, B. Melanie, 2012, I. Brook, 1998, D. Seamon, 2015, H. Bortoft, 1996, J. Cameron, 2005, D. Wahl, 2005, amongst others), proving itself very fertile for knowing nature, a concept until now undervalued in our culture. Scottish biologist Margaret Colquhoun (1947-2017) elaborated, taught and practiced Goethe's methodology for the construction of the relationship between human beings and nature, through art and science, influencing many of the authors who nowadays are interested in delicate empiricism. In our point of vue, introducing this concept in an educational context has great potential, especially in helping to develop capacities for intimate connections, in conjunction with analytical capacities.

D. Seamon (2005, p.8) expresses this intimate connection in a poetic manner that characterizes this path. He argues that "Goethe's way of science, understood as a phenomenology of nature, might be one valuable means for fostering [the] openness toward the living presence of the natural world, including its animals but also its plants, its terrestrial forms, its ecological regions, its formations of earth, sky and water, its sensual presence as expressed, for example, through light, darkness, and color".

Goethe's way of science "uses rigorous attention to direct experience, empathy, intuition and imagination as a path towards meaningful insights into nature's creative process. This artist's approach to science allows for a more appreciative, qualitative, meaningful and participatory engagement with nature" (D. Wahl, 2005, p.60). The practice of this "rigorous attention" forms the fundamental pillar for the emergence of an ecological conscience, essential to the construction of subjects ethically engaged with the world. This is the underlying supposition of the project ID-NATURA.

2.1. The project ID-NATURA "the river of my village"

The project ID-NATURA is carried out in a network composed of researchers, teachers, children and pupils from different institutions, the University of Évora, the Gabriel Pereira High School and Manuel Ferreira Patrício Basic School, in Évora. The ultimate goal of this project is to develop a sense of connectdness with nature and an awareness of the interdependence of all systems and living beings on the earth. The participants become involved with the natural world through direct, sensorial experience, through wonder(ment), adventure, reflexion, and imagination, in empathy with life itself. That is to say, they are engaged in a way of knowing that favour holistic approaches. The project integrates all levels of education, from pre-school to high school (children and pupils between 4 and 18 years old) and from various disciplines (Natural Sciences, Physics and Chemistry, Languages, Physical Training, Visual Arts, etc…), thus linking the cycle of learning with the cycle of life and bringing environmental education into the very heart of the school.

The program is based on a set of field visits to local streams (given the name "the river of my village"), nearby Évora in southern Portugal, designed to lead the participants to freely explore what surrounds them, with full attention, imagination and creativity, cultivating wonderment and a sense of adventure. Those moments fertilize the pupils' minds and promote the emergence of connections and the desire to learn more and new things about nature. Pupils are encouraged to express their perceptive experience of nature through different idioms: narratives, visual arts and drama. All the experiences lived in the streams are relived in the classroom through memories and imagination, at different moments and in different disciplines, promoting knowledge in a meaningful and integrated way.

There have been outings to two streams, one relatively well preserved, located in a rural area, and other in an urban context under degraded conditions. In this article we present brief narratives constructed by the pupils which were shared with the teachers.

2.2. On the form of presentation, the activities and the resulting narratives

We decided to present in progress results of the project in an unusual form that is accordingly with the way the whole process is constructed; a process inhabited by multiple voices and by a poetics of connectedness.

"Wandering … towards delicate empiricism" is developed over the course of 4 acts. On the stage will be the Voices of the pupils who participated in Project ID-NATURA, as well as our own voices designed as the echos (Delicate Chorus) of various authors that have valued delicate empiricism. The scheme of these voices is inspired by Greek drama, but they are happy voices, those of the pupils, in their field experiences, in their discoveries and learning. The chorus underscore the significant parts of the drama (narrative). The scenes will be spatially and temporally defined. The voices of the pupils narrate emotions, actions, connections and are the result of a connection and learning process that has been gained "in the direct experience of things" in a "natural/cultural framework". A synoptic description of the place context is present. .

3. Wandering... Towards the delicate empiricism

Act I (4 hours)

A spring afternoon at Valverde Stream (wondering….)
17.05.2017 | 38º31´44,89´´ W, 8º 01´06,96´´ N | 5,2 km, 3 stops
70 students, 7 teachers and 4 researchers

Water flowing, drifting, riffles, runs, pools, stones and boulders around. Shadows of tree canopies, helophytes, macrophytes, filamentous algae. Evidence of fish, crayfish and otters. Sounds of different bird species, frogs and insects. Sound of the waterfalls. Explosion of scents. Water illuminating and water-sky mirror.

J.,11 years old:

"Going to the river was amazing, I felt free. Usually we are not allowed to thoroughly explore the reality. They never let us watch the waterfalls and the lakes ... it was nice to have seen so much biodiversity."

F., 14 years old:

"I really liked the water and the stones… If I had to grade this field trip, I would rate it beautiful. I felt wonderful. I indeed, was welcomed by nature."

R., 12 years old:

"I enjoyed to observe the rocks in its place; I felt like an observer; I felt different. I learned that we also belong to nature. I felt happy for being able to know more about nature."

Delicate Chorus:
Wondering, knowing with one´s senses. Freedom and beauty fruition. That is the first stage of knowing in a goethean way. They are preparing for active observation, active seeing instead of the passive reception of visual impressions. They value to see the rocks in their place.
They are becoming closer to the phenomena, to nature!

J., 15 years old:

"We felt the smell, I was keeping attention; sometimes I was a little distracted but… (that is also good), I was always looking everywhere, I can memorize the things in my head. I lost my grandfather, we always went to the field and he would explain me everything. And here that happened too."

D., 16 years old:

"The contact with nature during this field trip did something to awaken me, to open my perception of this world and what is beyond. I had a special moment, in the first stop, during the silent minutes we spent looking at everything around us. In that moment of silence, I realized that everything was connected; the water that feeds the vegetation, the water that flows between the stones, wearing them… and what stood out from it all was that… everything is intertwined, even the knowledge of men is connected with everything, what we see, what we do. Even outside of this planet, in the stars, even in Uranium, there are elements that connect us."

Delicate Chorus:
They approach the surroundings, they exercise their full attention, they exercise sensorial imagination. They are searching for deeper encounters with the phenomena and attempting to think the phenomena with the imagination. They are attending to connections between phenomena. How many moments of glimmering of consciousness (using a Whitehead's expression). They are preparing for the second stage of delicate empiricism, the exact sensorial imagination!

S., 16 years old:

"I´ve made great observations, great in the sense that they fulfilled me because they were made in relation to small details."

J., 13 years old:

"The river was what I liked the most, what made me feel happy, and made me re-live the past where I was happy. I liked the sound of nature, of the living beings, of plants that I didn't know and started knowing (I brought plants, ferns). I learned new things and I hope that people, like me, go to the field to value nature."

Delicate Chorus:
The glimmering of a sense of wholeness. The reversal of perception: not from the part to the whole but from the whole to the parts. The whole comes to presence within the parts. An ethical dimension is growing in them from their experiences. They are happy to discover a way of valuing nature.

Act II (5 hours)

A winter morning with autumn colours, back to Valverde stream
23.01.2018 | 38º 31´34,11´´ W, 8º 01´30,63´´ | 6,2 km, 4 stops
56 students, 5 teachers and 5 researchers

Freezing air, iced waterlogging along the way. Low water level, no flow. A long drought, that year. Enormous granitic boulders highlighted. Sound of the wind through the tree leaves, sounds of some bird's species. Water illuminating and water-sky mirror.

F., 10 years old:

"It was a sunny day, but it was very cold; the landscapes were very beautiful. When we got there, I was really touched by coming back to the beautiful Valverde stream".

M., 14 years old:

"My body was aching, but it was a bearable pain, it had to be. It was not a mere pain that would discourage me from continuing the adventure. The water was shallow and turbid, there were no other signs of life besides the vegetation. It was cold and a bit windy but by being around the others I forgot the cold that I felt. It was beautiful to see several types of trees, shrubs, flowers, the sun, the rocks, all these things that make me love nature even more. It was fun, and it will always be every time I remember it."

Delicate Chorus:
They are feeling the attachment to the place, the awareness of its importance, the growing of the emotional connectedness with nature, through beauty and joy.

L., 13 years old:

"I felt sad to see the stream so dry…The drought destroyed a part of the stream beauty, but I found how the lack of water affects the earth. I decided that I can no longer waste much water."

C., 11 years old:

"When we get there, we noticed that the plants withered due to the lack of water… we heard a bird singing, a beautiful sound, we saw the green and brown leaves (the autumn colours), endless oleasters, many plants, but almost no water."

Delicate Chorus (voices from Goethe´s way of Science):
An emotional empathy with the stream, the contrary of alienation; the confront with the environmental impact of drought in a meaningful way.

Act III (4 hours)

A spring day, back to Valverde stream
18.04.2018 | 38º 31´06,12´´ W, 8º 01´38,36´´ | 5,9 km, 3 stops
56 students, 6 teachers and 5 researchers

Water flowing again, drifting, riffles, runs, pools, stones and boulders around, dancing shadows of tree canopies, helophytes, macrophytes, fungi. Many forms of life awaken, reproduction, metamorphosis…. Fish, crayfish, amphibious, insects, otters and others.

Sounds of different bird species, frogs' waterfalls. Great explosions of scents. Light effects on water and water-sky mirror.

F., 11 years old:

"There was plenty of water and we could see that we were finally in Spring. We saw several tree species, such as the ash tree and the holm oak. We went to a very beautiful place in the river: it looked like we were in the Amazon and I felt happy. I loved this day. I realize that I like to be in touch with nature; we must protect her. I hope to return to the river again."

T., 17 years old:

"By visiting the river I was able to see its true beauty, both visual and audible, and by drawing it I saw some things that would probably gone unnoticed otherwise, like the complexity of a leaf or the beauty of a rock".

Delicate Chorus:
They are experiencing esthetical and ethical dimensions, and this is driven by nature. They are learning in a meaningful way! The complexity of a leaf! The beauty of a rock! They are familiar with the ash trees and the holm oaks! They remember how they are so happy near the Valverde stream!

Act IV (5 hours)

A spring day, in Torregela stream
09.05.2018 | 38º 34´ 14,72´´N, 7º 55´ 38,54´´ | 4,6 km, 3 stops
56 students, 6 teachers and 5 researchers

Very low water level with shy flowing. Narrow stream with helophytes invasions. Turbid water with high sediment loads. Presence of effluent pipe lines with smell. Abundance of Chironomidae (insects larvae), blooms of green algae. Planted trees with big canopy along the stream margins. Catch sight of a small pond turtle. Sounds of bird´s, cars and people. Some solid domestic residues; plastic bags, wells, human clothes, tyres.

C., 12 years old:

"I didn't know that the Torregela stream existed, but now that I met it, it seems like I've known it for years."

S., 17 years old:

"I was surprised that even though the river was very neglected and mistreated, it was very beautiful and strongly present in the place."

B., 18 year old:

"It surprised me that despite we mistreat the world, it still fights for us."

Delicate Chorus:
The stream is in trouble and they feel, from the beginning, an affective connection

with it! How impressive it is! They are feeding this actual experience by their experiences with Valverde stream; they find beauty and they feel empathy besides all the degradation. The value of a stream is already inside them!

J., 12 years old:

"The river is part of nature and so am I, we are all connected; people, animals, plants. I feel connected."

B., 17 years old:

"I think that we all felt a connection to the river, simply by following it from the place it is born to the place where it almost leaves the city; always following the flowing water, making us feel like it, and therefore calm and happy, despite the sun and the heat."

Delicate Chorus:
By plunging into seeing flowing they find that their attention expands to experience, this movement as one whole that is its own present moment (Bortoft, 1996 p. 64). That´s the attunement with nature. That's a sense of wholeness driven by the flowing water! They are definitely connected with nature!

A., 17 years old:

"I don't know if I am able to say what I mean, but what I want to say is that we should think more about nature. In my opinion, by thinking about it, we would end up taking care of it."

N., 12 years old:

"My message to the people is to care about the Torregela river as if it was a member of your family. Take care of the river and, above all, value the river because it exists."

Delicate Chorus:
At the student's eyes, this stream is no longer a mere place, polluted and invisible for most of the city population. The connection with nature developed throughout the field trips experiences are now feeding the awareness to the earth care. And because they care about it, they take the time to figure out what it is and what they should do with it, for it, or because of it, they are learning to make kin with all the streams (following Donna Haraway words), even if the streams are apparently ugly!

J., 16 years old:

"I felt that being outdoor, interacting with the environment, is a great way of understanding the world."

J., 16 years old:

"This experience was very unusual, we went to nature, to the middle of its sounds and everything it contains; it opened my mind to new thoughts and ideas and made me realize all the beauty and charm that can reside in the smallest things, in the smallest corner of that small

river. I say it this way because I was really stunned by something I had never witnessed, and beyond the experience as I describe it, I can still say that what has been taught there, given the different form of learning, became much clearer in my mind."

Delicate Chorus:
So many beautiful and meaningful learnings! They are opening their minds to the world, they are glimmering ecological consciousness, they are opening their minds to become beings of a sustainable world!

4. Coming to age. Short final considerations

The students' wonderful narratives are echoes of Goethe's delicate empiricism that reveal that this way of knowing nature is a meaningful path for gaining knowledge about nature, which re-inforces the connectedness with the natural world, a connectedness that is a source of joy, nurturing ecological ways of being and creates sensitive, imaginative and less solitary human beings. The fragments of the pupils' voices, that are presented, testify to the incorporation of the poetics of this process and include parts of the various phases of delicate empiricism: "observing with patience and rigour; deepening a sense of wonder to the world; using sensual and emotional awareness to experience phenomena as fully as possible; attending to connections between phenomena; acknowledging an ethical dimension to the practice of science" (Isis Brook (1998, p.52). The freedom, the joy of discovering other beings, other structures, persistent movement, the joy of participating in a whole without hierarchy, the attention that is taking root, the attunement with the beauty of the natural world, all this contributes to an affective perception regarding the streams in such degraded conditions, that is to say a perception that sees the potential of such streams, boasting a caring attitude. The emergence of the desire to care for, comes from within these experiencing human beings. We believe that if (environmental) education would be in this way, we would inhabit a more sustainable world today!

We dare to say that we are learning to "make kin" (concept coined by Donna Haraway) with the whole of the streams, whether they are of pleasing appearance or not. The sharing of stories and narratives that we are creating during this process, aims at reinforcing the conscience of cooperative connections between all beings and ways of being, be they stones, animals (human and non-human), plants, light, shadows, land, sky and movement.

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References

Bortoft, H. (1996). The Wholeness of Nature – Goethe'Way of Science. Nova Iorque: Lindisfarne Press.
Brook, I. (1998). Goethean Science as a Way to Read Landscape. Landscape Research: 23 (1), 51-59.
Cameron, J. (2005). Place, Goethe and Phenomenology: A Theoretic Journey. Janus Head: 8(1), 174-198.
Carvalho, I.C.M. (2004). Educação Ambiental, a formação do sujeito ecológico. São Paulo: Cortez Editora.
Jeremy N. (2009). Goethe on science. An anthology of Goethe´s scientifc writings. Edinbourgh: Floris Books.
Haraway, D. (2016). Staying with the trouble. Duke University Press.
Latour, B. (2004). Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern. Critical Inquiry: 30, 225-248.
Maier, G. (1986). An optics of visual experience. Nova Iorque: Adonis Press.
Seamon, D. (2005). Goethe's Way of Science and Phenomenology. Janus Head: 8(1), 86-101.
Serres, M. (2012).Petite Poucette. Paris: Le Pommier.
Yourcenar, M. (1968). L'oeuvre au noir. Paris:Gallimard.
Wahl, D. (2005). "Zarte Empirie": Goethean Science as a Way of knowing. Janus Head: 8(1), 58-76.
Whitehead, A. (1957, 1ºedição 1929). The Aims of Education and Other Essays. New York: The Free Press.

4.2 Desenvolvimento escolar: um desvio urbano pelo programa Minha casa minha vida em Maceió-AL, Brasil

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Abstract

Economics and policies are spatial dimensions naturally embedded in city structures in many Brazilian capitals, where the social pattern of communities has contrasted over time. The case of the city of Maceió is highlighted by its linear urban structure and expansion on what we call grotas (urban cliffs). We discuss the impact of the Federal Housing Program popularly known in Brazil as My Home My Life Program. Established to provide accommodation facilities for many Brazilians with low financial condition. Many people's homes are structures of the historic city, locating the building along several valleys; however, the new policy has increased evasion and difficulties for the poor to attend schools. We argue that the Housing Program is not a planning made up of the same Ministry of Cities created earlier. Urban deviations involve residences and colleges, usually educational admissions are not recommended after the start of the period. Urban and school development must be interconnected for proper planning. The oath of some social rights has to be more effective, while useful and applicable. Strong interdisciplinary understandings are needed to integrate human and social development through complementary programs or procedures.

Keywords: Spatial dimension, Maceió, My Home My Life Program, Integrated planning.

1. Introdução

É notório observar que o processo de urbanização das cidades vem ocasionando diversas mudanças nas rotinas dos cidadãos, a exemplo das ampliações das malhas viárias que impulsionam um desenvolvimento vertical ao longo das suas margens, desenvolvendo novos comércios e habitações ocasionadas por este crescimento. Fato que traz consequências e problemas socioambientais de caráter logístico, pois, com a condensação das áreas urbanas os problemas sociais se emergem no instante que iniciam-se os processos de transformações paisagísticas de caráter antrópico, principalmente com os agravamentos ambientais ocasionados pelas proliferações de aglomerados subnormais e assentamentos precários em áreas de conurbação, que para o Brasil aplica-se de acordo com o conceito previsto pela Meta 11 dos Objetivos de Desenvolvimento do Milênio, em que segundo o IPEA (2016), se buscará ter alcançado até 2020 uma melhora significativa na vida dos habitantes de assentamentos precários.

Esse quadro pode ser explicado pelo crescimento da mancha urbana metropolitana, que acontece principalmente fora do município-núcleo. Isto é, a periferização

da população em geral é acompanhada pela periferização da população de menor renda que ocupa o território em assentamentos subnormais, incitando ao governo a tomada de medidas para implementação de políticas públicas que amenizem os problemas locais, a exemplo do programa Minha Casa Minha Vida. Desta maneira, apenas desloca-se os problemas constatados, realocando à novos endereços, ocasionando alguns impactos sociais antes não analisados, a exemplo da menor oferta de escolas ou até mesmo as grandes distâncias agora enfrentadas pelos estudantes e moradores beneficiados por este plano do governo, dando início ao processo vulnerabilização social a partir da evasão escolar.

2. O programa minha casa minha vida

Diante dos problemas sociais vivenciados pelo Brasil, o número de famílias que hoje se encaixam no índice populacional de baixa renda é cada vez maior. Sobre o assunto, observa-se alguns dados que traz o documento oficial do ministério das cidades:

> [...] a necessidade quantitativa corresponde a 7,2 milhões de novas moradias, das quais 5,5 milhões nas áreas urbanas e 1,7 milhões nas áreas rurais. A maior parcela da necessidade habitacional concentra-se nos estados do Sudeste (39,5%) e do Nordeste (32,4%), regiões que agregam a maioria da população de país (MINISTÉRIO DAS CIDADES, 2006, p.17).

Como visto, a moradia é um dos principais problemas sociais para esse grupo. Vale ressaltar, que ela é ponto fundamental para a segurança, em todos os seus aspectos, da unidade familiar, e que consome grande parte dos rendimentos ou mesmo que é razão para a construção de submoradias em locais de risco.
Essa violação de segurança e existência de submoradias, viola dois comandos constitucionais que servem como fundamento existencial do programa objeto do estudo:

> Art. 1º A República Federativa do Brasil, formada pela união indissolúvel dos Estados e Municípios e do Distrito Federal, constitui-se em Estado Democrático de Direito e tem como fundamentos:
> I - a soberania;
> II - a cidadania
> III - a dignidade da pessoa humana;
> IV - os valores sociais do trabalho e da livre iniciativa;
> V - o pluralismo político.
> Art. 6º São direitos sociais a educação, a saúde, a alimentação, o trabalho, a moradia, o transporte, o lazer, a segurança, a previdência social, a proteção à maternidade e à infância, a assistência aos desamparados, na forma desta Constituição (BRASIL,1988).

Portanto, milhões de famílias no Brasil estão excluídas do acesso à moradia digna em clara violação a Constituição Federal, sendo, então um quadro emergencial onde se deve fomentar a construção, como política pública, de moradias para o grupo social de baixa renda.

Contudo, a necessidade de uma moradia transcende a existência pura de um "teto", pois necessita de uma pesquisa ampla. Essa pesquisa deve englobar a inclusão dessas pessoas no meio urbano, a sua adequação as necessidades especiais e a sua atuação junto ao grupo social da cidade.

No entanto, o referido estudo não é levado em consideração, pois raramente as famílias são alojadas em condições de habitabilidade que sejam coerentes com as condições que necessitam para uma moradia estruturada e digna:

> As habitações acabam sendo obra do improviso. Feitas sem dialogar com o planejamento urbano e a realidade ambiental de cada localidade, trazem problemas para o individual e o coletivo na medida em que seus produtores desconhecem os parâmetros principais de conforto, segurança [...] (ARRUDA, CUNHA, MEDEIROS, 2007, p. 22).

A citada moradia necessita de qualidade, segurança, organização urbana e infraestrutura urbana, assim como pleiteia o Ministro das Cidades em documento oficial expedido pelo Governo Federal:

> A moradia digna como direito é vetor de inclusão social, garantindo um padrão mínimo de habitabilidade, infraestrutura, saneamento ambiental, mobilidade, transporte coletivo, equipamentos, serviços urbanos e sociais (MINISTÉRIO DAS CIDADES 2006, p. 30).

Para tanto, como um caminho para o enfrentamento da crise habitacional no Brasil, o Governo Federal adotou o Programa Minha Casa Minha Vida, para beneficiamento social, com o intuito de reduzir o déficit habitacional no país, servindo como meio de desenvolvimento econômico nacional.

Nessa linha, Lopes e Junqueira (2005, p. 14) contemplam que: "O fato é que os piores índices de desenvolvimento e os maiores déficits habitacionais do Brasil estão no Nordeste brasileiro [...]".

Então, o Governo Federal criou o referido programa para favorecer esse grupo populacional, contando com os incentivos governamentais para o financiamento do imóvel próprio, com o mínimo de dignidade e com condições aptas a faixa de renda do público destinado.

O Minha Casa Minha vida é pertencente ao Governo Federal, criado a partir da publicação da Lei nº 11.977, de 07 de julho de 2009, Lei esta que estabelece as suas regras e atribui ao Poder Executivo a regulamentação do Programa Nacional de Habitação Urbana – PNHU.

> Artigo 2º: O PMCMV tem como finalidade criar mecanismos de incentivo à produção e à aquisição de novas unidades habitacionais pelas famílias com renda mensal de até 10 (dez) salários mínimos, que

Dentre seus objetivos, há a implementação do Plano Nacional de Habitação com o intuito de construir moradias, aumentando, assim, o acesso das famílias de baixa renda à casa própria, gerando, ainda, a criação de emprego e renda através da construção civil. Essa foi uma das principais estratégias do governo federal para levanta o sistema econômico brasileiro.

Os principais agentes ativos do PMCMV são a Caixa Econômica Federal, os Estados, prefeituras e a construção civil.

Os subsídios oferecidos são divididos entre 3 faixas de renda, segundo a renda familiar. A faixa 1 inclui as famílias de renda mais baixa, com total de até 3 salários mínimos. A faixa 2 inclui renda familiar entre 3 e 6, enquanto a faixa 3, renda entre 6 e 10 salários mínimos.

Cabe salientar que é justamente na faixa de renda 1 que se localiza a maior parte do déficit habitacional. Ou seja, as famílias de baixa renda e a grande maioria dos empreendimentos do PMCMV localiza-se na periferia da área conurbada.

Assim, esse programa atende primordialmente a famílias de menor renda, pois tem níveis de subsídios que podem chegar a 96% dos valores financiados, fazendo com que a produção habitacional tenha ganho em escala industrial.

Para ingressar no referido programa, além de ser considerada como baixa-renda, é necessário que as famílias realizem o cadastro nos órgãos responsáveis pelo gerenciamento e atualização do CADÚNICO (Cadastro Único).

O referido cadastro faz parte do programa social do Governo, que tem como principal objetivo destacar a situação socioeconômica da população dos municípios. Através dele o ente público faz um mapeamento onde fazem a identificação das famílias de baixa renda que residem no país, bem como analisa as condições e as principais necessidades das mesmas para poder colocar em prática os serviços sociais que atendam essas famílias.

Portanto, é uma iniciativa que oferece condições atrativas para o financiamento de moradias nas áreas urbanas para famílias de baixa renda, com o intuito de diminuir esse déficit, ou seja, uma oportunidade para quem mais precisa, e uma forma de desenvolvimento para todo o Brasil.

Como visto, a formatação do programa atende a uma necessidade maior e de complexidade constitucional, exigindo a avaliação dos participantes em diversos pontos de análise. Contudo, sua execução não está alinhada a essa finalidade.

Conforme dito, o programa vai selecionar as pessoas de acordo com o atendimento dos requisitos e critérios que envolvam sua condição social, pois não se pode dissociar a moradia do contexto de inclusão. Esse contexto de inclusão é essencialmente ligado a participação da população beneficiada a sua necessidade urbana, ou seja, ao seu local de trabalho, acesso aos postos de saúde, escolas, centro de compras (supermercados), entre outros.

No entanto, no afã de atender critérios políticos e sem respeitar o cuidado mínimo necessário a esses requisitos, o poder público vem criando centros populacionais distantes do meio urbano e sem acesso a atuação do estado em outras frentes.

Ademais, são enfrentados problemas estruturais, desde a não conclusão de todas as etapas do projeto a má qualidade dos produtos empregados, o que ocasiona, também a manutenção da dor de cabeça dos usuários e, consequentemente, o aumento das reclamações junto aos órgãos de controle.

Portanto, mesmo diante do benefício de uma "casa nova", continua, o beneficiário, à margem da sociedade, distante dos serviços públicos, a exemplo das escolas, e cada vez mais fora de alcance de uma inclusão digna de sua moradia.

3. As vulnerabilidades da evasão escolar pelo abismo socioeconômico

A escola ocupa o seu locus central na sociedade como uma agência espacial, contrastando com os problemas adjacentes as problemáticas locais, tendo em seu viés um contexto geográfico, findado em toda a malha de complexidade socialmente adquirida. Relacionando dessa maneira com os seus problemas e conflitos nos mais diversos aspectos, desde as ocupações subnormais em áreas irregulares vizinhas, problemas com a violência, congestionamento, desemprego, falta de saneamento, iluminação, evasão e etc. A escola tem sido objeto de estudo da Educação, da Psicologia e, além de ser um espaço físico projetado para educar crianças e adolescentes, constitui-se também em espaço de relações humanas (OLIVEIRA, 2005, p. 228)

Remete-nos a importância de nos aprofundarmos em conceitos ainda pouco compreendidos por serem estes muitas vezes exercidos de forma imperceptível, pois, os detalhamentos da vulnerabilidade para Schramm (2012), caracterizam-se principalmente pelo momento em que certos indivíduos podem estar em um possível direcionamento de prejudicar, machucar e coagir, algo ou alguém. Já para Rodriguez (1995), o termo vulnerabilidade pode gerar os mais diversos tipos de interpretações, sendo caracterizados a partir dos dados pertinentes a serem analisados, pois, o sujeito em estado vulnerável é aquele que encontra-se em desvantagem, propício a sofrer represálias sem chances de defesa, aquele em que sua integridade física ou moral encontra-se sob ações danosas, provocadas por algo ou alguém, fatores que ferem a dignidade humana e social, gerando uma inabilidade diante do cenário de

enfrentado ocasionando por estes desafios, gerado ainda pela necessidade e ajuda externa para mitigar o problema apresentado.

A partir do posicionamento das escolas como agências de inter-relações sociais, estas ocupam um lugar significativo no âmbito local da cidade, sendo constantemente objeto de estudos urbanísticos, pois, as escolas pertencem as cidades, e devem buscar responder aos anseios da comunidade. Tosta (2013), afirma que após o seio familiar, a escola estabelece relações sistêmicas do conhecimento, favorecendo o fluxo contínuo de conhecimentos, socialização coletiva e agrupamento de conceitos e experiências de convívios tradicionalmente transmitidos.

Para que as garantias essenciais das funções educativas atinjam seus objetivos, cabe ao município como agência promotora de bens públicos avaliar e destinar recursos suficientes para o eficaz trabalho educativo das instituições de ensino, fazendo-se valer expertise dos agentes envolvidos nos processos dinâmicos das atividades, destinadas principalmente para o alicerce da aquisição dos objetivos básicos, dentre elas a universalidade do acesso ao conhecimento e a igualdade de oportunidades a todos os sujeitos, independentemente de classe social, religião ou etnia, dado cumprimento ao seu papel social de desenvolvimento local e individual.

Partindo desta premissa, ao se negligenciar ou dificultar o acesso as escolas, seja com relação ao número de vagas ou sob a ótima logística de deslocamento urbano, fere-se os princípios básicos da constituição, ao vulnerabilizar as possibilidades de acesso as instituições de ensino, principalmente no tocante da classe social atendida. Desta forma, o governo ao criar um programa ao exemplo do Minha Casa Minha Vida, deve realizar um estudo profundo e holístico acerca da cidade, bem como as consequências posteriores aos processos urbanísticos e suas influencias na vida diárias dos sujeitos contemplados.

4. Ecologia humana: um estudo emergente

Compreender as relações sociais para além da visão simplista ecológica é uma necessidade urgente, que em tese vem sendo melhor discutida e desenvolvida, pois, analisar o contexto social prima por uma análise espacial eminentemente intercalada com a realidade vivenciada, correlacionando os fatores de conhecimentos formais e informais. Todas as formas de representação dos aspectos educativos carecem de um aprofundamento conceitual, com uma função transformadora da realidade.

Dessa maneira, falar de ambiente implica integrar com conceitos relacionados a humanidade, tendo-se o cuidado que não cair em reducionismo ordinário, ao tempo em que busca-se classificar através de variáveis os conceitos e estruturas fundadas em estudos sobre Ecologia Humana (EH), pois, apesar de se caracterizar de forma explicativa os fragmentos embutidos na vertente ecológica, corre-se o risco infundir-se

no reducionismo explicativo, buscando estratificar em camadas associativas determinados eventos, mesmo estes sendo palco de estudos num ambiente social, conforme menciona Begossi:

> Quanto ao ambiente é comum incluir "ambiente social" como uma variável ambiental, o que significa ampliar o conceito de ambiente ao aplicá-lo a populações humanas. Fica-se então entre várias "ecologias humanas" oriundas de áreas diferentes e com conceitos muitas vezes indefinidos ou pouco claros, ou com uma ecologia humana "reducionista". (1993, p. 02).

Para Barbosa (2007), a EH surge como resposta da humanidade de forma sensitiva aos problemas emergentes de um mundo contemporâneo, em que busca-se garantir o direito aos seres vivos a partir da apreensão de um olhar holístico do mundo, em que os conhecimentos integrados poderiam das luz à questões essencialmente relacionadas ao homem-natureza, fazendo alusão a necessidade de um comportamento ético da humanidade perante o planeta em que habitamos.

Para o autor, as ações de interferência do homem sobre o meio ao qual ele se relaciona, possibilita o entendimento do conceito antropoceno, cuja dinâmica se evidencia a partir do momento em que estes atuam como agentes geofísicos e interferem de forma direta nas composições das atividades humanas em escala local e global, onde a partir deste entendimento, propomos incrementar um paralelo no que diz respeito às formas de interações sociais e o choque de conceitos educacionais e culturais, cujas matrizes simbólicas muitas vezes sofrem mutações variadas desses aspectos socioambientais.

Ao realizarmos um estudo acerca dos conceitos da ecologia, Badiru, nos diz que este divide-se em três vertentes:

> Os conceitos de Ecologia podem ser sintetizados em três aspectos epistemológicos: população, comunidade de animais (fauna) ou plantas (flora) e ecossistemas. A ciência do ecossistema, por sua vez, consiste em três abordagens: (a) a biocêntrica, quando a vida se encontra no cerne da questão, (b) a ecocêntrica, centralizando o foco nas relações de vida, pelo conjunto das dimensões e dos processos territoriais e (c) a geosistêmica, com o foco no topo terrestre como lugar geográfico que representa espaço e as condicionantes biofísicas e fisiográficas. (2014, p. 134)

Assim, os aspectos relacionados a EH vem a agregar toda uma gama de conhecimentos pertencentes a ecologia e as relações humanas socioambientais, em que a dinâmicas culturais e econômicas se correlacionam a todo momento.

Valendo-se ainda desses dispositivos epistemológicos no que concerne as relações capitais de exploração da natureza e do homem pelo homem, Badiru ainda nos afir-

ma que "A perda da identidade orgânica do homem com a natureza, a partir do capitalismo, contribuiu para a desigualdade social e para contradição socioambiental do sistema dependente" (2014, Pág. 155).

Assim, a EH elabora associações entre homem, natureza e capital, sendo exaustivamente discutidas ao tempo que se sugerem a reformulações de um desenvolvimento sustentável de combate a atual estrutura capitalista predatória e incentivadora de abismos socioeconômicos e injustiças sociais pelo mundo.

Para a busca da equidade socioambiental, Badiru (2006), mais uma vez nos contempla com a introdução do conceito de floresta-urbana como subsídio de busca pela igualdade de direitos humanos a partir da estruturação geoespacial como instrumento de planejamento urbano a luz do combate às vulnerabilidades socioambientais, a partir do planejamento regional que busque desenvolver políticas públicas voltadas a abrangência social e igualitária dos direitos sociais e ambientais, e que inclua o cidadão neste espaço de integração espacial e ambiental.

De acordo com os conceitos clássicos da EH de Odum (1971), a natureza está caracterizada pela conjunção dos seres vivos, animais e vegetais, bem como a inclusão dos aspectos únicos das sociedades humanas, em que estas últimas, se especializam das demais formas de vida por exercerem um papel exclusivo do uso da linguagem e troca de informações e conhecimentos, bem como a elaboração de trocas e apropriações monetárias econômicas, que regem as relações comerciais e sociais de um mundo globalizado.

5. As reflexões da ecologia humana sobre o abismo socioeconômico

A EH busca refletir sobre os rumos em que a humanidade deverá seguir para se desenvolver com ética, respeito ao meio ambiente e dignidade social a partir das relações estabelecidas entre as comunidades, uma vez que a EH está intricada como uma nova concepção inter e multidisciplinar das mais variadas relações com o meio, seja ele natural ou artificial.

Assim educação também buscar contribuir para equidade social, ao tempo em que traz para si a responsabilidade de desenvolver de forma crítica novas posturas e olhares que possibilitem o desenvolvimento social atrelado as múltiplas formas de soluções com a manutenção saudável do meio, em consonância com a garantia da dignidade da cada ser como agentes ativos e integrados em uma sociedade globalizada e em constante evolução social, cultural, educacional e econômica.

Partindo desse pressuposto, a EH busca:

> [...] propor ações futuras que reconstruam novos padrões de direito de direitos, deveres e valores humanos considerando a justiça social, val-

> orização do espaço natural, partindo do compromisso coletivo, pois só assim seremos capazes de entendermos que qualquer ação individual ou unilateral tenderá a afetar o equilíbrio entre estas forças. (ALVIM, 2012, p. 17)

Para Giarola Cecilio et al. (2014), os grupos mais suscetíveis às violações dos direitos constitucionais são os mais jovens, em especial as crianças, cuja consequência afeta de forma irreversível o contexto social, físico e mental, em que a vulnerabilidade torna-se mais marcante e decisiva na vida de cada um deles.

A pobreza acarreta de forma severa as vidas escolares dos grupos sociais mais vulneráveis, onde podemos observar a exclusão na participação política dessas famílias, ausência de liberdade e consequentemente a privação dos direitos legalmente constituídos, pois, "O fenômeno da pobreza, em suas diversas manifestações, produz indivíduos que, para sobreviverem, devem se adaptar a seus contornos e com isso gerar respostas às demandas da vida social baseadas em sua lógica de vida". (NAIFF, 2008, p. 127), mas que em detrimento de um voraz mercado financeiro, parte dos alunos são obrigados a deixarem as carteiras escolares para contribuírem com o sustento da família.

> Por outro lado, como resultado e consequência da pobreza, o trabalho realizado pelas crianças e adolescentes perpetua situações desfavoráveis e de exclusão social, ao impedir a escolarização ou prejudicar o aproveitamento escolar das mesmas, se limita a obtenção de conhecimentos e atitudes necessários para que, como adultos, poderão contribuir ao crescimento econômico e prosperidade, pelo qual restará o desenvolvimento nacional (GIAROLA CECILIO et al., 2014, p. 49).

Buscando combater as vulnerabilidades a partir desta perspectiva, Fonseca (2007) nos informa que algumas políticas públicas foram adotadas além do PMCMV, a exemplo da criação dos ministérios Bolsa Escola (MEC), Bolsa Alimentação (MS), Auxílio Gás, dentre outras iniciativas, que em 2003 foi-se agrupada basicamente em um único programa, o atual Bolsa Família, cuja principal sistemática é a de transferir renda aos que mais necessitam para suprirem as carências na saúde e educação.

A realidade da evasão muitas vezes se depara com as questões socioeconômicas como fatores decisivos para a permanência e sucesso escolar de muitas crianças e adolescentes, fato este em que "Segundo a OIT, trabalho infantil é o desempenho de qualquer atividade econômica, com o fim de receber remuneração, garantir o sustento e ainda auxiliar no alento familiar, sendo realizada por indivíduos menores de 18 anos." (GIAROLA CECILIO et al., 2014, p. 54).

Neste sentido, Ávila complementa que "El trabajo infantil no sólo es ilegal, moralmente inaceptable y un ultraje a la dignidad humana" (2007, p. 69).

Assim, não só pensando em aspectos estatísticos da visualização do alcance de

números e metas políticas, é necessário se repensar qual trajetória desejamos para o futuro educacional do nosso município, adotando programas que atendam as demandas das necessidades em sua plenitude, social e espacialmente.

6. Conclusão

Sendo assim, observando o crescimento da urbanização das cidades e a apresentação de novos projetos habitacionais para a população de baixa renda, constata-se a diminuta preocupação com a inclusão dos beneficiários nas políticas públicas do Estado nesses novos locais. A reduzida participação do Estado na vida dessas pessoas acaba influenciando na frequência educacional, iniciando um processo de evasão escolar, fato complicador de uma evolução social dessa parte da população. Insta reforçar que é através da educação que os agentes (atores) envolvidos nas dinâmicas sociointeracionistas têm a possibilidade de adquirirem formalmente conhecimentos pertinentes a execução de procedimentos básicos necessários para a continuidade nos estudos e a inserção no mercado de trabalho, para, assim, atender ao comando Constitucional de Dignidade.

Referências

ALVIM, Ronaldo Gomes. Ecologia Humana: da visão acadêmica aos temas atuais. Maceió: EDUFAL, 2012.

ALVIM, Ronaldo Gomes; MARQUES, Juracy (orgs.). Ecologia humana: uma visão global. UEFS, 368p. Feira de Santana-Ba, 2014.

AVILA, Antonio Sandoval. Trabajo infantil e inasistencia escolar. Rev. Bras. Educ., Rio de Janeiro, v. 12, n. 34, p. 68-80, Apr. 2007.

BADIRU, A. I. Floresta urbana: uma proposta metodológica no estudo do espaço hídrico e da configuração territorial de registro, região do Vale do Ribeira, SP. 2006. 182 f. Tese (Doutorado em Pesquisas Energéticas Nucleares) – Universidade de São Paulo, São Paulo, 2006.

BARBOSA, Mônica Maria Vieira Lima. Tríade da ecologia humana no cenário da pedagogia socioambiental: ética, estética e bem-estar. Rios Eletrônica – Revista Científica da FASETE – Ano 1 – Nº 01 – Agosto/2007.

BEGOSSI, Alpina. Ecologia Humana: Um Enfoque Das Relações Homem-Ambiente. Interciencia. 18(1): 121-132. Disponível em: <http://www.interciencia.org.ve/>. Acesso em: 04 de novembro de 2017.

BRASIL. Ministério das Cidades. Política Nacional de Habitação. Reimpressão, 2006. 30 p.

BRASIL. Ministério das Cidades. Trabalho Social em programas de habitação de interesse social. 2ª ed. Brasília: MCidades/SNH, 2014.

BRASÍLIA (DF). Lei nº 11.977, de 07 de julho de 2009. Manual MCMV Entidades. Disponível em: <http://www.planalto.gov.br/lei/2009 >. Acesso em: 22 maio 2018.

Caracterização e tipologia de assentamentos precários: estudos de caso brasileiros / editores: Maria da Piedade Morais, Cleandro Krause, Vicente Correia Lima Neto. – Brasília: Ipea, 540 p., 2016.

CUNHA, Eglaísa Micheline; ARRUDA, Ângelo Marcos; MEDEIROS, Yasmim. Experiências em habitação de interesse social no Brasil. Brasília: Ministério das Cidades, Secretária Nacional de Habitação, 2007. 219 p.

FONSECA, Ana Maria Medeiros da; VIANA, Ana Luiza d'Ávila. Direito à saúde, atenção básica e transferências condicionadas de renda na América Latina. Ciênc. saúde coletiva, Rio de Janeiro, v. 12, n. 6, p. 1505-1512, Dec. 2007.

GIAROLA CECILIO, S.; DA PENHA SILVEIRA, R. C. Caracterização do trabalho de menores de uma escola estadual de Divinópolis-MG. Cienc. enferm., Concepción, v. 20, n. 1, p. 47-60, Abr. 2014.

IPEA. Caracterização e tipologia de assentamentos precários: estudos de caso brasileiros. Editores: Maria da Piedade Morais, Cleandro Krause, Vicente Correia Lima Neto. – Brasília: DF, 540 p., 2016.

JUNQUEIRA, Eliana; LOPES, Alberto Costa. Habitação de Interesse Social em Maceió. Rio de Janeiro: IBAM/DUMA, 2005.

NAIFF, Luciene Alves Miguez; SA, Celso Pereira de; NAIFF, Denis Giovanni Monteiro. Preciso estudar para ser alguém: memória e representações sociais da educação escolar. Paidéia (Ribeirão Preto), Ribeirão Preto, v. 18, n. 39, p. 125-138, 2008.

ODUM, E. P. Fundamentals of Ecology. Philadelphia, PA: W.B. Saunders, 1971.

OLIVEIRA, Cynthia Bisinoto Evangelista de; ALVES, Paola Biasoli. Ensino fundamental: papel do professor, motivação e estimulação no contexto escolar. Paidéia (RibeirãoPreto), Ribeirão Preto, v. 15, n. 31, p. 227-238, Aug. 2005.

SCHRAMM, F. R. Vulnerabilidade, vulneração, saúde pública e bioética da proteção: análise conceitual e aplicação. In: Taquette, S. R.; Caldas, C. P. (Orgs.). Ética e pesquisa com populações vulneráveis. Rio de Janeiro: Ed. EdUFRJ; 2012.

TOSTA, M. C. Síndrome de alienação parental: a criança, a família e a lei. [2013].Disponível em:<http://www3.pucrs.br/pucrs/files/uni/poa/direito/graduacao/tcc/tcc2/trabalhos2013

_1/marlina_tosta.pdf>. Acesso em 07 de setembro de 2017.

4.3 The human nature of children: ecoperceptions in school spaces

Daniela Santos Silva, Juracy Marques dos Santos

Abstract

Human Ecology thinks about the interaction of the human species with the natural and social world, involves multidimensional factors of this universe (MACHADO, 1984). The core of this study sought to analyze aspects of the child nature, gathering partial results of the master's research in Human Ecology and Socioenvironmental Management - PPGEcoH / UNEB. The objective was to investigate the representations of Nature, based on the perception of the children's environment in the school context in the city of Juazeiro-BA, based on an analytical-descriptive picture of children's representations, based on social representations (MOSCOVICI, 1978). The methodology used was participant observation, field diary, design workshops and semi-structured interviews. Partial results highlight the ways children enter the Nature model, excluding humans from the integrated parts. In Human Ecology, childhood enables significant reflections for the development of the knowledge of humanity and the consolidation of a notion of future. Education is the most important dimension of Human Ecology.

Keywords: Nature; Human Ecology; Children; Mental Maps; Social Representation.

1. Introduction

By immersing ourselves in the theory of child development, we immerse ourselves in the beginnings of human nature. Reflecting this universe of knowledgements, makes it possible to think about the considerations of the ecosystem of life, the dynamics of men and women in the world. According to the British psychoanalyst Winnicott, "if we are to judge the way a human being deals with his fellows and see how he builds up his personality and life, we can not afford to leave out what happens in the early years, months, weeks, and even days of his life" (1979: 116).

The knowledge built in childhood presents the initial characteristics, in the construction of human personality, this universe carries knowledge that develops throughout life. From this perspective, we ask: What are the perceptions of children about Nature in school spaces? We hold, what is observed here, is the basis for the human relationship with the world, with other beings and with their fellow beings.

In this way, the Social Representations express knowledges arising from this process of becoming. For Moscovici, "representation is always directed to others: through the act of showing something at someone, it speaks; and through the act of expressing something to someone, it communicates" (1978: 26).

The understanding of Nature, from the child's perception, seeks to reflect the development of humanity, through the relations established with the environment. Children nurture their ideas, building their knowledge from the dynamics of the context in which they live. Freud, the forerunner of psychoanalysis, carried out studies immersing himself in this universe, stating that "Psychoanalysis has been obliged to infer from the psychic life of the child the adult's life, thus giving reason to the claim that the child is the father of man. He sought the transformations and changes that are taking place in this trajectory" (FREUD, 1900, p. 215). Freud who, before psychoanalysis, was a zoologist in love with the theory of evolution of species, an ecologist, took childhood as the basis of human life, so, as Marques (2017) says, it can be considered a precursor of Human Ecology.

When thinking about these questions, we go through reflections on the lines of the archaic and the contemporary, meditated considerations in the dynamics of the planetary senses organized by children, which can only be apprehended/ learned from a multidisciplinary perspective such as Human Ecology. According to Machado, "Human Ecology is above all, a new level of thought within the reach of different disciplines" (1984, 33).

Based on this possibility, this essay presents partial results of the master's research in Human Ecology and Socioenvironmental Management, whose objective is to investigate the representations of Nature, based on children's perception, in the school environment.

2. Material and methods

The core of this study focuses on the human nature of children. The essence of this work is the results of a master's research in Human Ecology and Socioenvironmental Management, with a qualitative and quantitative approach, which aims to investigate the representations of nature through an analytical-descriptive framework based on the Theory of Social Representations (MOSCOVICI, 1978).

The research was developed in two schools: one located in the rural area and the other in the urban area of the city of Juazeiro, state of Bahia, Brazil. We organized the studies in two classes of the 2nd year of Basic Education I, children ranging from 7 to 10 years of age. The methodology developed in the school environment was based on: participant observations, notes in the field diary, development of design workshops and semi-structured interviews, based in the permanent dialogue with the children.

Data analysis was based on the categorization of the drawings, noting the icons illustrated by children, linked to listening to the drawings and their understanding of

Nature. The discourse on this research is based on Content Analysis, which focuses on the inference of the data, on the atmosphere of the knowledge arising from children's perceptions. This fruitful universe groups categories related to the interpretation and understanding of these elaborations (BARDIN, 2016).

3. Results and discussion
3.1 ecoperceptions and representations of nature

Perception is a dynamic, involving sensory elements, beyond the visual field. According to Mèredieu, "the child's own mode of expression, the drawing , constitutes a language that has its vocabulary and its syntax, from here, the attempt to include it in the framework of semiology, the general science of signs, in the sense in which it was understood by Sausurre" (2006, p. 14).

Thinking about these aspects encompasses/involve Ecoperceptive knowledge that is based on the individual and collective culture of children, touching in a certain way on the defense of environmental issues, reflected, from the ecological, ethical, political, economic, social and cultural aspects of the planet. From the historical roots of this process (DIAS, 2004), always drinking, in the voice, in the infantile imaginary.

We know, the world's experiences touch the souls of children. Environmental problems run through them. From this perspective, the children argued: "If Nature dies people die, then we must take care of Nature, so that it doesn't die. Well, one day I planted a little plant and it was never born. I thought she had died, I threw it in the bush, but when I looked at the seedling it was sprouting, then I took it and showed it to my brother, he advised me: if the plant is not born it means that it died, then I threw it away, I never saw the little plant again. My grandmother every day sweeps the floor because of the trees and she is always threatening to cut them down. I think it's mean , why will she cut a tree? just because it dirts the house, but if it gets dirty in a few years the wind will take everything" (CHILD S, 8 years old).

Figure 1 - Source: (CRIANÇA B, 8 years old)

Figure 2 - Source: (CRIANÇA V, 7 years old)

The drawings presented in figures 1 and 2 represent the Nature perceived by children, abundantly, a world that remains away from its real world, from the landscape of the place where they live physically. Children's illustrations express compositions, in addition to the lines and colors materialized on the face of the paper. They manifest deep considerations of the natural knowledge that invade them, like apple-trees in the semi-arid landscape.

The Ecoperceptive dimension of reality allows the construction of new knowledge, emerging innovative thoughts and attitudes, linked to biological, social, cognitive and affective aspects. In this perspective, an education based on ecological awareness, makes possible human development, however, it is important to be attentive, to the meaning of these children's representations that denounce the absence of their landscapes of life, replaced by another one, certainly linked by the communicative channels they have access, as well as textbooks.

The senses observed in the drawings also reflect the conditions of life currently, projecting ideas for the future. The children observe the events and the explanations given to each situation, thinking about this process, the fragilities of the human relationship with Nature. There is, among them, a critical sense that needs to be worked toward strengthening a consistent ecological consciousness.

Figure 3 - Source: (CHILD VG, 8 years old)   Figure 4 - Source: (CHILD M, 7 years old)

This affective discussion with the place expands our thoughts and behaviors, it covers aspects, the way we relate to the natural environment. In Figure 4, we can see the representation of the affective link with the place, with the city, in which children experience their experiences and build their relationships and worldviews. "I drew a butterfly carrying a cocoon" (CHILD L, 8 years old). The place of children, as we have seen, is not a purely physical place, it is a place of the soul, of the heart, of the imagination. The practice of human ecology must protect these places.

In figure 3, we observe the representation of the metamorphosis, the dance of the butterfly means transformation, existential renewals. The study of the child-nature relationship, from these drawings, beforehand, allows us to infer something about

the absence of human representation in what it considers Nature. This is a key issue in the struggle to affirm an ecology that also includes people in their environments. On the wings of freedom, children unfold their ideas, in the atmosphere of imagination, where reality inhabits, the infant universe, that is how they build their learning. According to Moscovici, "social representations are almost tangible. They circulate, cross and crystallize incessantly through a speech, a gesture, an encounter, in our everyday universe" (1978: 41).

The representations express the composition of the thoughts, of the substances that circulate in the connection of internal and external ideas, involves symbolic elements emphasized by individual and collective images and language of the environment. The Ecology of the Child emerges discussions seeking to reflect the beginning of the human relationship with the natural environment, this process involves cognitive and sensory knowledge, According to Tuan,

Perception is an activity, an extension to the world. The sense organs are ineffective when they are not actively used. Our tactile sense is very delicate, but to differentiate the texture or hardness of the surfaces it is not enough to put a finger on them; the finger has to move over them. It is possible to have eyes and not see; ears and not hear. (TUAN, 2012, 30)

The considerations of children, penetrate the historical environmental phenomena, Ecoperception goes beyond materiality, it is developed in the environment of listening, tastes, sensations, sounds, textures, relationship with the world. In this sense, we can not speak of a strictly objective science. The analysis of infantile representations needs deepening in their subjective worlds. So, thinking about the Ecology of the Child, it is of fundamental importance to access knowledge from different fields of knowledgments. Thus, the model of Human Ecology can be an indispensable tool in this understanding.

The children reflected these questions, from the reality experienced in the city of Juazeiro-BA, as we can see in figures 5 and 6, and in their argument: "The river is drying, the flowers being cut off, the trees cut in half , the trees are take to make a chair, a table, these things, and I think it's cruel to do it because, these trees bear fruit, give us sun, give us wind. And there are people who think that thunder causes death, I also think, but now that I'm thinking, the thunder brings water to the plants to
be beautiful" (CHILD Y, 7 years old).

Figure 5 - Source: (CHILD R, 8 years old)
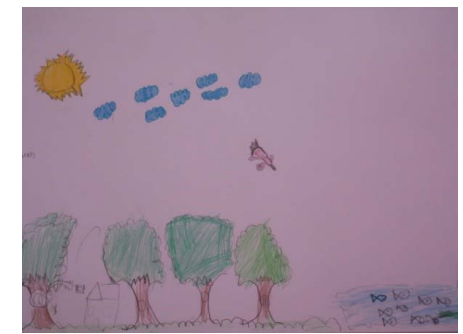
Figure 6 - Source: (CHILD, L 8 years old)

The representations of children, their senses about life, about nature, bring motion meanings . Their consciousness is being built . Not only the school, but all sciences, in particular ecology, should treat this moment as fundamental for the structuring of the world, the human future, Like what the child describes of thunder, how many other mistakes could be avoided if we arrived in time at this stage of the formation of people. There is an urgent need for attention from all fields of humanity to childhood in every corner of the world.

These representations reflect the core of this relationship, which begins in childhood and evolves throughout life. In most of the drawings, it is possible to observe, that the human figure is not represented in Nature, this opens a discussion to the question of the denature of our species to the natural environment. They are considerations of extreme importance, aspects to be reflected, because, it addresses the meanings of the relational crisis of man with the environment, central question of Human Ecology.

The child representations connect to the senses of what we think the planet is. The drawings also manifest on the emerging processes of the environment, beautiful and also threatening things. The Social Representations of Nature signalize the need to think more deeply about environmental issues in educational processes. As pictures 7 and 8 show, we need to believe in this love that children devote to nature.

Figure 7 - Source: (CHILD, L 8 years old)

Figure 8 - Source: (CHILD M, 7 years old)

Still in Figures 7 and 8, we can observe affective expressions, illustrated by the heart. As a result, the child reflected: "I think that Nature is the environment that helps people to study, we need trees to give us the leaves , then we study the leaves , so Nature already helps a lot, but there are already some people who do not conserve nature . well! To me , Nature is what I like best in the world." (CHILD R, 9 years old).

Figure 9 - Source: (CHILD K, 8 years old)

Figure 10 - Source: (CHILD V, 7 years old)

In expressing their thoughts, the children reflected that: "Nature for me is life! But there are people who do not like Nature and do not care about Nature" (CHILD L, 8 years old). "When buses and cars pass, smoke comes out and pollutes the city, poluting the trees and the respiration of the trees and flowers; then, Sometimes I see men using a saw and cutting the trees down and there was a man throwing trash into the Saint Francisco river polluting the river , and also cutting the trees" (CHILD M, 8 years old).

In Figures 9 and 10, the children illustrated an urbanized Nature. We can observe the composition of a space, with natural elements and constructed by man's action. Buildings, houses, lanes, automobiles mixed with the way of life, which portrays contemporary artificial and natural life.

The reflection of the Social Representations of Nature by children is of paramount importance, as it allows the construction of meaningful knowledge inside and outside the spaces, to understand how this construction is managed emerges relevant knowledge to humanity.

4. Final considerations

The Social Representations of Nature, expresses a significant content of children's knowledge, these, a treasure that needs to be taken care of, if, in fact, we want to think about the future of humanity.

The drawings present a social and natural image of the world, but also with the absence of the human figure. The human being is part in the action of all the prob-

lems indicated by the children, but as an external agent to nature. The child draws, on paper, the imaginary and real experiences, what he sees and what he hopes to construct, in the present and in the future, thoughts that have been aggregated throughout his development. It is urgent that not only the school welcome and take care of this moment, but that it is part of the concerns of all the sciences that think about the human question nowadays, especially Human Ecology.

Language has its structuring, from the objectivity and subjectivity, of the meanings learned, in the relations established with the family, with the school, with the environment. In addition to materialization, the children expressed a meaningful content, which reflects in depth, the bond that binds us to Nature. This can not be grasped from an essentially rationalist paradigm, but models based on subjective perspectives, such as psychoanalysis and child psychology.

Thus, we call the pedagogy of school spaces, to all human science, to reflect in the educational processes of the human nature, linked to the ecology of the planet, opening a dialogue about the man-woman-environment relationship, thinking in how the imbalance of this relationship, can affect the natural dynamics of life, from the Ecology of the Child.

We are part of this great ecosystem; when studying the universe of the child, we have the possibility of entering into a fertile content for contemporary Human Ecology. From this study, we seek to analyze and understand how this complex process goes, actually, the most expensive phenomenon to study human behavior in all epochs.

References

Bardin, Laurence. (2016). Content analysis. / Laurence Bardin; translation by Luís Antero Reto, Augusto Pinheiro. - São Paulo: Issues 70.

Dias, Genebaldo Freire. (2004). Ecoperception: a didactic summary of socio-environmental challenges, Editora: Gaia.

Freire, P. (1996). Pedagogy of Autonomy: knowledge needed for educational practice / Paulo Freire. – Peace and earth .

Freud, S. (1990). New Introductory Lectures on Psychoanalysis. In: FREUD, S. Brazilian standard edition of the complete psychological works by Sigmund Freud. v. 22. Rio de Janeiro: Imago.

Machado, Paulo de Almeida. (1984). Human Ecology / Paulo de Almeida Machado. - [São Paulo]: Cortez; [Brasilia]: National Council for Scientific and Technological Development; [São Paulo]: Associated Authors.

Marques, Juracy. (2017). The Ecology of Freud: The Ecosystems of Human Nature. Paulo Afonso: SABEH.

Mèredieu, Florence de. (2006). The children's drawing / Florence de Mèredieu; translation by Álvaro Lorencini, Sandra M. Nitrini. 11 ed. - São Paulo: Cultrix.

Moscovici, Serge. (1978). The social representation of psychoanalysis. Translation by Álvaro Cabral, Zahar Editors, Rio de Janeiro.

Penna, Antônio Gomes. (1993). Perception and reality: introduction to the study of perceptive activity / Antônio Gomes Penna.- Rio de Janeiro: Imago Ed.

Tuan, Yu-Fu. (2012).Topography: a study of the perception, attitudes and values of the environment. São Paulo / Rio de Janeiro. Difel.

W. Winnicott.(1979). The Child and his world. Fifth Edition by Zahar Edictors, Rio de Janeiro.

5. Human Health and Wellbeing of Indigenous Populations
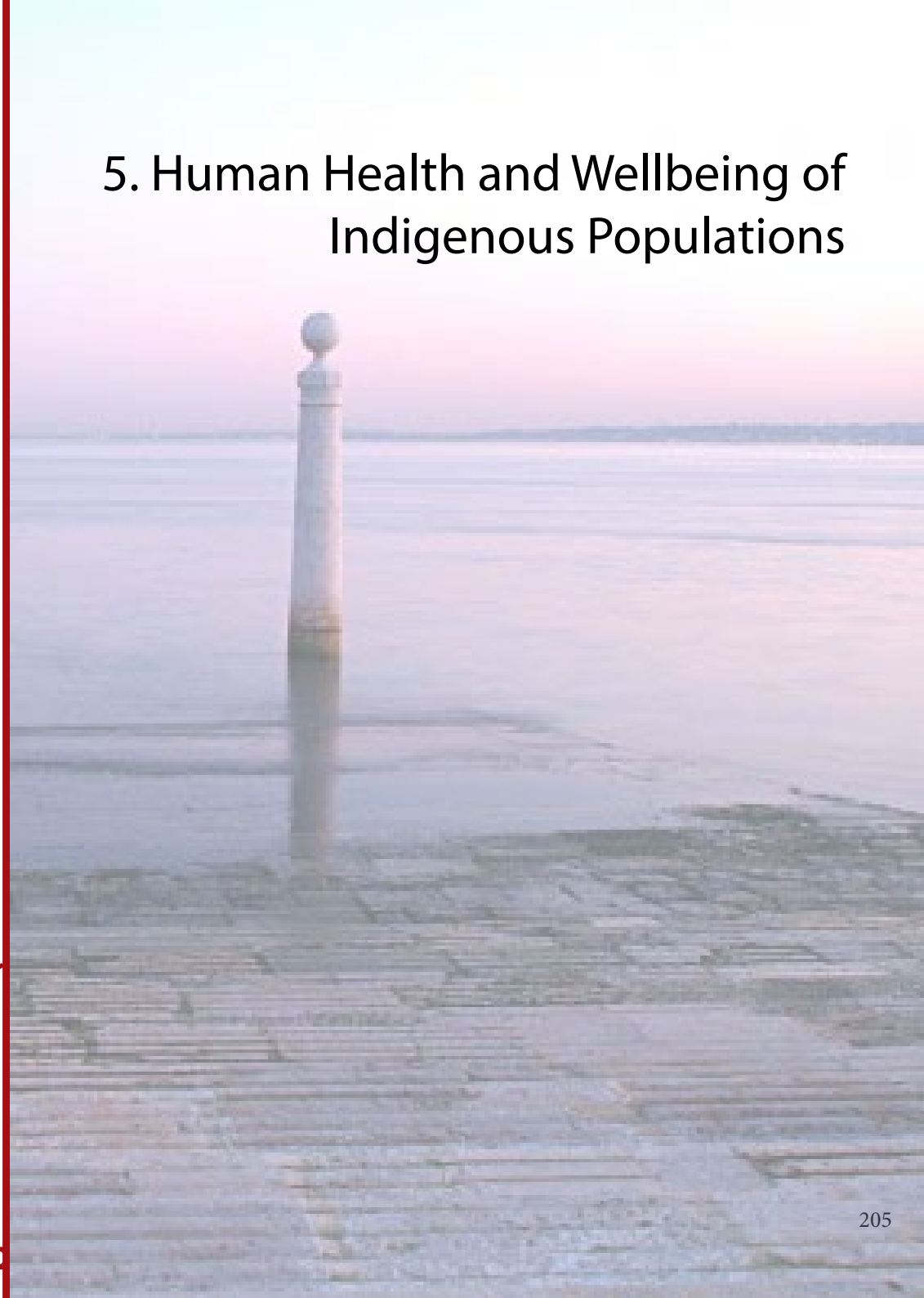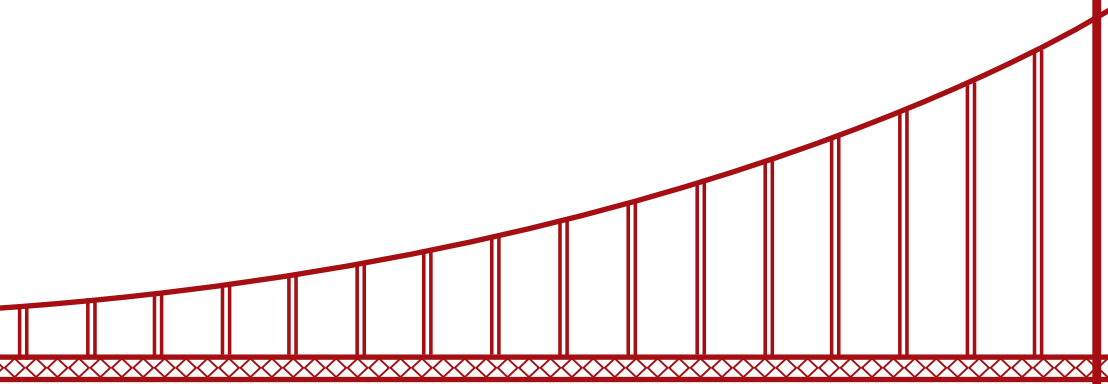
5.1 Concepts of Urbanization and Indigenous Health in the PAI Study

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Abstract

The process of "urbanization" is related to different health problems, but there is no standardized concept for defining it. There was a need to establish a valid concept of urbanization to be applied in the Project of Atherosclerosis among Indigenous Populations (PAI), a study that investigates the impact of urbanization on the cardiovascular burden of traditional indigenous populations living in the São Francisco Valley, Northeast Brazil. We reviewed the literature to access historical and cultural aspects of local native indigenous people, as well as Brazilian official records for classifying degrees of urbanization. This paper summarizes the scientific background and the local particularities that were used to create a solid concept of urbanization in the context of the PAI Study. We classified degrees of urbanization based on historical, cultural, and physical landscape aspects. The Fulni-ô people were considered the least urbanized group, as they keep their traditional language, have periodic isolation from non-indigenous communities, and showed the least urbanized landscape. The Truká people were classified as in an intermediate level of urbanization, and the urban control group was recruited in the highly urbanized city of Juazeiro. This review provides a solid basis for the PAI Study, which may improve the understanding of how the urbanization process affects the health of surrounding traditional communities, particularly in countries with emerging economies.

Introduction

Multiple publications have related the process of "urbanization" to different health problems, including cardiovascular risk, in different population settings (Mansur & Favarato, 2012; Bedoya et al., 2015; Armstrong 2018). However, there is no standardized concept for defining urbanization. Different studies use concepts that seem to be created to fit the particularities of each group of people to be investigated (Vorster, 2002; Li & Zhang, 2013; Phipps, 2015)

The Project of Atherosclerosis among Indigenous Populations (PAI) aims to investigate the impact of urbanization on the cardiovascular burden of traditional indigenous populations living in the São Francisco Valley, Northeast Brazil. This objective generated a concern in elaborating a valid concept of urbanization that could evolve from previous scientific concepts, while taking regional particularities into account. It was necessary that the definition of urbanization used in the PAI Study allow for a clear and reproducible system to establish the degree of urbanization in the different groups to be included in the study and in future research under similar conditions. The PAI Study planned to include three groups of people in different degrees of urbanization.

As challenging as defining urbanization might be, we understand that Brazilian indigenous people have traditional connections with their territory (Santos et al, 2016). There are cultural and religious connections related to how urbanization affects indigenous people (Fany, 2017). Considering the multiple aspects that may involve the relationship between health and urbanization in the context of the PAI Study, we could not base our concepts of urbanization solely on physical landscape changes. Historical and cultural aspects that are strongly connected to the traditional indigenous way of life were also considered.

To access historical and cultural aspects of native indigenous populations in Northeast Brazil, we performed a literature review. The number of publications in this field is scarce and mostly available in books and academic dissertations published in Portuguese. Brazilian official records for classifying degrees of urbanization were also reviewed in this process.

In this study, we discuss the main aspects that were taken into account in classifying degrees of urbanization in the PAI Study. This paper summarizes the scientific background and the local particularities that were used to create a solid concept of urbanization, which was applied to the indigenous populations of the São Francisco Valley in the context of the PAI Study.

Historical and cultural aspects of the human groups included in the PAI Study

The Fulni-ô people were once known as a large number of groups that occupied a large area in the low São Francisco River Basin. The word Fulni-ô could be translated as "the riverside people" (Silveira, Marques & Silva, 2012). Multiple land disputes with European pioneers and their direct descendants led this people to a single area now located by the shores of the Ipanema River, a tributary of the São Francisco River.

Despite the fact that the Fulni-ô people's lifestyle has been impacted by centuries of cultural exchange with non-indigenous communities (Silveira, Marques & Silva, 2012), they attempt to preserve their traditions by isolating themselves from European-derived influences (Arruti, 2004). To this day, the Fulni-ô people practice an annual three-month period of isolation from non-indigenous people, in a ritual known as Ouricuri. During this Ouricuri ritual, Fulni-ô men and women are kept apart, and non-indigenous people are forbidden to access their premises. Many religious and

cultural ceremonies are then performed with the participation of the entire tribe. The struggle to maintain their own cultural values is attested by the fact that they are the only indigenous population in Northeast Brazil to maintain their native language, Yathê. (Marques, 2008)

Language is a strong cultural tool, as it relates to tradition, sense of community, and lifestyle (Luciano, 2006). In the past, native languages were often seen as hindrances to the incorporation of the European way of life. During the process of European colonization in Brazil, the use of native languages was forbidden by Portuguese rulers, and those who insisted on using native languages were severely punished (Silveira, Marques & Silva, 2012). In consequence of government coercion, many native languages were lost from daily use in Brazil, particularly in the Northeast region. The Fulni-ô native language, Yathê, is currently taught in schools along with Portuguese. They also have a radio station that adapts daily content in Yathê, and the language is encouraged during the Ouricuri rituals.

Violence and epidemics cause major environmental changes (Young, & Minai, 2002). During the initial colonization process, violent acts were directed at indigenous people (Silva, 2006; Romani, 2009). At this time, European missionaries from the Catholic Church were commonly seen as safe shores for multiple native peoples fleeing from areas of conflict. The Assunção Mission, located on Assunção Island in the São Francisco River, had been the territory of the Cariri people, but it became one of the locations where European missionaries sheltered indigenous people. After the missions were closed, Assunção Island and nearby locations continued to provide refuge for indigenous people and fugitive Afro-descendant slaves. These indigenous people were later grouped as the Truká people. The presence of Truká people on Assunção island was first documented in 1722 (Batista, 2009).

For over 200 years, the Truká people faced several violent territory conflicts with non-indigenous groups, also generating internal conflicts and migration among Truká individuals (Santos et al, 2016). The Truká also had consistent interaction with fugitive slave settlements. In the late 20th century and early 21st century, the Truká people have been affected by a wave of infrastructural developments implemented by the Brazilian Federal Government. These infrastructural changes include the Sobradinho power plant, with the largest artificial lake in the continent, and more recently the São Francisco River transposition canals (Marques, 2008).

In the context of the PAI Study, the reviewed historical and cultural aspects of the Fulni-ô people in the banks of the Ipanema River were considered to be less influenced by the European-driven urbanization process in the São Francisco Valley, when compared to the Truká people on Assunção Island.

Landscape changes as part of the urbanization process

It is expected that human-mediated landscape changes occur during the process of urbanization (Weng, 2007). Ultimately, urbanization will lead to villages and cities, with higher population density, flux of people and traffic, scarce vegetation, and high density of constructions. These alterations in landscape are the most notable characteristics when assessing the degree of urbanization in a given area.

In an attempt to consider landscape change factors to assess the urbanization process, the PAI Project used the criteria described by the Brazilian Institute for Geography and Statistics (IBGE) (IBGE, 2017). When officially mapping Brazilian urban areas, the IBGE basically adopts population density to classify degrees of urbanization, using three other aspects when defining the urbanization process of a given area: (1) the permeability of the soil to rain; (2) the presence and characteristics of buildings; and (3) the density of constructions.

The São Francisco River Valley in Northeast Brazil has been affected by human-mediated landscape changes since the earliest periods of Euro-American interaction. In the coast of Bahia, the first official encounters between Portuguese pioneers and Native Brazilians took place in the late 15th century. Shortly thereafter, the pioneers aimed to occupy lands farther away from the Brazilian Atlantic coast. During this European colonization process of Northeast Brazil, the São Francisco River served as the main pathway for European pioneers to reach lands in the interior of the region. While the Europeans and their direct descendants moved to the borders of the São Francisco River, violent territory conflicts occurred and native peoples were forced to migrate (Barbosa, 2007; Gomes, 2011).

The São Francisco River, which is almost 3,000 km long, runs entirely within Brazilian territory. Its watershed covers 521 municipalities in five different states in Brazil. Four of those states are part of the Northeast Region of Brazil, and they include the dry lands of the semi-arid region of Brazil, also known as the Sertão. In those areas, the São Francisco River provides water for human and animal consumption, as well as large irrigated areas for agriculture. The São Francisco River has played an important role as a major axis for economic development in Brazil with multiple large agriculture projects and with the highest number of hydroelectric power plants in Brazil. Those hydroelectric dams have been described as impacting more than 250,000 people, with many indigenous groups among them (Marques, 2008).

The city of Juazeiro in the state of Bahia has 151,336 inhabitants according to the 2010 IBGE census and is considered one of the major economical centers in the São Francisco Valley's Sertão area. The city is highly urbanized, with several vertical buildings, some industries, intense commercial centers, and moderate car traffic. During the planning of the PAI Study, Juazeiro was the place selected for recruiting the urban control group in the São Francisco Valley.

It is clear that human activity has been affecting the landscape where Native Brazilians live since the earliest times of colonization with unknown impacts on local indigenous populations. More recently, a major infrastructural project has been created in Northeast Brazil: the transposition of the São Francisco River. For this major landscape intervention, the Brazilian government built large systems of canals to take water from the São Francisco River and distribute it to distant areas in the semi-arid Sertão. The canal systems are divided in two sub-systems, the east and west ramifications, serving the east and west areas of the northern states of the Northeast Region. Although this project does not directly affect the Fulni-ô people, the east sub-system crosses land that is formally claimed by the Truká people.

In the initial phases of the PAI Study, we visited the Fulni-ô and the Truká territories. In contrast with the Truká, the Fulni-ô tribe does not have paved roads and their houses are more isolated. Also, the Ouricuri area, where the Fulni-ô people spend at least three months every year, still has traditional mud house constructions. We, thus, concluded that the Fulni-ô territory had the least urbanized landscape.

Final considerations

There are many challenges when establishing degrees of urbanization for different human groups. Indigenous people face additional challenges, as their traditional way of life is strongly related to the territory in which they have lived for centuries. When assessing aspects of the traditional native way of life, indigenous culture is strongly associated with the landscape in which they live. This perspective is important, as the PAI Project studies the influence of urbanization on indigenous health. Therefore, it is reasonable to consider the influence of changes in the indigenous territory induced by the process of urbanization to be strongly connected to current indigenous population culture and lifestyle.

In summary, the PAI Project was able to classify degrees of urbanization based on historical, cultural, and physical landscape aspects that include isolation from non-indigenous people, landscape changes that occurred in their territory, and the use of traditional language. Based on these proposed criteria, the Fulni-ô people were considered the least urbanized group, given the following: they are the only indigenous community in Northeast Brazil to preserve their traditional language as a powerful tool of cultural perpetuation; they have periodic isolation from non-indigenous communities during the Ouricuri ritual, and they showed the least urbanized landscape. The Truká people were classified as in an intermediate level of urbanization, as they are particularly affected by historical conflicts, lifestyle changes, and major infrastructural landscape transformation. The urban control group was recruited in the highly urbanized city of Juazeiro, Bahia, a major city in the São Francisco Valley. Establishing urbanization levels using comprehensive criteria that account for human and landscape aspects provided a solid basis to investigate the impact of the urbanization process on the health of indigenous people in the São Francisco Valley,

Northeast Brazil. We hope that this original study may improve the understanding of how the urbanization process affects the health of surrounding traditional communities, possibly aiding public health policy planning. This is particularly of interest in countries with emerging economies, where major infrastructural developments are occasionally implemented in areas traditionally occupied by native peoples.

References

Armstrong, A.C., Ladeia, A.M.T., Marques J., et al (2018). Urbanization is associated with increased trends in cardiovascular mortality among indigenous populations: the PAI Study. Arq Bras Cardiol. 110(3):240-245. doi: 10.5935/abc.20180026.

Arruti, J.M.A (2004). A árvore Pankararu: fluxos e metáforas da emergência étnica no sertão do São Francisco. In: OLIVEIRA, João Pacheco de. A viagem de volta: etnicidade, política e reelaboração cultural no Nordeste indígena. 2. ed. Rio de Janeiro: LACED.

Barbosa, B. F. (2007). Pernambuco: herança e poder indígena no Nordeste (séculos XVIXVII). Recife: Ed. Universitária/UFPE.

Batista, M.R.R. (2009) Índio, Quilombola, Ribeirinho: o desafio do fazer antropológico em situações de disputas. In: Reunión de antropología del Mercosur. Buenos Aires.

Batista, M.R.R. (2004). O Desencantamento da Aldeia: exercício antropológico a partir do relatório circunstanciado de identificação e delimitação da terra indígena Truká. Revista de Estudos e Pesquisas, Brasília, v. 1, n. 2, p. 157–247.

Bedoya, J.U.C., Botero, J.D., González C.A.N., et al (2015). Prevalencia de factores de riesgo cardiovascular en indígenas embera-chamí de Cristianía (Jardín), Antioquia. 28(1):5–16. Available at: http://www.scielo.org.co/pdf/iat/v28n1/v28n1a01.pdf. Accessed: Jul 7, 2017;

Cappio, L.F., Martins, A. & Kirchner, R. (2000). Rio São Francisco: uma caminhada entre a vida e a morte. Petrópolis: Vozes.

Fany, R (2004). Terras indígenas & unidades de conservação da natureza: o desafio das sobreposições. São Paulo: Instituto Socioambiental. 37–41p. Available at: https://www.socioambiental.org/banco_imagens/pdfs/10144.pdf.

Florêncio, R.R. (2016). Educação e letramento intercultural na aldeia de Assunção do povo Truká. 87 f. Dissertação (Mestrado em Educação) – Universidade do Estado da Bahia. Departamento de Ciências Humanas. Programa de Pós-Graduação Mestrado em Educação, Cultura e Territórios Semiáridos, Juazeiro.

Gomes, F. Migrações (2011). Populações indígenas e etno-genese na América Portuguesa (Amazônia Colonial, s. XVIII). Nuevo Mundo Mundos Nuevos [En ligne]. doi 10.4000/nuevomundo.60721

Instituto Brasileiro de Geografia e Estatística (2017). Áreas urbanizadas. Available at: http://www.ibge.gov.br/home/geociencias/geografia/geografia_urbana/areas_urbanizadas/default.shtm?c=8. Accessed: August 2, 2017

Li ,W. & Zhang, Q (2013). Human-environment interactions in China: Evidence of land-use change in Beijing-Tianjin-Hebei Metropolitan Region. Human Ecology Review. Vol. 20, No. 1, 2013; Available at: http://www.rard.org/rard/uploads/file/201403/20140311075242_58.pdf.

Luciano, G. S. (2006). O índio brasileiro: o que você precisa saber sobre os povos indígenas no Brasil de hoje. Brasília: MEC.

Mansur, A.P., & Favarato, D (2012). Mortality due to cardiovascular diseases in Brazil and in the Metropolitan Region of São Paulo: A 2011 Update. Arq Bras Cardiol; [online]. ahead print, PP.0-0. Available at: http://www.scielo.br/pdf/abc/2012nahead/en_aop05812.pdf

Marques, J. (2008). Povos indígenas do Nordeste impactados com a transposição do Rio São Francisco: relatório de denúncia. Available at: http://www.cimi.org.br/pub/publicacoes/1241549933_relatapoinmetransp.pdf.

Marques, J. (2008). Cultura material e etnicidade dos povos indígenas do São Francisco afetados por barragens: um estudo de caso dos Tuxá de Rodelas, Bahia, Brasil. Salvador. Available at: https://repositorio.ufba.br/ri/bitstream/ri/10835/1/tese_Juracy Marques1.pdf.

Phipps, M.E., Chan, K.K.L., Naidu, R., et al (2015). Cardio-metabolic health risks in indigenous populations of Southeast Asia and the influence of urbanization. BMC Public Health, 2015. doi: https://doi.org/10.1186/s12889-015-1384-3.

Pompa, C. (2003). Religião como tradução: missionários, Tupi e Tapuia no Brasil colonial. Bauru: EDUSC/ANPOCS.

Ribeiro, D. (1995). O povo brasileiro: a formação e o sentido do Brasil. São Paulo: Companhia das letras; 480 p.

Romani, D. (2009). Yathe a última língua sagrada. Revista Continente, Recife.

Said, M. (2009). Transposição do rio São Francisco; a outra margem da história. Fortaleza: Expressão Gráfica. 2009.

Santos, C.A.B., De Albuquerque, U.P., Souto, W.M.S. & Alves, R.R.N. (2016). Assessing the Effects of Indigenous Migration on Zootherapeutic Practices in the Semiarid Region of Brazil. PLoS ONE 11(1): e0146657. doi:10.1371/journal.pone.0146657.

Silva, E. (2006). Índios organizados, mobilizados e atuantes: história indígena em Pernambuco nos documentos do Arquivo Público. Revista de Estudos e Pesquisas, FUNAI, Brasília, v.3, n.1/2, p.175-224.

Silva, E. (2003). Povos indígenas no Nordeste: contribuição a reflexão Histórica sobre o processo de emergência étnica. Mneme, Revista de Humanidades, v.4 - n.7.

Silveira, L. M. L. C.; Marques, L. R. & Silva, E. H. (2012). FULNI-Ô: história e educação de um povo bilingue em Pernambuco Cad. Pesq., São Luís, v. 19, n. 1.

Vorster, H.H (2002). The emergence of cardiovascular disease during urbanisation of Africans. Public Health Nutr. 5:239–243.

Weng, Y.C. (2007) Spatiotemporal changes of landscape pattern in response to urbanization. Landscape and Urban Planning. 81, 341–353. doi:10.1016/j.landurbplan.2007.01.009.

Young, F.W. & Minai, K. (2002). Human Ecology Review, Vol. 9, No. 2.

5.2 Ecology in health: decolonizing knowledge and expirience

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Resumo

Este estudo discute as interconexões entre a ampliação da concepção de saúde e a concepção de Ecologia em Saúde, reconhecendo com isso a transdisciplinaridade que o fenômeno saúde-ambiente-sociedade alberga, e considerando que justiça social e ambiental se dão com justiça cognitiva. Foi levado em conta saúde como direito de todos os povos que têm lutado pelo direito à vida em suas comunidades, contra os impactos do agronegócio, a exploração dos recursos naturais e todas as opressões causadas pelo capitalismo, o colonialismo e o patriarcado. Nesse sentido, consideramos a visão holística de ser humano em seu meio físico, biológico, simbólico, social e econômico. A pesquisa apontou que inúmeras produções acadêmicas advindas da Promoção da Saúde, da Educação Ambiental, Medicina Preventiva e Saúde da Família realizadas por diversos profissionais da saúde podem ampliar a produção na ecologia humana, ampliando a compreensão da saúde como natureza, vida, cultura, e acesso a outros direitos, sob a égide da perspectiva descolonial da Ecologia de Saberes, onde diferentes campos de estudo não apenas dialogam entre em si como se permitem ao encontro com outros saberes para além dos muros acadêmicos, com vistas à emancipação humana e à justiça socioambiental.
Palavras-chave: Ecologia em Saúde. Saúde como direito. Ecologia de Saberes. Ecologia Médica.

Introdução

A descolonização é uma árdua tarefa porque implica em desfazer âncoras nas relações de poder, na própria idéia de ser e especialmente nas formas de pensar que orientam e alimentam as opressões e o ideal de ser. Nesse sentido não se descoloniza sem o ataque multifacetado às formas de pensar hegemônicas, batizadas pela Modernidade eurocêntrica. Não se descoloniza sem a assunção de que os referenciais que norteiam os pensamentos e as experiências são geopolíticos. Não se descoloniza com as ferramentas com as quais fomos colonizados. Não se descoloniza sem dissidência, sem desobediência, sem enfrentamentos às formas como pensamos e agimos (Quijano, 2010; Moldonado-Torres, 2010; Mignolo, 2008; Audre Lord, 1988).

Essa perspectiva descolonial - que dá visibilidade às experiências, lutas, discursos e modos contra-hegemônicos de viver e lidar com a natureza, com povos indígenas, com as comunidades quilombolas, com os povos campesinos, que traz para o debate a natureza simbólica das relações com o sagrado, que enfatiza os subterrâneos da subjetividade humana - inaugura uma Ecologia Humana ressemantizada para além do ideal da ciência eurocêntrica, de ser humano entendido no limiar do corpo

como mera carcaça que encobre o conjunto de órgãos, e de natureza como mundo a explorar (Almeida, 2014; Bomfim, 2017; Marques, 2012; 2014; 2016).

Sob essa cosmovisão e para resolver questões reais de coletivos humanos subalternizados pelas políticas públicas de saúde, sob a égide da tríade saúde-ambiente-sociedade, experiências no campo da saúde coletiva no Brasil, advindas de um plural grupo de profissionais da saúde que assume a pesquisa engajada (Mama, 2010,) têm possibilitado uma nova e relevante contribuição da Ecologia em Saúde, trazendo para o mundo acadêmico novas formas de compreender as relações do humano consigo e com seu entorno, à partir do diálogo com os diferentes jeitos que os diversos povos representam seus mundos e as implicações disso nos processos de saúde (Gomés & Minayo, 2006).

Esses estudos não se dão fora de um campo de tensão, pois implicam entre outras questões, a clareza sobre o sentido de saúde que se passa a assumir e sobre quem participa do processo decisório das questões de saúde. Saúde entendida não mais como ausência de doenças, mas como conjunto de elementos que permitem viver sob a égide de justiça social e ambiental: educação, habitação, qualidade de vida, trabalho, tempo para o ócio, entre outros tantos indicadores (Ottawa, 1986), saúde como direito fundamental (CF, 1988).

Essa tensão se estende quando se leva em consideração que os sentidos do mundo materializam-se em práticas, que os conceitos carregam consigo uma dimensão política com o fito de cristalizar determinadas representações, na medida em comportam uma ideologia e estão a serviço de projetos societais em disputa (Gonçalves, Souza e Bomfim, 2018). Por esta razão, ao descobrirmos a quase inexistência da expressão Ecologia Médica em algumas das principais plataformas de busca científica, passamos a enxergar mais consistência em nossa tese, qual seja, da impertinência desta expressão para os estudos no campo da saúde sob a perspectiva da Ecologia Humana.

Assim, este estudo bibliográfico, sob a égide da Ecologia de Saberes, tem como objetivo discutir as interconexões entre a ampliação da concepção de saúde e a concepção de Ecologia em Saúde, reconhecendo com isso a transdisciplinaridade que a tríade saúde-ambiente-sociedade abarca, e considerando que justiça social e ambiental se dão sob a égide da justiça cognitiva. Foi levado em conta saúde como direito de todos os povos que têm lutado pelo direito à vida em suas comunidades, e como cenário inicial de análise a realidade brasileira nas últimas duas décadas.

Pensar a Ecologia em Saúde sob uma ótica emancipatória, ou seja, sob a ótica da Ecologia Humana implica em assegurar que todos as variantes do condicionamento humano estejam envolvidas na constituição da reflexão, sem os quais incorremos no grave delito de parcializar a experiência humana, e assim artificializar a apreensão do real, talhando-o tal qual a perspectiva fragmentária que há séculos dominou a ciên-

cia moderna. É preciso que todos os intelectuais que se ocupam com o fenômeno humano não só se humanizem em afetos e sentimentos, que humanizem suas práxis sociais, mas que ominilateralizem sua apreensão do real. Sem esta tarefa de incursão viva na crise paradigmática que está longe de terminar, pois apenas acabara de iniciar, nós não realizamos a demanda marxiana da auto-educação do ser humano implícita no conceito de superação positiva da propriedade privada.

Assim avancemos rumo a uma compreensão viva, tensa, em movimento do porvir que é o eterno presente. Isto significa olhar antes de interpretar, conhecer antes de depreender, sentir antes de reagir, rever antes de antever, moderar os pensares para que eles simplesmente não apenas reproduzam as verdades paradigmáticas da ciência normal (Kuhn, 1988), atropelando a experiência hodierna da crise paradigmática. Por isto os olhares não podem ser universalizantes, a despeito da unicidade e relacionalidade do real, é por isto que fazemos fileiras a autores como Boaventura Souza Santos, Said, Aschile Mbembe e outros, para os quais a universalidade do pensamento moderno está contaminado de eurocentricidade, cujo plasma nos impele a enxergar nossa realidade com catarata. Daí ser mais do que imprescindível, senão um imperativo categórico, nos movermos no chão de nossa realidade, descolonizando-nos da colonização de saberes que ergueram sobre nossos cérebros. Arrancar esta couraça que nos rouba de nós mesmos.

1. A descolonialidade do ser, do saber e do poder nos processos de Saúde

Experiências de aprendizagem coletiva para sobrevivência de grupos humanos têm demonstrado ser um importante caminho para a superação dos inúmeros problemas geradores de injustiça social e ambiental. Se o acesso ao conhecimento historicamente produzido pelos espaços hegemônicos de aprendizagem tem sido um importante instrumento de poder (Freire, 1967, 2005; Apple, 1989, 2002) os processos humanos que decorrem da ecologia dos mais diversos saberes, entre eles o hegemônico, inaugura uma nova dimensão de poder, de emancipação horizontalizada, onde os diferentes grupos, portadores de diferentes saberes se articulam a agem em busca de um horizonte comum. Nesses processos a hierarquia que cimenta processos decisórios verticalizados cede espaço à aprendizagem coletiva.

Trata-se de experiências que albergam especificidades, constituindo-se em pontos de interseção de necessidades comuns de grupos diferentes e nesse sentido tornam-se lócus de equidade de saberes diversos. A Universidade Popular dos Movimentos Sociais e Fórum Social Mundial (Santos, 2004; Nobre e Faria, 2003) são exemplos de sensibilidade intercultural cuja metodologia e os princípios orientam compartilhamento de saberes, permeiam estudos, reflexões, lazer e mística, em um denso processo de despolarização das relações entre os grupos e movimentos que os constituem, e especialmente destronam a idéia de um eixo central de poder.

O Brasil pós ditadura militar 1964-1984 vivenciou experiências exitosas de ecologia de saberes promotoras de políticas públicas de diminuição das injustiças sociais, protagonizadas pelos movimentos sociais: a constituição da Educação do Campo (CNE, 2002; CNE, 2008; Brasil, 2010) como política pública que entende o campo como lugar de vida e a educação como direito gerador de outros direitos (Gonçalves, 2018) decorreu da ação articulada dos Movimentos Sociais do campo, universidades, CNBB e Poder Público e; a erradicação da desnutrição infantil através da ação conjunta da Pastoral da Criança, Movimentos Sociais, pesquisadores e Poder Público.

Nesse contexto brasileiro em torno de justiça social, passa-se a conceber que não há um bloco de saber capaz de resolver os tantos problemas que permeiam a vida em sociedade. Assume-se assim que se faz necessário reconhecer outros jeitos de entender e intervir no mundo a favor da sociobiodiversidade. Se faz necessário para a superação das injustiças sociais que o lugar hegemônico de uma única forma de pensar seja destronado para o convívio respeitoso dos diversos saberes, cimentando a tese de Santos (2010) de que o horizonte da justiça social requer justiça cognitiva. Esse novo delineamento marcava uma nova trajetória epistemológica que debilitava o velho e hegemônico ideal de que o único caminho emancipador viria da ciência eurocêntrica; viria também dela, mas não unicamente dela. Iniciava-se um processo de subversão epistêmica (Mignolo, 2010) que não mais se curvava ao ideal societal universalista. Implicava em uma ruptura com a monocultura ocidental de produção de conhecimento, através de uma ecologia de saberes que se firmava na diversidade de saberes sem a necessidade de hierarquizá-los.

Começava a ganhar chão uma pluriversalidade cognitiva que consubstancia outras formas de ser e estar no mundo, onde coexistem vários mundos, onde discurso se compromete com experiências a serviço da vida em uma natureza plural. Esse enfrentamento ao modo de pensar e a hegemonia discursiva ressiginfica o velho ideal da pensamento/ação engajados de Paulo Freire (1967, 2005) que orientou a pedagogia do oprimido e da esperança. Trata-se de uma posição epistêmica que não dissocia o pensamento produzido das mudanças das condições concretas de vida, o que coloca o conhecimento a serviço de pessoas e de um mundo real atualmente agonizante.

Esse desmonte das âncoras que conduzem as velhas formas de orientar o pensamento – apresentado pelas teorias descoloniais – desestabilizaos processos decisórios estabelecidos na hierarquia de saberes onde a ciência eurocêntrica tem lugar hegemônico. Assim ao se horizontalizar as relações, ao se estabelecer um espaço de diálogo, ampliam-se os partícipes em poder de decisão, e por conseguinte,resgata-se uma humanidade usurpadapelos processos de colonização em grupos humanos historicamente silenciados (Lugones, 2010), desarticulando assim as investidas da colonialidade nas dimensões do saber, do poder e do ser (Mignolo, 2010, Quijano, 2010; Moldonado-Torres, 2010). É o que se dá, por exemplo, com os movimentos sociais do campo no Brasil que em menos de duas décadas (2002-2018)[1] forçaram

a entrada da Educação do Campo no ordenamento jurídico brasileiro, tornando-a política pública e instigando-a a se firmar como e área de conhecimento em ampla expansão (Gonçalves, 2018).

Esses processos de descolonização ao resgatar o ser, dão centralidade às experiências, tradições, saberes subalternizados, pondo fim ao que Mignolo (2008) denomina de diferença colonial: a segregação, a hierarquização dos seres, dos seus lugares, sentidos e saberes caem por terra. O Programa Saúde da Família, instituído pelo Governo Federal em 1994, além de contar com uma equipe multiprofissional, afirma uma nova lógica onde a equipe de saúde é quem vai ao encontro das pessoas em suas residências, restabelecendo a dignidade humana corrompida pelo histórico silêncio do Estado Brasileiro nas políticas de saúde coletiva até então. Além disso, o protagonismo dos Agentes Comunitários de Saúde nesse Programa, constituído por pessoas das comunidades tem sido essencial nos processos de cuidado e de humanização preconizados pelo Sistema Único de Saúde (Souza & Barrientos, 2018).

A evolução do conceito de Saúde em uma Ecologia de Saúde

Para imergirmos nessa densa discussão torna-se imprescindível resgatarmos a definição do conceito de saúde, contextualizando sua proposição histórica apresentada pela Organização Mundial da Saúde – OMS ainda na década de 1950, mais precisamente no ano de 1946:"O estado de completo bem-estar físico, mental e social, e não somente a ausência de enfermidade ou invalidez" (OMS, 1946)

Este conceito amplamente questionado por parcela significativa de pesquisadores e profissionais da saúde precisa ser entendido dentro de seu contexto social e econômico, uma vez que foi concebido para responder às demandas levantadas em todo o mundo, especialmente nas nações que no final do século XIX e início do século XX estavam envolvidas em um intenso processo de industrialização, urbanização, fenômeno este que trazia consigo mudanças significativas no perfil epidemiológico das populações, com surgimento de patologias desconhecidas, mas que logo foram associadas ao processo de expansão das cidades, dos grandes centros e, principalmente das precárias condições sanitárias as quais estas populações estavam expostas. Fortalecia-se o movimento que, mesmo de forma incipiente, já associava muitas das doenças daquele período à quebra do equilíbrio ecológico apresentado pelo crescimento desordenado das cidades e o conseqüente desequilíbrio ambiental. (Gómez & Minayo, 2006)

Neste cenário de notável desequilíbrio ambiental, que se perpetuou até os dias atuais, destacamos a necessidade de ampliação do conceito de saúde, sob o risco de sucumbirmos no ideal de criarmos ambientes saudáveis para as diversas populações. Ainda no final da década de 1970 e a primeira metade da década de 1980, impulsionados pelos diversos movimentos que consolidariam a Reforma Sanitária Brasileira, o Brasil em meio ao vibrante processo político de redemocratização, começou a pre-

parar a VIII Conferência Nacional de Saúde, realizada em 1986 e que, dentre outras rupturas, avançou da direção da concepção de saúde da OMS apresentada acima, qual seja, para além da ausência de doença (Brasil, 1986).

Na conjuntura social, político e econômica brasileira, onde se destacam a degradação ambiental, o crescimento desordenado das populações, a crescente escassez de alimento para segmentos da população, as precárias condições sanitárias de expressiva parcela das cidades brasileiras, torna-se missão complexa a definição do conceito saúde. Esta definição deve se distanciar do entendimento delimitante de "ausência de doença", uma vez que no atual contexto social que a sociedade brasileira está mergulhada, é impossível a identificação de indivíduos ou coletividades absolutamente imunes aos diversos processos patológicos, nem que sejam esporadicamente, como se vê no texto que orienta o Ministério de Saúde brasileiro:

> "b) Cada indivíduo e cada comunidade, em dado momento de sua existência, sentem necessidades e correm riscos que lhes são próprios seja em função da idade, sexo, ou outros atributos individuais, seja em decorrência de sua localização geográfica e ecológica, sua cultura e nível educacional ou ainda por sua situação econômica e social, aspectos que se traduzem em perfil de problemas de saúde, os quais afetam em maior ou menor grau suas possibilidades de realização pessoal e coletiva;" (Brasil, 2006, p.18)

Diante desse quadro que atrela saúde-doença às diversas condições intra/intersubjetiva e social dos indivíduos e coletivos, e ainda embebecidos pela necessidade de rompimento com o paradigma conceitual que empobrece, limita, cerceia a possibilidade de discussão e ampliação do debate sobre as variáveis envolvidas direta e indiretamente no processo saúde-doença, tangenciamos os preceitos de Gómez e Minayo (2006) quando apresentam, numa perspectiva transdisciplinar, o enfoque ecossistêmico de saúde, propondo combater a visão reducionista dos problemas relacionados ao processo saúde-doença, incluindo aqui a variável não menos importante de ambiente, e na perspectiva da Ecologia Humana, incluindo o ambiente intrahumano.

Neste sentido, considerando que os estudos sobre a saúde humana sob a ótica da Ecologia Humana precisam abarcar a totalidade das abordagens científicas, sem qualquer resquício de feudo disciplinar, que possa constranger ou hierarquizar o diálogo científico, compreendemos ser extremamente indevida o uso da expressão Ecologia Médica, em detrimento da expressão Ecologia em Saúde, que de fato desfeudaliza, a-disciplinariza o estudos de saúde sob a perspectiva da Ecologia Humana. Ao fazermos um comparativo entre ambas expressões, chegamos ao seguinte quadro:

Tabela 1 - Comparação das abordagens da ecologia médica X Ecologia em Saúde

Rompendo Paradigma	
Ecologia Médica	Ecologia em Saúde
Centrada no médico	Multiprofissional
Disciplinar	Transdisciplinar
Medicina Preventiva	Saúde Coletiva
Excludente	Inclusiva

Fonte: dados da pesquisa

Por isto podemos afirmar que a Ecologia em Saúde, inclusiva em sua essência, abre as portas da pesquisa sobre a saúde humana para o encontro de pesquisadores dos mais diversos campos científicos, que cooperativa e colaborativamente interlocutam na perspectiva da qualificação da vida humana, no mais lúcido sentido de respeitar as razões existenciais das demais espécies da natureza. Assim, pensar a saúde humana exclui qualquer forma de feudalização científica do compreender a vida e assim contribuir para sua qualificação. Se por um lado precisamos compreender que o uso da expressão Ecologia Médica é a reprodução da ideologia de saber, que por sua vez é a reprodução - ainda vigente - de uma das formas da ideologia de classe, cujas raízes se encontram no período colonial, por outro torna-se imperativo para o desenvolvimento dos estudos em saúde numa perspectiva emancipatória, que derrubemos por vez este entrave, que não é mera questão terminológica, mas sim conceitual, banindo de vez a expressão Ecologia Médica como representativa de todos os estudos em Ecologia em Saúde.

Esse enfoque da Ecologia em Saúdese firma sob a égide da Ecologia Humana brasileira que tem assumido nos últimos anos a missão de protagonizar as discussões que permeiam esta inquestionável indissociabilidade homem – natureza, encontrando em território brasileiro, cenário fértil para questionar pilares conceituais que insistem em se perpetuar e que fragilizam os avanços epistemológicos, na medida em que criam hiatos intransponíveis para que profissionais/pesquisadores de outras áreas possam contribuir com suas discussões.

Transgredir este modelo hegemônico, tendo como respaldo a Ecologia de Saberes (Santos, 2010) nos possibilita, mesmo que de forma embrionária propor uma ruptura dentro da Ecologia Humana. É importante considerar que em 2018 o Brasil celebra 30 anos da promulgação de sua Constituição Federal (Brasil, 1988), documento que demarca um novo momento na concepção das políticas públicas no país, tendo sido influenciada sobremaneira pela VIII Conferencia Nacional de Saúde, que dentre outros avanços, propunha um conceito ampliado de saúde e que influenciaria o Modelo de Atenção à Saúde no Brasil em vigor, propondo um enfoque maior na família e não mais na doença, indo do modelo hospitalocêntrico para uma Saúde Preventiva e da família, retirando o protagonismo único da figura do médico e fomentando a valorização de equipes multiprofissionais, como acenam Gómez e Minayo (2006),

> "A visão social apartada da compreensão ecológica também é reducionista. E a solução tecnológica apenas é insuficiente para dar conta da interação de vários fatores. Para conseguir um equilíbrio entre a saúde do ecossistema e das pessoas, é preciso experimentar novas estratégias." (Gómez & Minayo, 2006, p. 6-7)

É imprescindível rompermos com a concepção ultrapassada também da ecologia médica, desconstruindo as redomas que desestimulam outros profissionais que militam nas áreas de saúde ambiental, saúde coletiva, saúde pública a contribuírem em uma ecologia humana mais ampla, mais democrática: a Ecologia em Saúde.

Estudo

Entendendo que o processo de descolonização da ciência passa pela afirmação e reconhecimento da geopolítica que consubstancia as produções científicas e nesse caso, cimenta novas categorias e novos sistemas conceituais à luz do nosso lugar, do nosso discurso e das nossas realidades, delineando nosso lócus epistemológico (Mudimbe, 1988), optamos por dar visibilidade às produções acadêmicas na Universidade Federal da Bahia (UFBA) e do seu Instituto de Saúde Coletiva (ISC).

Esta pesquisa de natureza bibliográfica foi realizada em quatro etapas: a primeira concerne a identificação das produções realizadas no Repositório Institucional da Universidade Federal da Bahia, ao longo de sua existência institucional, tendo termo chave a "Ecologia Médica", partindo da concepção que a ideologia da palavra "médica" (Baktin, 1988) distanciava o acervo de pesquisa/intervenção que se debruçam no fenômeno saúde-ambiente do enfoque da Ecologia Humana – chão teórico-epistemológico de natureza transdisciplinar que se debruça a compreender as relações do ser humano consigo e com seu entorno. Sobre esse propósito não foram encontradas quaisquer publicações nos diversos programas de pós-graduação, o que nos leva a inferir que se o fenômeno em tela foi objeto de pesquisa e intervenção, não se deu à luz da Ecologia Humana.

Em uma segunda etapa, e respaldada pela base epistemológica descolonial de que o pluralidade interna da ciência e seu diálogo com outros saberes tem ganhado lastro acadêmico, foi realizada uma busca de produções, utilizando-se a expressão "ecologia de saberes". Nessa tarefa foram identificadas quatro pesquisas publicadas, embora nenhuma delas se debruçasse na tríade saúde-ambiente-sociedade, o que levanta a reflexão sobre as possíveis pesquisas realizadas em uma perspectiva transdisciplinar e ecossistêmica de saúde sem que isso se afirme em descritores ou palavras-chave. A tabela 2 elucida os resultados aqui apresentados.

Tabela2 - Características dos estudos encontrados no repositório institucional da UFBA, utilizando a palavra chave "Ecologia de Saberes" (N = 4).

Autor/ano	Área profissional	Proposta	População-alvo	Abordagem
SANTOS, Carla Renata Santos dos; JESUS, Djane Santiago de; CYPRIANO, Carlos Alex de Cantuária. (2017)	Desenvolvimento Social.	Compreender o sentido das ações dos atores no processo de articulação de diferentes saberes no desenvolvimento de Tecnologias Sociais para fortalecimento da cadeia produtiva do licuri no semiárido;	Produtores de licuri	Educação
AYALA, Mariela Pinto; CAMPOS, Maria de Fátima Hanaque; BURNHA, Teresinha Fróes. (2018)	Difusão de Conhecimento	Estudar a interação dialógica entre comunidades cognitivas diferenciadas, cujas práticas envolvem o conhecimento científico (universidade) e o conhecimento comum (comunidades locais, não acadêmicas),	Comunidades Locais e Comunidade universitária	Educação.
BRANDÃO, Ana Elisabeth Simões; SÁ, Maria Roseli Gomes Brito de. (2015)	Educação.	Propõe uma reflexão sobre processos artístico-educativos e práticas sociais.	Projetos artísticos-culturais	Educação.
VALENÇA, Marcos Moraes. (2015)	Educação	Objetiva analisar um caso concreto de ecologia dos saberes, em que acadêmicos e mestres de culturas tradicionais ministraram, juntos, sociologia da cultura	Acadêmicos e mestres de culturas tradicionais	Educação

Fonte: Pesquisa

Os estudos de Santos, Jesus e Cypriano (2017) buscam entender o sentido das ações dos diversos atores no processo de articulação de diferentes saberes no planejamento e desenvolvimento de Tecnologias Sociais para fortalecimento da cadeia produtiva do licuri no semiárido. Um segundo estudo vislumbra analisar possíveis relações dialógicas entre populações cognitivas diferenciadas, que apresentam práticas envolvendo o conhecimento científico e o conhecimento comum, não acadêmico (Ayala, Campos e Burnha, 2018). Brandão e Sá (2015) apresentam uma incipiente reflexão dos processos educativos e práticas sociais no contexto artístico. Valença (2015) em seu estudo socializa um caso específico de ecologia de saberes, onde acadêmicos e mestres de culturas tradicionais ministraram, juntos, sociologia da cultura.

A terceira etapa correspondeu a busca através do termo "Ecologia em Saúde", não tendo sido identificada quaisquer produções, o que nos levou a ampliar os descritores e palavras-chave de busca, em uma quarta etapa da pesquisa, utilizando termos comumente utilizados em produções científicas que discutem temáticas associadas à Ecologia em Saúde, a saber: Educação Ambiental, Promoção de Saúde, Medicina Preventiva e Saúde da Família. Ressalta-se que o repositório da UFBA objetiva aumentar a visibilidade da produção científica e cultural da instituição, seus programas de pós-graduação, bem como de seu corpo de pesquisadores, preservando sua memória intelectual nas diversas áreas, seja na das artes, nas ciências ou humanidades. Nessa etapa os resultados apontam uma vasta produção ao longo das últimas duas décadas.

Tabela 3 - Pesquisa no repositório da UFBA N (53.145)

Palavras Chaves	Quantitativo de publicações
1. Medicina Preventiva	3.234 artigos publicados;
2. Promoção da Saúde	21.711 artigos publicados;
3. Saúde da Família	21.711 artigos publicados;
4. Educação Ambiental	6.489 artigos publicados;

Fonte: dados da Pesquisa

Ressalta-se que as palavras utilizadas na tabela 3 são comumente utilizadas como indexadores e ou palavras chaves nas diversas áreas do conhecimento que defendemos poder contribuir sobremaneira na ampliação da discussão de Ecologia em Saúde. Do ponto de vista conceitual desses termos, utilizamos como referência os marcos legais estabelecidos pelo Ministério da Saúde Brasileiro nas últimas décadas, representando estratégias institucionais de melhoria da qualidade dos serviços ofertados à população em geral, bem como a qualidade de vida das comunidades atendidas pelas políticas de saúde e outras correlatas.

1.   Promoção da Saúde como estratégia que possibilita o resgate do foco nos aspectos determinantes do processo saúde-doença, sejam eles, urbanização desordenada, qualidade do ar, as diversas facetas da violência, os expressivos índices de desemprego, falta de moradia, vislumbrando a melhoria da qualidade de vida e o fomento à participação popular neste processo (Brasil, 2010; Otawa, 1986).

2.   Apresentamos o conceito de medicina preventiva convergindo com Brasil (2011) como ciência e estratégia de prevenir patologias, prolongando a vitalidade e promovendo uma saúde equilibrada à nível físico e mental.

3.   O conceito de saúde da família tangencia a estratégia institucional do Ministério da Saúde Brasileira de reorganização dos serviços de saúde ofertadas no Sistema Único de Saúde – SUS, fugindo da lógica centrada na doença, focando na família e nas ações de prevenção de agravos e criação de ambientes sociais saudáveis e democráticos (Brasil, 2000).

4.   Finalizamos a apresentação dos conceitos abordados com educação ambiental à luz de Brasil (2007) de estratégias dinâmicas que respeitam a diversidade biológica, cultural, étnica, potencializando o fortalecimento da resistência social a um paradigma que propõe a extinção das complexas relações dos seres humanos, sejam em seus ambientes coletivos, sejam com relação ao meio ambiente.

Considerações Finais

Refletir sobre ampliação da concepção de saúde dá visibilidade a um importante processo histórico brasileiro que protagoniza indivíduos e coletivos e que implicou em uma substancial elevação sócio-econômica e cognitiva do país nas últimas décadas. Nesse contexto, saúde não se dissocia do direito à diversidade, do acesso dos povos campesinos à terra e à educação pública gratuita, do direito do povo brasileiro à produtos agroecológicos e à sobrevivência dos seus vários biomas, do direito à habitação, à trabalho, ao patrimônio natural, cultural, arqueológico, à vida em seu sentido pleno e integral.

Nessa reflexão, interconectar a concepção de saúde com a de Ecologia em Saúde instiga descortinar a grande contribuição de pesquisadores e pesquisadoras da Ecologia Humana que protagonizam tanto as comunidades tradicionais, os povos campesinos, os ribeirinhos em suas relações com o ambiente, como traz para a análise o ambiente inter/intrasubjetivo e suas relações com o campo do direito, na medida em que se postula justiça social, justiça ambiental à luz de justiça cognitiva. Esse processo de produção acadêmica que vem sendo feito por profissionais e pesquisadores de diversas áreas tem possibilitado a compreensão/intervenção do fenômeno saúde-doença a partir do diálogo de várias áreas de conhecimento, o que permite a fluência de uma Ecologia em Saúde que considera o ser humano em uma perspec-

tiva ecossistêmica, em seu meiofísico, biológico, simbólico, social e econômico.

As inúmeras produções realizadas pelo Instituto de Saúde Coletiva da UFBA, nas áreas de Promoção de Saúde, Educação Ambiental, Medicina Preventiva e Saúde da Família partem da concepção que orientam as produções em Ecologia Humana que se debruçam no fenômeno saúde-ambiente e ainda reforçam a Ecologia de Saberes como alicerce da produção acadêmica de viés descolonial, acenando para processos acadêmicos decorrentes do dialógico encontro de diferentes formas de pensar e agir no mundo a favor da emancipação humana e da justiça socioambiental.

Notes:

[1] O primeiro texto legal brasileiro que inclui a Educação do Campo no Ordenamento Jurídico Brasileiro é aResolução CNE nº 01/2002 que estabelece as Diretrizes Operacionais para a Educação do Campo

Referências

Almeida, A. W. B. de. (2014). Ecologia dos Povos e Comunidades Tradicionais do Brasil. In MARQUES. Juracy (Org.). Ecologias Humanas. Feira de Santana: UEFS, p 43-52.

Ayala, M. P. Campos, M. de F. H. Burnham, T. F. (2018). Interação dialógica entre comunidade acadêmica e comunidade local: Difusão do conhecimento mediado pelo Projeto Acadêmico Comunitário da Universidade Bolivariana de Venezuela (PAC-UBV). UFBA, Tese de Doutorado.

Apple, M.(2002). Repensando Ideologia e Currículo. In MOREIRA, Antonio Flávio; SILVA, Tomaz Tadeu da. (org.). Currículo, Cultura e Sociedade. 7.ed. São Paulo: Cortez.

_____.(1989). Educação e Poder. Porto Alegre: Artes Médicas.

Bakhtin, M. (Voloshinov). (1988). Marxismo e filosofia da linguagem. São Paulo: Hucitec.

Bonfim, L. (2017). As Raízes da Ecologia Humana no Brasil. In MARQUES, Juracy & ALVIM, Ronaldo (orgs). As Raízes da Ecologia Humana. Paulo Afonso: SABEH.

Brandão, A.E.S. Sá, M.R.G.B. (2015). A arte como tecnologia educacional. UFBA, Tese de Doutorado.

Brasil.(1988). Constituição da República Federativa do Brasil. Promulgada em 05 de outubro de 1988. Disponível em http://www.planalto.gov.br/ccivil_03/constituicao/constituicaocompilado.htm. Acesso em 10 de junho de 2018.

Brasil. Ministério da Educação. Resolução CNE/CEB nº 01, de 3 de abril de 2002 – Institui Diretrizes Operacionais para a Educação Básica nas Escolas do Campo. Brasília, 2002. Acesso em 28/06/2016.

Brasil. (2000). A Implantação da Unidade de Saúde da Família/Milton Menezes da Costa Neto, org. - Brasília: Ministério da Saúde; Secretaria de Políticas de Saúde, Departamento de Atenção Básica, 44 p.

Brasil. (2006). Ministério da Saúde. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Fundação Oswaldo Cruz. Abordagens espaciais na saúde pública / Ministério da Saúde, Fundação Oswaldo Cruz; Simone M.Santos, Christovam Barcellos, organizadores. – Brasília : Ministério da Saúde, 136 p. : il. – (Série B. Textos Básicos de Saúde) (Série Capacitação e Atualização em Geoprocessamento em Saúde; 1)

Brasil. (2007). Ministério da Educação/UNESCO. Vamos cuidar do Brasil : conceitos e práticas em educação ambiental na escola / [Coordenação: Soraia Silva de Mello, Rachel Trajber]. – Brasília: Ministério da Educação, Coordenação Geral de Educação Ambiental: Ministério do Meio Ambiente, Departamento de Educação Ambiental : UNESCO, 248 p.

Brasil. (2010). Ministério da Saúde. Secretaria de Vigilância em Saúde. Secretaria de Atenção à Saúde. Política Nacional de Promoção da Saúde / Ministério da Saúde, Secretaria de Vigilância em Saúde, Secretaria de Atenção à Saúde. – 3. ed. – Brasília : Ministério da Saúde.

Brasil. (2011). Agência Nacional de Saúde Suplementar. Manual técnico para promoção da saúde e prevenção de riscos e doenças na saúde suplementar / Agência Nacional de Saúde Suplementar (Brasil). – 4. ed. rev. e atual. – Rio de Janeiro : ANS, 244 p.

Brasil. (2008). Ministério da Educação. Resolução CNE/CEB nº 02, de 28 de abril de 2008 – Estabelece Diretrizes complementares, normas e princípios para o desenvolvimento de políticas públicas de atendi-

mento da Educação do Campo. Acesso em: 28/06/2016.

Brandão. (2010). Decreto nº 7.352, de 04 de novembro de 2010. Dispõe sobre a política de educação do campo e o Programa Nacional de Educação e Reforma Agrária – PRONERA. Diário Oficial da União – Seção 1 – 5/11/2010, página 1. Acesso em: 28/06/2016.

Brasil. Ministério da Saúde. (2010). Secretaria de Vigilância em Saúde. Secretaria de Atenção à Saúde. Política Nacional de Promoção da Saúde / Ministério da Saúde, Secretaria de Vigilância em Saúde, Secretaria de Atenção à Saúde. – 3. ed. – Brasília : Ministério da Saúde.

Freire, P. Educação como Prática de Liberdade. (1967). Rio de Janeiro: Paz e Terra.

_____.(2005). Pedagogia do Oprimido. 46.ed. Rio de Janeiro: Paz e Terra.

Gomes, N. L. (2010). Intelectuais Negros e produção do conhecimento: algumas reflexões sobre a realidade brasileira. In Santos, B. de S. & Meneses, M. P. Epistemologias do Sul. São Paulo: Cortez.

Gómez, C. M; Minayo, M. C. de S. (2006). Enfoque Ecossistêmico de Saúde: uma estratégia transdisciplinar . Revista IntercaEHS, 2006. Disponível em http://www.interfacehs.sp.senac.br/br/artigos.asp?ed=1&cod_artigo=11 .

Gonçalves, M. E. S. Bomfim, L. S.V. Souza, M. M. A. (2018). Ecologia em Saúde: para além da Ecologia Médica. No Prelo.

Gonçalves, M. E. S. (2018). DIREITO À EDUCAÇÃO DO CAMPO DE QUALIDADE – desafios dos Planos Municipais de Educação para o decênio 2015-2025. In Compartilhando saberes: um panorama sobre a produção acadêmica em múltiplas abordagens teórico-metodológicas. Curitiba: CRV Editora.

Kuhn, T. (1998). A Estrutura das Revoluções Científicas. 5.ed. São Paulo: Perspectiva.

Lorde, A. (1988). La casa del amo no se derrumba con las herramientas del amo. Em MORAGA Ch. y CASTILLO, A (Eds.). Esta puente mi espalda. Voces de mujeres tercermundistas en los Estados Unidos. San Francisco. ISM Press, p. 89-93.

Lugones, M. (2010). Rumo a um feminismo descolonial. In Revista Estudos Feministas, Florianópolis, set-dez de 2014. Originalmente publicado pela Revista Hypatia, v. 25, n.4.

Marques, J. (2012). Ecologia da Alma. Petrolina: Franciscana.

_____. (2015). Ecologia do Corpo. SABEH: Paulo Afonso.

_____. (2016). Ecologia do Espírito. SABEH: Paulo Afonso.

Mignolo, W. (2008). Desobediência epistêmica: a opção descolonial e o significado da identidade em política. Cadernos de Letras da UFF – Dossiê: Literatura, língua e identidade, n. 34, p. 287-324.

_____. (2010). Desobediencia epistémica: retórica de la modernidad, lógica de la colonialidad y gramática de la descolonialidad. Argentina: Ediciones del signo.

Mama, A. (2010). Será ético estudar a África? Considerações preliminares sobre pesquisa acadêmica e liberdade. In SANTOS, Boaventura De Souza & MENESES, Maria Paula. Epistemologias do Sul. São Paulo: Cortez.

MBEMBE, Achile. (2017). Crítica da Razão Negra. 2.ed. Lisboa: Antígona.

Moldonado-Torres, N. (2010). A topologia do ser e a geopolítica do conhecimento. Modernidade, impeéio e colonialidade. In SANTOS, Boaventura De Souza & MENESES, Maria Paula. Epistemologias do Sul. São Paulo: Cortez.

Mudimbe, V. (1988). A Invenção da África: Gnose, Filosofia e a Ordem do Conhecimento. Tradução de Leonor Pires Martins. (Bloomington: Indiana University Press.

Nobre, M., & Faria, N. (2003). Feminismo em movimento: temas e processos organizativos da Marcha Mundial das Mulheres no Fórum Social Mundial. Revista Estudos Feministas, 11(2), 623. Recuperado de https://periodicos.ufsc.br/index.php/ref/article/view/9932

Ottawa (1986). Carta de Ottawa - Primeira Conferência Internacional sobre Promoção da Saúde; Ottawa - Canadá.

Porto, M. F. P. Ferreira, D.R. Finamore, R. (2016). Health as dignity: political ecology, epistemology and challenges to environmental justice movements. In CONNOLLY, Creighton. KOTSILA, Panagiota. D'ALISA, Giacomo (eds.). "Tracing narratives and perceptions in the political ecology of health and disease". Special Section of the Journal of Political Ecology 24: 1-124. National School of Public Health / Oswaldo Cruz Foundation (ENSP/FIOCRUZ), Brazil.

Quijano, A. (2010). Colonialidade do Poder e clasificação social. In Santos, Boaventura de Souza & Meneses, Maria Paula. Epistemologias do Sul. São Paulo: Cortez.

Santos, B. de S. (2004). O Futuro do Fórum Mundial Social: o trabalho da tradução. Buenos Aires,

Argentina: OSAL, ano V, número 15, set-dez,. Disponível em http://www.ces.uc.pt/myces/UserFiles/livros/65_Futuro%20FSM%20-%20O%20trabalho%20da%20traducao_OSAL_2004.pdf.   Acesso em 03 de junho de 2017.

Santos, B. de S. (2010). Para além do pensamento abissal: das linhas globais a uma ecologia de saberes. (2010). In SANTOS, Boaventura de Souza. Meneses, Maria Paula. Epistemologias do Sul. São Paulo: Cortez.

Santos, C.R.S. Jesus, D. S. de. Cypriano, C.A. de C. (2017). Conectando saberes e práticas plurais - um olhar sob a ótica da tecnologia social e o licuri. UFBA, Tese de Doutorado.

Souza, M. M A. Barrientos, O. C. (2018) Educação Superior como alternativa para o fortalecimento do trabalho do Agente Comunitário de Saúde no Brasil: a proposição de um novo design curricular Manoel Messias Alves de Souza & Pedro Ricardo da Cunha Nóbrega (Organizadores). Compartilhando Saberes: um panorama sobre a produção acadêmica em múltiplas abordagens teórico-metodológicas. Curitiba, CRV, 2018. 348 p.

Valença, M.M. (2015). Encontro (ecologia) de saberes na licenciatura em música da Universidade Federal do Pará. Trabalho de Conclusão de Curso.

5.3 Living a week with the Truká tribe (island of Assunção, Brazil) for the project of atherosclerosis among indigenous populations (PAI) - a medical student experience report.

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Abstract

Introduction: Brazilian indigenous people have been neglected by academic studies and government programs. Moreover, the health of indigenous populations is not included in teaching activities in most medical schools. This arm of the PAI study aims to introduce medical students into the reality of indigenous people, in the context of medical ecology. Methodology: Descriptive study, in the form of an experience report, developed during seven days in the Truká tribe. We assessed 350 indigenous people, between the ages of 30 and 70, of both sexes, without clinically manifest cardiovascular disease. Clinical, laboratory, and imaging data were collected from each participant to evaluate their cardiovascular health. Meetings were conducted with staff of the PAI study, discussing medical ecology aspects of the study. Results: During the Truká experience, medical students were able to witness the process of transculturation through the observation of both behavioral and alimentary changes and to become aware of this population's precarious access to health. Conclusion: Spending time in this multicultural territory had a major impact on the medical student learning process, evidencing the need for a humanized and qualified care for indigenous people. Moreover, there is a need for of the application medical ecology in Brazilian medical schools, in order to allow for a better understanding of local population health.

Keywords: Indigenous populations, PAI Study, Medical Ecology, Cardiovascular Health and Medical Students.

1. Introduction

Human ecology is a multidisciplinary science that engages in profound study of human beings' relations with the physical and biotic environment, which are mediated by culture1. For a better understanding of many questions that arise, human ecology makes use of physical, biological, social, economic, and cultural processes2. Only in trying to grasp more fully how humans relate to their environment can we understand their true place in the environments where they are inserted3.

Faced with these concepts, it is quite challenging to apply human ecology in a country like Brazil, to whose formation numerous cultures contributed. This is especially true when dealing with the health of indigenous populations. It is known for a fact that from the beginning of the colonization of Brazil to present day, indigenous populations have reduced drastically, and many of them have become extinct. For many years, they have had to face situations of injustice and inequality and other forms of aggression to their human rights, exacerbated by the fact that they were only recently recognized as part of the Brazilian population4.

In treating a population that still suffers the consequences of all these years of exclusion, healthcare professionals face many challenge in providing health care services and assistance, especially when we consider that indigenous people possess great cultural diversity, expressed through languages, habits, knowledge, history, worldview, and other factors5.

Only through a fundamental knowledge of this situation can you understand the cultural context and realize how Truká people understand health, illness, and healing. This is an indigenous population that lives in the lower-middle region of the São Francisco River, between the states of Bahia and Pernambuco. Like many indigenous populations, they have suffered from the process of urbanization, and their history is marked by the production of dams in their territories and other socio-environmental changes brought about by subsistence agriculture. In this way, this group is in a health, social, and economic situation similar to that of other people who live in their surroundings; however, Truká people stand out in their cultural context and in their vision of natural processes that occur throughout life, for example, their understanding of the mechanisms of sickness and healing, which are particular to this population6.

Based on specific and detailed knowledge of how members of a population see themselves within a particular social, environmental, and cultural context, especially in the face of so many external changes, human ecology takes on a much larger dimension than before, being able to connect all these different areas with the people's own process of self-knowledge and, consequently, of self-understanding of their culture and their life.

When thinking about the challenges that a doctor needs to face in order to welcome, build trust, and, consequently, treat an indigenous patient, one must keep in mind that the construction of the doctor's professional profile began at university, through close contact and exchange of experience between different worlds, still in the university environment, which often means going beyond the mandatory hours. In this way, the medical student still in their training who has the opportunity to follow these indigenous patients must welcome them in order to conduct the specific practices and procedures of medicine itself with confidence, respect, and care. This relationship must be based not only on well-founded and concrete theory that the future doctor should have, but also on a dialogue of knowledge about the education of that people and the shared management of the processes involved, favoring the qualification of attendance and follow-up of these indigenous populations, whether in their native land or in places like hospitals, which they often view with hostility.

Many scientists in this area who discuss how the relationship between the two worlds should be established confirm a very concrete certainty: dialogue between indigenous patients and health professionals (whether doctors or students) is the best way to minimize the existing impacts of cultural differences7. Therefore, the medical student is placed before a new social relation that comes to exist, in which he or she has to deal with the social, economic, and political differences of a people historically excluded and not seen by social leaders. He or she must then be taught to recognize, reveal, and confront society's possible conflicts of power and not just keep them hidden. It is in breaking down barriers and changing paradigms, in seeing others' experiences and applying them to healthcare actions and services in the best way possible that students of Medicine are guided through their academic formation.

Therefore, this article aims to demonstrate how this exchange of experiences between the academic world and these indigenous population from the interior of the semiarid region, in the Northeast of Brazil occurred in the middle of the academic formation of medical students who decided to leave the walls of the classroom and explore other lives so close and yet unseen.

2. Methods
2.1. Type, area and study population

The PAI study, entitled "Association between Urbanization Process, Cardiovascular Risk and Subclinical Cardiovascular Disease in Indigenous Populations of the São Francisco River Basin: Effects of Dams and the Transposition of the São Francisco River", covers three distinct groups. The first group (Group 1) is composed of indigenous people of the Fulni-Ô ethnic group, living in the city of Águas Belas, Pernambuco, whose relationship with their indigenous traditions is very strong, to the extent that they maintain their native language; this town is distant from the work area of the transposition of the São Francisco River, an important Brazilian river. The second group (Group 2) is composed of indigenous people of the Truká ethnic group, living on the Island of Assunção, which is located in the city of Cabrobó, Pernambuco, and is in a clear process of urbanization. The third group (Group 3) is a control group, composed of non-indigenous people in the city of Juazeiro, Bahia, which is in an advanced urbanization process.

This arm of the PAI study is a descriptive study, in the form of an experience report, developed during seven days in the Truká tribe, with 350 indigenous people. The team that participated in the process was composed of masters, doctors, anthropologists, nurses, and medical students. The latter are the focus of this experience report.

The individuals from the Truká indigenous population selected for the survey were between the ages of 30 and 70, of both sexes (with a 1:1 ratio of women to men). Exclusion criteria were clinically manifest heart failure, past acute coronary event requiring hospitalization, renal insufficiency on dialysis, past surgical procedure for cardiac or peripheral arterial procedure, and cerebrovascular disease requiring hospitalization. Participants who showed restrictions on collection and laboratory analysis related to the project objectives were also excluded from this study.

All participants were informed about the research and only joined Group 2 after signing informed consent forms. At any time during the study, participants were able to request their exclusion without any effect on their health care.

2.2. Ethical and legal aspects

The research project was submitted to the Research Ethics Committee in accordance with the norms established by Resolution 466/12 of CONEP (National Committee for Ethics in Research). As it deals with research on indigenous populations, it also complied with Resolution 304/200 of the CNS (National Council of Health) and Normative Instruction 1/95/PRESI-FUNAI (National Indian Foundation) of November 29, 1995, which regulates the entry into indigenous lands for the purpose of developing scientific research. Data were collected after CONEP approved the study under protocol number 1.488.268. Participation in this study did not violate legal and ethical standards. The procedures adopted obeyed the Criteria of Ethics in Research with Human Beings according to Resolution 466/12 of the National Council of Health. All information collected in this study is strictly confidential and will be restricted to access on Brazilian territory.

2.3. Data collection

Following approval of the competent public agencies and signing of informed consent forms, data collection began, through an initial clinical interview, during which the indigenous participants were asked about their medical, personal, and family history. Then, after participants had fasted for twelve hours, blood collection was performed for laboratory analysis. Then, several other tests were performed, including echocardiogram, carotid Doppler ultrasound, and ankle-brachial pressure index.

Data collection and examinations were carried out in the indigenous village itself with portable equipment, and there was no need for infrastructure designed for research during fieldwork.

2.4. Living with the Truká community

For seven days, the team and the medical students met the Truká people from 7:00 a.m. to 8:00 p.m. at the place where the structure was set up, namely, the municipal school of the Island of Assunção, Pernambuco.

During these days, in addition to having contact with the indigenous participants during medical consultations, they also shared experiences, such as making meals together and participating in cultural activities involving music and crafts.

After this moment of integration in the process of learning for medical care, the team met with medical students daily to discuss the importance of medical ecology in the training of health professionals.

3. Results and discussion

At the beginning of the Truká experience, it was possible to create an amicable environment by introducing the team and clarifying the reasons for the project to the population, with the intention of including the community in the process of building the environment, bringing them to participate in a way that was active, rather than merely passive. For this purpose, the indigenous participants helped the multi-professional team during the preparation of meals, inviting the community to be attended, and helping to organize patients during the visits. In this way, a vast road was opened for the formation of a concrete and real bond between the students and some participants, making it possible, from this initial interaction, to empathize and build a real perception of the population's needs. From the medical student's perspective, this initial contact was a lively and effective way to learn how to build a solid doctor-patient relationship with people from another culture. We observed that the best way to make this happen is to step into the patients' universe, not only physical their physical universe, but also, and especially, their cultural universe.

During their stay in the village, students assisted in the process of sorting, data collection, and examinations, and it was possible to identify that the visit of specialized professionals brought relief to the community in the form of access to exams and consultations. On the other hand, this close contact also generated anxiety, since many of them had never received specific health care, permeated by so many hitherto unfamiliar details and techniques. During the time spent in this connection, the community's difficulties in accessing the public health system became obvious to all the staff. Thus, building a bond was fundamental to guide indigenous people throughout the evaluation process, and it was necessary to understand each individual's concerns and anxieties, guaranteeing integral and individualized attention.

The conversation spaces offered at the end of the day by the multi-professional team had the purpose of generating bonds, establishing trust, discovering socio-cultural aspects, and identifying the demands of the Truká people. From this exchange of knowledge, it was possible to understand the relation of human ecology to the development of a more humanized medicine, because this indigenous community does not view disease as merely a pathological result. This process of falling ill is related to a cosmological view of the world, involving forces of nature, having the process of suffering beyond the physical body, relating to rules or social conflicts within the village.

During the stay in the village, it was possible to highlight the need to build a relationship of proximity with the indigenous community, it being necessary to understand that this process passes through a transculturation scenario, since, on one hand, students are trained with a technical and scientific base for health promotion, whereas, on the other hand, the indigenous community has the medicine of shamans and their knowledge linked to culture, which transcends biomedical care, being related to nature and spirituality.

It is important to emphasize that sometimes indigenous medicine, with its means of diagnosing the health problems of individuals, has been related to pejorative characteristics such as esotericism, irrationality, or mysticism, so that health students end up labeling this knowledge as an obstacle to the creation of the true bonds that are fundamental to a comprehensive health care for these patients8. In this context, discussions on human ecology with the multi-professional team were fundamental for the recognition and appreciation of the knowledge of the healers and spiritual leaders of the tribe, helping in the process of articulation between scientific and popular knowledge, promoting an approach that results in adherence to health actions.

Data collection went beyond the mere use of equipment to detect possible pathologies. Throughout the week, students had the opportunity to talk to patients, before the specialized medical evaluation, about other health-related aspects, such as eating habits. During these conversations, the process of transculturation and change of habits was observed in some individuals who no longer share the traditions of fishing and hunting, while others keep these customs within the family. In this context, it was possible not only to listen to them, but also to help them with simple issues that impact community health, such as proper washing of food and proper handling of drinking water.

Therefore, students learned how to introduce new information, such as the technique of washing food, which is already well established and widely used in their culture, into this indigenous environment in order to prevent future diseases. It is necessary to build trust with patients, so that the information given by health professionals will be accepted and, consequently, practiced in the future as a new habit of life. This must be achieved daily throughout the workweek, which requires a great deal of respect and efficiency on the part of the multi-professional team. Knowing that everything that must be done has been done in the best possible way to serve patients well, the professional can better accept the possible rejection that these indigenous people may have regarding their knowledge and the techniques used.

Additionally, it was possible to understand how health care for this population is not limited only to pharmacological drugs, but is related to the therapeutic use of regional plants concomitant with the convocation of shamans for spiritual guidance. Based on this information, students had the opportunity to discuss with health professionals the need to overcome cultural barriers, so that they could know and understand the process of sickness in this population, to approach them respecting the traditions of that region.

4. Conclusion

Hence, the work incorporated substantial knowledge into the training of medical students, bringing a global view of patients, as proposed by the Brazilian Unified Health System (SUS), through the principle of integrality, in which the patient should be understood as the result of a cultural environment, which involves personal relationships and relationships with nature, as studied in human ecology, and is extremely enriching for the construction of future doctors. Additionally, it was possible to minimize the cultural distance, evidencing the need for undergraduate students to go beyond what is offered within the university and to try to understand the diverse cultures and desires of the population. It was possible to observe that health promotion in the Truká community requires the development of integrated actions which are consonant with the behavior of this population, emphasizing their culture, their interpersonal relationships, and their relation with the environment.

References

Ávila-Pires, F. (2009). Human Ecology and Health. In Begossi, A.; Lopes, P. (eds.) (2009) Current Trends in Human Ecology (pp. 202-221).

Commonwealth Conference on Development and Human Ecology (9th : 1989 : University of Edinburgh) & Commonwealth Human Ecology Council & University of Edinburgh. Centre for Human Ecology (1991). Human ecology environmental education and sustainable development : report of the Ninth Commonwealth Conference on Development and Human Ecology, University of Edinburgh, 19th-23rd July 1989. Commonwealth Human Ecology Council ; Edinburgh : Centre for Human Ecology, University of Edinburgh, London.

Pires, I. Craveiro, J. (2011). Ética e prática da ecologia humana: questões introdutórias sobre a ecologia humana e a emergência dos riscos ambientais. Apenas Livros Ltda. e Autores.

Santos, A.; Iamarino, A.; Silva, J.; Zollner, A.; Constantino, C. (2017). Considerações bioéticas sobre a relação médico-paciente indígena. Revista bioética, 25 (3): 603-10.

Da Silva, C. (2013). Profissionais de saúde em contexto indígena: Os desafios para uma atuação intercultural e dialógica. Revista de Antropologia – Ano 5 – Volume 6.

Vieira, Hítalo Thiago Gomes, Oliveira, Jacqueline Eyleen de Lima, & Neves, Rita de Cássia Maria. (2013). A relação de intermedicalidade nos Índios Truká, em Cabrobó - Pernambuco. Saúde e Sociedade, 22(2), 566-574.

Pereira, Érica Ribeiro, Biruel, Elisabeth Peres, Oliveira, Lavínia Santos de Souza, & Rodrigues, Douglas Antônio. (2014). A experiência de um serviço de saúde especializado no atendimento a pacientes indígenas. Saúde e Sociedade, 23(3), 1077-1090.

Melo LP, Cabral ERM, Junior JAS. O Processo saúde-doença: Uma Reflexão à Luz da Antropologia da Saúde. Rev Enferm UFPE Online 2009;3(4):426-32.

5.4 The use of force plants in traditional comunities of the brazilian northeast

Reuber Rosendo Costa Macedo dos Santos

Abstract

The aim of this article is to analyze power plants used in traditional communities in northeast Brazil. For this, a brief analysis of the "Jurema" and "Ayahuasca" plants, much used in religious rituals, was necessary. Traditional communities have very deep characteristics that do not end in a single article. A bibliographical research was done around this theme in order to know more these plants, as well as their functioning in the communities, with emphasis on "Kariri-Xocó". Popular knowledge becomes essential in providing data so that new scientific discoveries are made about the therapeutic properties of these plants. In this sense, the most profound studies in these communities become relevant in order to reveal the different facets of the use of power plants, among which are the connection between man and the sacred, the promotion of human self-knowledge and the importance of tradition, with its enigmas and mysteries.

Keywords:Traditional communities. Power plants. Northeast.

1. Introduction

Men have always drawn from nature the most diverse resources to improve their quality of life. The interaction between nature and man was indissociated: it was given in food, housing construction, clothing and use of plants and herbs for healing purposes. The curative use of plants in traditional communities cannot be historically situated, it is ontologically linked to the embryonic forms of human social organization and the very development of consciousness. Giraldi andHanazaki (2010) emphasize that the use of certain "powerful" plants has as main function the maintenance of the health of these communities.

The communities considered traditional have peculiar characteristics, directly linked to the expression of their traditions and their self-identification. In the semi-arid region, which covers nine Brazilian states, characterized by the dry climate, there is a territory with a social history of spatial organization that is interconnected with environmental problems, most of them resulting from the predatory interference of Westernized man, which has led to a process of abrupt reorganization of the environment. Add to that the difficulties that the population of the region faces historically, due to the absence of public policies, especially in health.

The question is relevant, as these difficulties impel the local in habitants to look for alternatives unrelated to the State. Popular knowledge has become indispensable in the support to the health of the communities, besides being a source of data for new scientific discoveries about the therapeutic properties of plants.

In spite of the alert brought by Almeida (2011, p.40), which affirms that in Brazil this popular knowledge has been lost, science has directed its glances to this knowledge and conferred legitimacy to the curative possibilities in the popular use of certain plants. The therapeutic effectiveness of this knowledge was recognized by the Brazilian state and has recently started to operationalize with the National Health System the national policy of herbal and phytotherapeutic plants.

In this line of reasoning, some practices and traditions that are historically associated with the use of healing plants constitute sources of knowledge whose demand is increasing, even in urban centers. Healerism, shamanism and the religious manifestations of traditional "terreiros", such as candomblé and umbanda, once developed almost exclusively in the most remote rural areas and within indigenous communities, have spread within the cities, bringing with them the use of plants that will be the focus of this article: Ayahuasca and Jurema, here called "plants of power".

The Ayahuasca, infusion prepared from two plants characteristic of the Amazon region, is the sacrament used in the Santo Daime, União do Vegetal, among others. Due to the growth of these religions, which can now be classified as urban manifestations, it has spread to all regions of Brazil.

Jurema, in turn, is a species perfectly adapted to the Brazilian semi-arid. It is easily cultivated and from it the population makes different uses, not only while planting power within religious or spiritualistic manifestations. The plant is used for the production of firewood and cuttings, and for the purposes of therapeutics proper, its uses indicate antibiotic and anti-inflammatory properties. Like the Ayahuasca, Jurema, as a power plant, spread with the growth of the religious traditions that are used as a sacrament.

In this sense, this article aims to establish connections between these "power plants" in the rituals of traditional northeastern communities, including urban religious manifestations. For this, a historical digression will be necessary, undertaking efforts to understand the complex uses of these plants. In addition, it is necessary to investigate certain communities in theBrazilianNortheast.

2 Ayahuasca and its ritualistic utilizations
2.1. The power of Ayahuasca.

Ayahuasca, according to Shanon (2003, p.110) is a psychoactive plant infusion of the Amazon. Its effects include hallucinations in various modes of perception

and powerful visions. These are experiences that are linked to personal, intellectual, affective, and deep spiritual experiences. The author also considers (2003, p.110):

> We also observe changes in the basic parameters of experience - personal identity, connection with the outside world, temporality and feelings of meaning and noesis. In the past, ayahuasca was one of the central pillars of various tribal cultures in the Amazon. Today, the infusion is still a common tool for healers throughout the region. In addition, during the twentieth century, several syncretic religious groups were formed in Brazil in which indigenous traditions related to ayahuasca are combined with non-indigenous cultural elements - Christian or other. Among these groups, the most important are the Santo Daime Church, União do Vegetal (abbreviated to UdV) and Barquinha. In all, ayahuasca functions as a sacrament.

There are still some issues relevant to Ayahuasca, such as the contrasts between form and content for each individual. The ways of visualizing Ayahuasca are shown in different aspects, which differ according to the perception and stability of the subjects that make use of it, causing different psychological impacts. This aspect, according to Shanon (2003), refers to the content and themes that are aroused in the interaction with the plant, which also differ from person to person. Ricciardi (2009, p. 40), elucidates that ayahuasca tea consumed in rituals by União do Vegetal adherents is called "vegetal" or "hoasca", association of a vine, called "mariri" (Banisteriopsis caapi) together with leaves a shrub called "Chacrona" (Psychotria viridis), both plants native to the Amazon Region. Its effect is known as "burracheira" and the ritual of "session".

On the effects promoted by Ayahuasca, some insurgent questions are: would it be a hallucinogenic tea? Would this tea bring about a collective hallucination process? According to Ricciardi (2009, p.41), the term "hallucinogenic" has been questioned by ayahuasca users because, in the light of classical psychiatry, hallucination consists of alterations in the perception generated by biochemical dysfunctions in the central nervous system. It occurs that, although power plants also promote changes in the functioning of the senses, it is frequent among users to describe identical views that have arisen throughout the same group experience. Thus, it would be incorrect to affirm that this type of alteration of perception, envisaged by the group, consists of hallucination in the medical-psychiatric sense.

The experience of tea translates into something unique, permeated by many emotional, psychological and cultural meanings by its users, since each brings with it its own experiences of the world. Taking into consideration that each being has its singularity, that its reactions in face of what is awakened by the plant can be unforeseeable and, considering still the necessity of preservation of the own religion, still surrounded of preconceptions and disinformation in the society, the rituals are formally and informally regulated and supervised by the irrespective leaders.
Luís Eduardo Luna, in his text 'Narratives of alterity to Ayahuasca and the motive of transformation in animal', brings some very important considerations of this "sacred"

drink. The author analyzes Ayahuasca in various segments, such as: ethnography, botany, pharmacology, medicine, psychotherapy, comparative religions, cognitive psychology, art and literature, as well as the potential for law. The relevance of this plant in several areas is noteworthy given its latent range.

As already mentioned, it is possible to direct the focus around the evaluation of the quality of life of the people according to the way of use of Ayahuasca, emphasizing that, ultimately, the personal well-being promoted by this plant is one of the main goals.

3 Jurema and its ritualistic uses.
3.1. Jurema and the sacred.

Present in a variety of religious rituals, the "Jurema" is pure polysemy. Inserted in several religious cults, its origin comes from the Northeast. It comes from a strong religious symbol, stands out in its cults, being sometimes a bush, sometimes a drink, or even a spiritual entity. The "Jurema" is multifaceted, since it manifests itself in several contexts.

Its name is of tupi origin "Yu-roe" and it emphasizes that there are other species also known like Jurema. This plant, according to Mota, is commonly known as "the magic drug of the interior of the Northeast" (MOTA, 2007) in drought-affected environments and in the caatingas. From the perspective of the juremeiros, the plant has the power of enchantment, of magic. The Jurema cult has long been realized in the regions populated by the Kariri, being conceived by this community as a plant, sacrament and religious practice.

Mota, brings an important clarification about Jurema:

> Above all, Jurema is a tree that means the creative principle, and the substance extracted from its roots brings messages from Sonsé, the creator. According to the words of Judea, Jurema is in fact the representation of Sonso, the primordial ancestor, that makes it possible for the Kariri-Xocó to travel to the past and to the future, unifying their generations into one. Jurema gives meaning to life. (ibid., 2007, p 121)

This is what Tromboni says

> "Jurema" is a word frequently used by the people of santo of Salvador, where it designates a drink made from the infusion in cachaça of the leaves of the plant of the same name, which is offered to the "caboclo" in its celebrations. Although it is always associated with it, such a drink does not seem to arouse greater interest, much less can it be said that it is perceived as the central symbol of the whole religious cult, as in other manifestations. It is firmly associated, therefore, with what is widely known in the city as candomblé de caboclo. This variety or, for some, a

nation of "candomblé", has a confused status in the boarder framework of Soteropolitan "candomblé", and this is what makes it "good to think". In attempting to unravel the confusion, we must ask what we mean by the term nation in this context of use which becomes the candomblé, and to what extent this latter more inclusive designation itself no longer reduces to some supposed common denominator a diversity of religious manifestations (2012, p.96).

The ritualistic use of the Mimosa Tenuiflora plant originates from the Caatinga is found in almost all the Brazilian northeast in the religious cults of traditional people of "terreiro". What is Jurema's secret? The beliefs in mythic ancestors in the jure communities validate the sacred. Many of these communities, specifically the indigenous peoples, use their beliefs as an argument to validate the struggle for a return to land. A well-known ritual is the "toré". It is a dance, watered by the "wine of Jurema", rhythmic and centennial.

Tromboni (2012, p.115), complements:

> By dramatizing in collective dance the imaginary of the mythical past present in the poetry sung by the toantes, simple and illiterate people found a language of few concepts, but of eloquent images with which to speak of itself for itself. Commemorating Jurema, "Jurema's wine," not only with the members of the present generation, but also with the ancestors, she celebrated and celebrated her own community. Ritual, then, has been the very language through which ethnicity is expressed and lived, as much as it communicates itself to the surrounding society.

It is understood that it is a sacred communion between present and past, with its own language and that celebrates life. Rodrigues and Campos (2013, p.273) compare, in ritualistic terms, the Jurema to Candomblé, identifying dissonances between toadas and garments. They affirm that the Jurema can be celebrated in festivals in the rhythm of the coconut and also in rituals, denominated "table jurema". In both rituals there is the strong presence of smoke, which, according to the belief of the juremeiros, is responsible for the cleanliness, raising the desires of its faithful and also expressing the will of the entities.

The question of the sacred in the Jurema is something very enigmatic because, according to the Indians, only they can hear the Sonsé and decipher what they are told, through the magic that comes from the "enchanted" of the drink. In a conversation with one of the Kariris-Chocós' pajés, the old "Suíte," Clarice Mota heard about the myths of creating such an old secret. It was emphatic in stating that the beverage maintains an extension of renewal and does not involve whites or blacks, only Indians. However, the tribal leader's perspective can be questioned, as the ritualistic use of jurema has been reaching other spaces, especially in urban centers.
In cities, the Jurema, as sacrament, is used in religious manifestations of different matrices, as umbanda, candomblé, as well as practices conventionally called Urban Shamanism.

4. The traditional rituals.

4.1 Indigenous communities and rituals in northeastern Brazil.

In the Northeast, there were member villages calling themselves caboclos. Such a condition was assumed by natives with the purpose of hiding their ethnic identity, since they underwent persecutions of the invaders of the lands that they inhabited. Studies were devoted to their customs, their dances and "folkloric manifestations", considered as exotic. According to Silva's lessons (2017, p.258-259), these stages of integration were attributed to Indians who were isolated in the 19th century. XX. There was a kind of acculturation and assimilation of these Indians in the national society.

In the semi-arid Northeast, the experiences that the Indians experience, including their sacred rituals, are constituted in a process of historical reflection, which also includes the struggles for their rights. Their sacred rituals are part of a historical experience. Mota (2007, p.128-129) in drawing a panorama, for example of the past of the roots of Mimosa tenueflora, reported that the 'Funiô' of Pernambuco still use it, but the Kariri-Xocho does not. The author, in her research in the community, reports::

> The information they gave me at the time was that they used the roots of a Mimosa that was classified through the exsicata produced as being the Linn verrucous species. The sacred drink of the ancestors was known to stimulate "marvelous visions" which, according to ancient ethnographic accounts, were dream states describing things as "enchanted stones, birds of fire and other natural wonders. (ibid., p. 128)

Mota (2007, p. 129) also reports that it has been difficult to know which species of Jurema used by the Kariri-Xocó Indians, and yet, if there is another plant used in this production. According to the author, the species tenueflora, is called by them "Black Jurema", so that it is known that its use causes psychotropic or hallucinogenic reactions. The verrucosa, known as "Juremamansa", has different effects from the "black jurema", which is described by some authors as a drink of "miracle powers", provoking ecstasy and feelings very pleasurable in those who eat them.

Final thoughts

The desire for the healing of body and / or soul has increased among people. The doctor's office is just one of the ways to cure. However, in the context of religious manifestations, physical and spiritual healings can also be obtained, as in the case of Ayahuasca and Jurema.

The human being is always in search of a meaning to live, this transcends any socio-economic, cultural or religious condition. Through its cognition, its relation of adaptation to the world generates its own reality.

The use of power plants should not be seen as a collective hallucination. If a particular group perceives some consensual presence or manifestation, one may take into account the fact that they are correct within their vision. This possibility of establishing a connection between man and the Divine feeds the soul and establishes the human contact with its interior in search of the meaning for its existence.

Notes:
[1]Typical rhythm of the Northeast region of Brazil. Wheel dance, accompanied by singing, of African and indigenous influence;
[2]Ritual ceremony of jurema that takes place in consultation sessions or Juremeiros. Drinking is part of the ritual;
[3]Mystical entities worshiped in juremeiras religions.

References

ALMEIDA, MZ. Plantas medicinais: abordagem histórico-contemporânea. In: Plantas Medicinais [online]. 3rd ed. Salvador: EDUFBA, 2011, pp. 34-66. ISBN 978-85-232-1216-2. Available from SciELO Books .Acesso em 08 mai. 2018.

GIRALDI, Mariana; HANAZAKI, Natália. Uso e conhecimento de plantas medicinais no sertão do Ribeirão, Florianópolis, SC, Brasil. Acta Bot, Bras. Florianópolis, v.24, n.2, p.395-406, 2010. Disponível em: <http://www.scielo.br/pdf/abb/v24n2/a10v24n2.pdf. >. Acesso em 08 mai. 2018.

LABATE B.C; ARAÚJO W. S. (orgs.).O uso ritual da Ayahuasca. Campinas/São Paulo, Mercado de Letras/ Fapesp, 2002.

LUNA, Luís Eduardo. Narrativas da alteridade: A Ayahuasca e o motivo de transformação em animal. In: LABATE, Beatriz Caiuby; GOULART, Sandra Lúcia (orgs). O uso ritual das plantas de poder. Campinas: Mercado de letras, 2005.

MOTA, Clarice Novaes da. Os filhos da Jurema na floresta dos espíritos: ritual e cura entre dois grupos indígenas do nordeste brasileiro. Maceió; EDUFAL, 2007.

TROMBONI, M. A Jurema das ramas até o tronco: ensaio sobre algumas categorias de classificação religiosa. In: CARVALHO, MR., and CARVALHO, AM., org. Índios e caboclos: a história recontada [online]. Salvador: EDUFBA, 2012, pp. 95-125. ISBN 978-85-232-1208-7. Available from SciELO Books .Disponível em:<http://books.scielo.org/id/mv4m8/pdf/carvalho-9788523212087-05.pdf>. Acesso em: 10 mai.2018.

OLIVEIRA, Rita Barreto de Sales; AMARAL, Renilda Gonçalves do. Ayahuasca: Um Caminho para o Equilíbrio. Revista Científica Multidisciplinar Núcleo do Conhecimento. Brasília, ano 01, Vol. 09, pp 724-738, Outubro / Novembro de 2016. ISSN:2448-0959 Disponível em: https://www.nucleodoconhecimento.com.br/ciencia-da-religiao/caminho-para--equilibrio. Acesso em 10 mai.2018.

RICCIARDI, GS. O uso da Ayahuasca e a experiência de alívio, transformação e cura na União Vegetal (UDV). In: NERY FILHO, A., et al. orgs. Toxicomanias: incidências clínicas e socioantropológicas. Salvador: EDUFBA; Salvador: CETAD, 2009, pp. 37-60. Drogas: clínica e cultura collection. ISBN 978-85-232-0882-0. Available from SciELO Books, Disponível em: <http://books.scielo.org/id/qk/pdf/nery-9788523208820-04.pdf.>. Acesso em 08 mai.2018.

ROGRIGUES, Michelle Gonçalves; CAMPOS, Roberta Bivar Carneiro. Caminhos da visibilidade: A ascensão do culto a Jurema no campo religioso de Recife. Afro-ásia. Salvador, v.1. n.47, p. 269-291, 2013. Disponível em:<http://www.scielo.br/pdf/afro/n47/a08n47.pdf>. Acesso em 10 mai. 2018.

SHANON, Benny. Os conteúdos das visões da Ayahuasca. Mana. Rio de Janeiro, v.9, n.2, p.109-153, 2003. Disponível em:<http://www.scielo.br/pdf/mana/v9n2/17934.pdf>. Acesso em 08 maio.2018.

SILVA, Edson. Índios no semiárido nordestino: Re (conhecendo) sociodiversidades. Revista de Pesquisa Histórica. Recife, v.1, n.35, p. 254-273, 2017. Disponível em:<http://www.editorarealize.com.br/revistas/conidis/trabalhos/TRABALHO_EV064_MD1_SA8_ID80_20102016235721.pdf. >. Acesso em 16 mai.2018.

MACRAE, Edward. Santo Daime e Santa Maria – Usos religiosos de substâncias psicoativas lícitas e ilícitas. In: LABATE, Beatriz Caiuby; GOULART, Sandra Lúcia (orgs). O uso ritual das plantas de poder. Campinas: Mercado de letras, 2005.

6. Cross-Cutting Issues
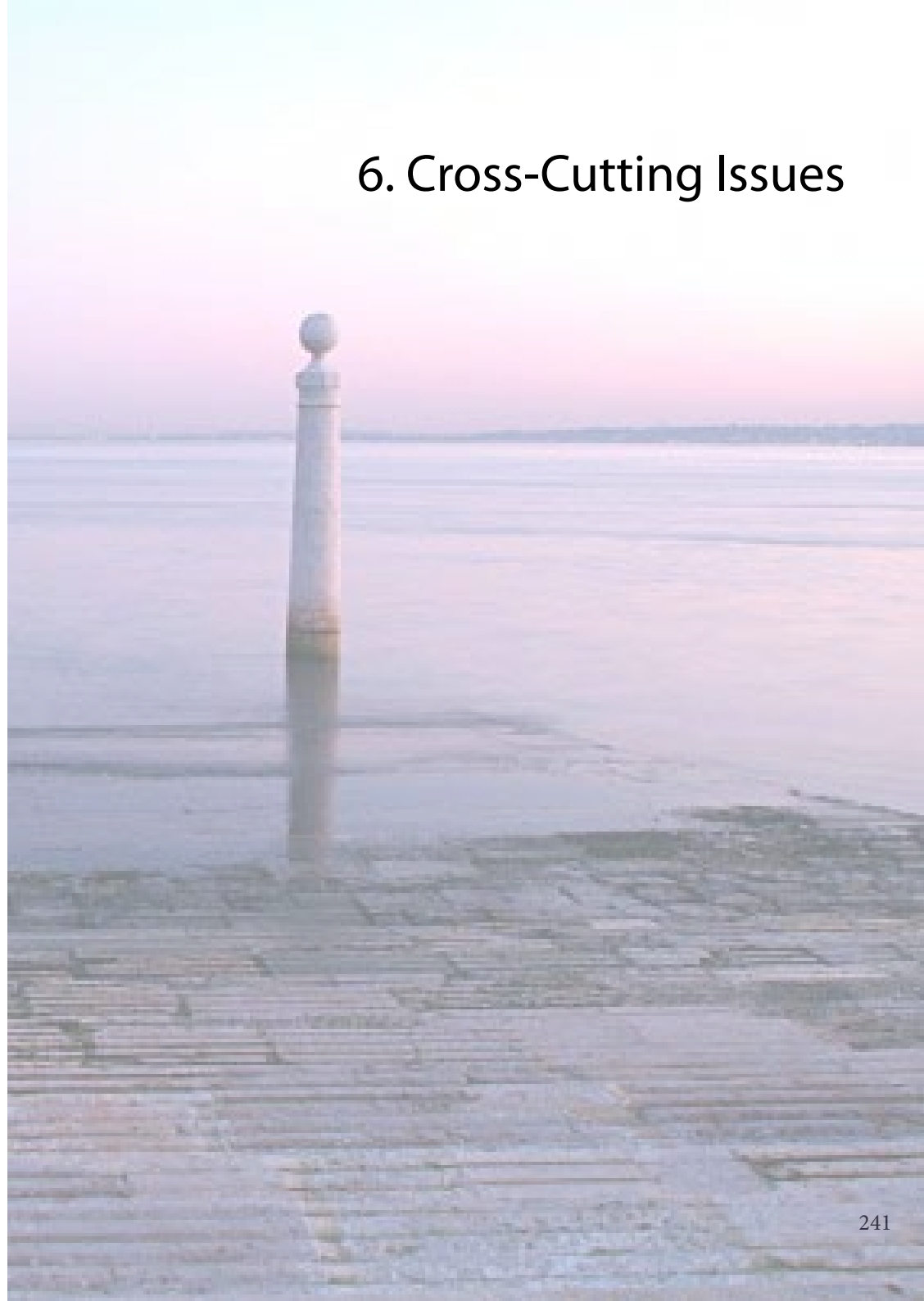
6.1 A segregação espacial e a conjuntura da mobilidade

Lourival Teixeira de Assunção Filho

Resumo

O presente trabalho objetiva discutir as inter-relações existentes entre a segregação espacial, formação territorial e a mobilidade urbana. Aspectos de uma sociedade que tem sua conjuntura inserida no modo de produção capitalista, na qual à classe dominante, visa e deseja o enriquecimento individual em prol de um avanço coletivo, assim, uma distribuição territorial se reconfigura em prol das mudanças econômicas, e suas estruturas vinculam-se à a propriedade da terra. Vale lembrar que este processo iniciou desde a revolução política de 1850, quando todos os cidadãos eram obrigados a registrarem suas propriedades de acordo com a lei da terra no Brasil, tornando, os proprietários tonaram meios para o desenvolvimento e a produção para o Estado novo que veio assumir a organização em temos funcionais. Desta forma a economia urbana se revela pela especulação imobiliária e pela segregação espacial inevitável, acompanhada a deficiência urbana quanto a infraestrutura centralizada contra ao aumento populacional. Apesar das favelas invadiram os morros e vazios com construções de diferentes tipos, considerados legais e ilegais, esta forma de expansão urbana esquiva do controle e do planejamento. Todavia, a segregação sugere um olhar sistêmico e sobretudo estrutural de como o aumento de tarifas no transporte público coletivo e o alto índice de automóveis e motos ainda afetam o quadro financeiro e o próprio Estado. É necessário, retomar as discussões sobre a leitura da cidade/campo e aprofundar o como essa problemática será solucionada para as futuras gerações que se quer em territórios ambientalmente mais sustentáveis.

Palavras-chaves: Mobilidade Urbana, Segregação Espacial, Capitalismo, Transporte.

Introdução

O presente artigo está estruturado em três partes. A primeira evidencia a história da formação território do capital e seu vinculo ao processo de segregação socioespacial, intuindo situar o processo orquestrado pelo direito: econômico; social e habitacional. A segunda, foca na questão da segregação tratando o efeito do transporte e a perda da escala humanas e detrimento do liberalismo. Na sequência, se discute a relação politica e o direito á cidade. Por fim, conclui-se com uma suscita consideração sobre a cidade e sua problemática estrutural.

Deste modo, o presente trabalho tem como objetivo discutir sobre as inter-relações existentes entre a segregação espacial, formação territorial e a mobilidade urbana. Segundo Marx (1818-1883), o modo de produção capitalista é um processo histórico que está centrado na acumulação, já a sociedade capitalista, segundo Lessa e Tonet (2008), tem sua raiz na compra e venda da força de trabalho, reduzindo o homem ao status de mercadoria. Assim, uma distribuição territorial se reconfigura em prol das mudanças econômicas, e suas estruturas passam a ser vinculada a propriedade da terra.

No Brasil, esse processo antecede a formação do Estado Novo, segundo Holanda (1995), a acumulação brasileira tem seu pontapé inicial, quando os ambiciosos aventureiros colonizadores chegam em terras Americanas, ignorando fronteiras, em que, na sociedade do século XVIII, o Brasil era visto como um longo espaço de "prosperidade sem custo, de títulos honoríficos, de posições e riquezas fáceis" (HOLANDA, 1995, p.46).

Para Holanda (1995), o que os portugueses instauraram no Brasil foi uma sociedade enraizada na cultura rural, e as cidades, para o autor, são dependentes deste âmbito; essa herança rural é perdida a partir dos acontecimentos de 1851, quando se instaura o Banco do Brasil, em seu segundo molde, monopolizando as unidades de emissões de crédito. Segundo o autor, a cidade urbana comercial, começa a tomar forma: em 1852, quando primeira linha telegráfica é instalada no Rio de Janeiro e em 1854, quando as estradas de ferro são abertas. Ocorrendo nesse período, a obrigatoriedade do registo das propriedades, de acordo com a lei da terra no Brasil, por parte de seus proprietários; os proprietários tonaram meios para o desenvolvimento e a produção para o Estado novo que veio assumir a organização em termos funcionais. Desta forma a economia urbana se revela pela especulação imobiliária e pela segregação espacial inevitável, acompanhada a deficiência urbana quanto a infraestrutura centralizada contra ao aumento populacional.

A favelas invadiram os morros, a partir dos processos de segregação e limpeza urbana, com construções de diversos tipo, considerados legais e ilegais, esta forma de expansão urbana esquiva do controle e do planejamento. Todavia, a segregação sugere um olhar sistêmico e sobretudo estrutural de como o aumento de tarifas no transporte público coletivo e o alto índice de automóveis e motos ainda afetam o quadro financeiro e o próprio Estado. É necessário, retomar as discussões sobre a leitura da cidade/campo e aprofundar o como essa problemática será solucionada para as futuras gerações, que se quer territórios ambientalmente mais sustentáveis.

1. A segregação social e a mobilidade

Com o objetivo de discutir as relações existentes entre o alcance da mobilidade urbana pública e a segregação sócio espacial presente na cidade de Maceió, é preciso reconhecer os processos inerentes a seu contexto social atual.
O capitalismo nasce do aprisionamento dos meios de produção pelos senhores de terra, e aos desprovidos, recaí a venda da força de trabalho em prol de sua sobrevivência e para produção de mais valia. Gorender (2013), afirma que a força de trabalho se transforma em mercadoria e os bens da produção assumem o papel de capital, carregados enquanto valor de troca e não de uso.

Para Harvey (2005), Marx situa a acumulação enquanto motor central do capitalismo, é ela que dá forças para o aumento da produção, o que fica claro dentro da lei geral de acumulação capitalista, ou seja, conforme cresce a riqueza social, aumenta o percentual de trabalhadores dentro do exercito de reserva e assim, o pauperismo se instaura.

E a história profunda de Maceió, é marcada pelas decisões do capital; segundo Almeida (2011), o desejo pelo crescimento econômico de Maceió, abriu caminho nas matas, esquecendo a ascensão de Penedo ao sertão; a Capital Alagoana foi traduzida enquanto uma "resposta provincial da exportação" (ALMEIDA. 2011, p.25) devido ao ancoradouro que fixava no Jaraguá.

No século XVIII, os trilhos urbanos já cantarolavam na cidade de Maceió, para Almeida (2011), foram eles que alteraram o território alagoano, propiciando a criação de uma nova escala da mobilidade. Conforme o autor, os trilhos que na capital se estabeleceram, constituíram como resultado de um acordo econômico com a Companhia Baiana de Navegação, em que, atuaria nas navegações das Lagoas Mundaú e Manguaba, e assim, lançariam os primeiros trilhos, interligando a lagoa com o porto; caracterizando como um benefício aos negociantes da exportação. A fim de tornar esse processo mais humano, o caminho de ferro fazia um desvio a Rua do Comércio no bairro do Centro, interligando o porto as propriedades urbanas.

A abundante presença das águas em Alagoas, fazem com que elas ganhem responsabilidade nas aberturas de caminhos dentro da cidade de Maceió, assim como os trilhos, as estradas eram pensadas com a função de articular os eixos do açúcar e do algodão. Desta forma é que na primeira metade do século XIX, segundo Maciel (2004), era possível encontrar em Maceió, desde de comerciantes, a firmas estrangeiras e pequenos agricultores, sendo dentro dessa pluralidade que a cidade começava a vivenciar os momentos de transição do valor de uso ao valor de troca.
No modo de produção capitalista, tudo é movido em prol do enriquecimento, tudo é visto como mercadoria. Segundo Ribeiro (2015), a terra é um bem não produzido, ela não possui valor, mas adquire um preço, desta forma, ela não se encontra regulamentada pelas leis do mercado; mas pela "utilização e da transformação do uso do solo urbano" (Ribeiro, 2015.p.40).

Retomando ao século XVIII, o porto do Jaraguá, para Maciel (2004), passou a ser uma porta de entrada para a modernidade, tendo muitos trapiches e armazéns se instalando nas proximidades. Estes são os primórdios do espaço urbano maceioense, que interliga com a práxis, natural do comércio. O que se observa da Maceió hoje, são resultados de ações decisivas do capital em prol de sua maior acumulação, segundo Pimentel (2015), a cidade capitalista passa a produzir e reproduzir riquezas e mazelas, assumindo estereótipos a partir das divisões territoriais a ela determinada. Os primeiros bairros da capital Alagoana foram: Jaraguá, Centro, Levada, Bebedouro e Fernão Velho, uma cidade que expandia sobre aspirações tinha seus canais sendo enclausurados.

Suas construções instalavam-se de forma ágil, e em 1853, iniciou-se a construção da ponte do poço, a fim de contornar os problemas. Segundo Sá Albuquerque (1885, p. 36), a cidade precisava crescer, encanar água potável, abrir estradas, e assim ela fez; construíram uma via chamada de Estrada do Farol, a urbanização chegava mais forte ao platô (parte alta da cidade). Não apenas a ele, o litoral norte de Maceió foi sendo reconhecido, em 1859, já haviam vias do Jaraguá até Jacarecica.

Conforme Almeida (2004), essas transmutações que ocorriam no espaço social, fez a chegada de novos atores, conforme a mesma se desenvolvia, crescia a presença dos trabalhadores nas ruas de Maceió. Que são saltados de lugares em lugares na busca pela moradia e locomoção, que de inicio, se amontoaram nas proximidades do porto, foram ao norte ou ao platô, andando pela insalubridade que cidade possuía.

Os trabalhadores que segundo Maciel (2004), usavam os bonds todas manhãs carregados de peixe, sururu, galinhas; e pela tarde vinham com o vatapá, caruru, cuscuz e tapioca, para serem vendidos em feiras e na porta de teatros, para uma elite ou quase elite que desfilava a modernidade inglesa adentrada no nordeste brasileiro. A marginalização dessa população oprimida, acompanha o território do qual habita; Maciel (2004) relata em seu trabalho, passagens escrita que demostra a marginalização de bairros como: Levada, Ponta da Terra e Jaraguá; são retratados nos jornais da época pelos incidentes de baderna, prostituição e roubos/furtos, para Maciel (2004), a impressa traduzia o senso da elite, era inexistentes o debate entre os bairros nobres e os lugares invisíveis dentro de Maceió, dado desta maneira o embrionamento da cidade.

Na metade do século XIX, a capital Alagoana já contava com 25 bairros, e da mesma maneira que as vias foram sendo construídas em prol dos lucros provenientes do comércio, o mercado imobiliário já nascia com o deslumbre de altos lucros. Enquadrando áreas como uma boa localização para instalação, vai além das posições geográfica, segundo Santana (2006) é a acumulação dos materiais de acessibilidade, infraestrutura e serviços urbanos. Sendo assim, algumas zonas, já em 1970 eram tidas como da classe alta, recebendo os maiores investimentos públicos em cima de suas zonas pobres.

O trabalhador que andava nos bonds, hoje atravessa a cidade em ônibus lotados, morando em lugares afastado, devido a condições "privilegiadas" dadas por programas oficiais que espaira a cidade e afasta o morado da vivência urbana do centro; programas esses, que segundo Cavalcanti (2017), ajudam a municípios aumentarem seus perímetros urbanos por conta da especulação imobiliária das áreas bem localizadas. Tal fator, ocorreu em Maceió no ano de 1980 com o Plano de Desenvolvimento, que duplicou o número de bairros dentro da cidade.

Ficando claro que o fator da aglomeração da pobreza e os valores dado a terra, não são uma conjuntura atual, mas que vem se configurando dentro da capital alagoana,

desde de seus primórdios. Tendo a quantidade populacional entrado em uma escala crescente e a expansão territorial de Maceió sendo comandado pelas mãos invisíveis do mercado, tudo se transforma em mercadoria e a objetivação da mais valia como a base. Segundo Maricato (2017), no curso de formação da realidade brasileira, deixa claro o como a terra urbana entra dentro na lógica mercadológica e adquire um valor, e uma caracterização disto é que uma casa de aproximadamente 80m², no Bairro Cidade Universitária, está custando 95.000 reais; já no Bairro da Ponta Verde essa mesma casa não existiria, se traduziria em um apartamento que em média custaria 640.000 reais (estes dados foram coletados de sites de vendas de imóveis).

Fazendo valer a construção de duas Maceió. A Maceió de fora, para os turistas, com as belas praias, grandes investimentos imobiliários, e o desenvolvimento crescente do Estado. E a Maceió de dentro, do Mercado da Produção insalubre, da Cidade Universitária, das grotas e favelas que tem crescido descontroladamente nos últimos anos. Reforçando, como o uso e ocupação do solo urbano é ditado pelas necessidades do capital, e demonstrando a importância de apresentar uma pesquisa voltada para a classe invisível, sem voz que se submete a sobrevivência diária sem ter suas necessidades básicas atendidas nem direitos respeitados.

2. Mobilidade urbana e a política pública

Maceió em 2017 se colocou no vigésimo sexto lugar no ranking do IDGE – Índice dos Desafios da Gestão Estadual, o qual, busca analisar os processos educacionais, de saúde, segurança, infraestrutura, condições de vida e o desenvolvimento social e econômico. Para Marx, o modo de sociedade capitalista, é enraizado no modo de produção onde homens assalariados vedem sua força de trabalho, por serem despossuídos de meios de produção, a fim de produzirem.

O espraiamento urbano leva a cidade a adquirir um novo posicionamento de escala, a locomoção se torna cansativa e demorada visto as distâncias percorridas para o acesso aos centros urbanos. E com a popularização do automóvel, isso se configurou muito nos gestores de planejamento urbano: "a síndrome de Brasília", onde a Cidade perde a escala do Homem e ganha a escala do automóvel, é ele que irá proporcionar o direito de ir e vir, a liberdade. Mas, e aos que não possuem condições de obter tal produto? Resta ônibus atrasados, metrôs superlotados e os transportes ilegais.

Para Gehl (2015), o campo de visão do homem, explica muito sobre os processos de planejamento urbano, em seus textos ele demonstra a experiência da verticalização; o campo de visão do pedestre consegue alcançar um prédio de 10 andares, acima disso não se terá uma familiaridade, os famosos olhos para as ruas, explicado por Jacobs (2011), que para a autora são responsáveis pelo sentimento de segurança da vivência urbana que é perdido. A cidade da verticalização e do espraiamento, perdem a velocidade do pedestre e entra na velocidade do automóvel, que segundo Gehl (2015), fazem como que se perca os detalhes da cidade e das pessoas e assim, as experiências urbanas vão se perdendo.

Segundo Cavalcanti (2017), a segregação da população invisível é uma resposta do planejamento urbano e habitacional, inadequada e que contribui para a reprodução de estigmas. Ainda Segundo Cavalcante (2015), Maceió ganha novas escalas, após a década de 1960, quando a cidade recebe uma grande leva de migrantes em busca de sobrevivência e moradia, mas ao chegar, os lugares reservados a eles eram as grotas e encostas. De acordo com a autora, é a partir deste momento que a cidade passa a se preocupar em políticas habitacionais, e qual foi a área destinada a eles? O platô ou parte alta da cidade, pois os litorais já estavam ocupados pelo capital.

Esse desenvolvimento excludente de Maceió fica claro no próprio Código de Urbanismo e Edificações, onde destina os bairros: Trapiche, Vergel, Chã da Jaqueira, Cidade Universitária, Clima Bom, Santos Dumont, Mutange, Feitosa, Jacitinho, Tabuleiro, Ponta da Terra, entre outros da orla laguna e da parte alta, como áreas de habitação de interesse social, por outro lado, bairros como Jacarecica, Garça Torta e Gauxuma são classificados enquanto macrozona de estruturação urbana, prevendo por lei, a instalação de prédios de 15 a 20 andares.

Os efeitos desse espaçamento habitacional e urbano podem ser sentidos nos problemas da mobilidade; segundo dados da Superintendência Municipal de Transporte e Trânsito – SMTT, em 2010, Maceió contava com uma frota de ônibus de aproximadamente 648 para 350 mil passageiros, em 2018 esse número subiu para 670 ônibus circulando na cidade. Segundo o Departamento Estadual de Trânsito - DETRAN/AL, o número de automóveis circulando pela cidade já chega em 305 mil; um número considerado alarmante para uma cidade no porte de Maceió, essa dependência de automóveis individuais traz a paisagem dos congestionamentos, o que nesta cidade já é visto em diversos pontos, como por exemplo a BR-104 – via de acesso do aeroporto, próximo a bairros como Santos Dumont e Benedito Bentes, locais de direcionamento dos programas Minha Casa Minha Vida.

De acordo com Scaringella (2001), a crise da mobilidade é algo presente desde do final dos anos de 1990, onde a média de um congestionamento passou de 40km para 120km, aliado a esse fator o aparecimento da "cidade clandestina" como ele nomeia, a cidade vista pelos morros e favelas, a cidade que depende de uma mobilidade irregular e ilegal para se locomover, já que não se pode apoiar no deslocamento público coletivo.

Ficando claro que a busca de solução não deve se concentrar no trânsito, mas no modo de planejamento urbano; Scaringella (2001), é claro ao apresentar que se existisse um Plano Diretor com uma política de uso e ocupação do solo, serviria como uma ajuda na racionalização do deslocamento. Atualmente em Maceió, ela cresce sentido norte, e a resposta da prefeitura para a mobilidade nessa zona nova da Cidade foi: Viadutos!

Esse modelo clássico A + B, não é suficiente quanto aos problemas da mobilidade urbana, para Scaringella (2001), a resolução da problemática vira com a ultrapassagem do olhar setorial e o alcance do envolvimento comportamental do usuário, alinhado a metodologias e recursos tecnológicos. Para o autor, neste ponto de complexidade é fundamental acabar com o abismo entre urbanistas, técnicos de transportes urbanos e os de trânsito, a racionalização das três políticas podem levar a dados de uso e ocupação do solo-transporte-trânsito, podendo desenvolver ações que levem ao aumento da oferta de infraestrutura, traçando uma organização da demanda de viagens.

3. Transporte urbano

Planejar o espaço urbano é um desafio, é preciso visualizar as cidades dentro de um panorama macro, e que todos seus pontos fragmentados estejam conectados enquanto uma rede de articulação urbana que trabalhe em por de uma Cidade justa e igualitária.

No entanto, o que se observa dentro da sociedade capitalista, são falas pontuais e individuais vindo dos mais variados espaços sobre o trabalho dentro de seu espaço urbano, a vivência democrática burguesa, propõe uma reprodução da alienação e a desarticulação da fala. A representação unilateral é imposta a maioria da população tida como analfabeta política, e é por isso que muitos textos teóricos explanam à vontade, com insumos tirados a partir de concepções próprias sobre o que a cidade quer/precisa.

Em 1950 a Cidade se pronunciou, e foi preciso a escuta ativa de uma jornalista para poder conversar com a Cidade; Jane Jacobs (1916-2006), com sua belíssima contribuição aos estudos urbanos; em Morte e Vida das Grandes Cidades, metamorfoseou o modo como as Cidades eram analisadas e trabalhadas. Para a autora, o espaço habitado é um grande laboratório, com tentativas de fracassos e sucessos e que o caos dos estudos urbanos era a escolha de teóricos, em desconsiderar a vida real; além de imporem as vontades humanas acima das vontades naturais da Cidade.

Ao estudar Maceió, é possível compreender como suas vontades e anseios foram deixados para trás, os processos instalados na capital em prol de acessos justos da mobilidade urbana pública, são no mínimo contraditórios. A disponibilidade e qualidade de abrigos (se entende por abrigo, a instalação provida pela SMTT dentro da cidade, localizada crescem.

Com a visão final da mais valia, os procedimentos de aumento do valor da terra adentram as questões da mobilidade e do transporte público, a faixa da orla de Maceió, recebeu nos últimos anos, abrigos exclusivos feitos de madeira, e os retirados foram destinados aos bairros de interesse social já citados neste artigo. As ordenas da "mão invisível do mercado", adentram em qualquer âmbito da sociedade capitalista, os órgãos públicos são dominados por vontades políticas e individuais, as tensões sociais são crescentes nos lugares com fragilidade social e urbana, invisíveis perante os olhos de uma sociedade elitista marcada por uma politica coronelista.

Conforme Leitão e Ferreira (2016), o tema da mobilidade não é apenas um caráter espacial, mas temporal também, visto que a dimensão do tempo gasto com a locomoção, segundo o Índice de Mobilidade, é um dos principais tópicos na hora da escolha do tipo de transporte; traçando um incentivo rodoviarista, ao qual não seria exagero dizer, que o privilégio dado politicamente ao modelo rodoviarista está associado à nossa tradição patrimonialista-clientelista, ao financiamento espúrio de campanha, e às grandes obras viárias. (LEITÂO; FERREIRA, 2016. P.38)

Ao questionar o poder público sobre a deficiência do transporte, em muitas revistas e jornais, a resposta será a falta de recursos, mas o que deixa aparente na precariedade do transporte público coletivo. E a luta pela mobilidade igualitária precisa ganhar força e destaque, pois medidas paliativas não levarão a Cidade a alcançar a qualidade de vida necessária. Precisa-se tirar o foco dos carros e motos e direcionar mais atenção aos transportes públicos coletivos.

De acordo com Quadros (2016), o gasto com o transporte vai além de pontos financeiros, mas também é o tempo; visto que aqueles que mora a longas distancias dos locais de trabalho, sofrem com engarrafamentos, espera, lotações, um – dois ônibus, metro; a expressão de uma grande parcela social. Devido a isso que em 2013, ocorreu uma manifestação pela melhoria do transporte público coletivo e a implementação da Tarifa Zero – projeto de lei, que propunha apresentar a população a garantia de acesso ao transporte sem custos. E uma cidade na Região Metropolitana de São Paulo conseguiu esse direito, a Cidade de Embu-Guaçu discutiu o nascimento do Sistema Único de Transporte – SUT e foi no governo da prefeita Luiza Erundina que o projeto de lei 381/1990, foi enviado a câmara, com o objetivo de criar o Fundo Municipal de Transporte – FUMTRAM, no entanto o projeto foi reprovado e não houve mais retornos.

A mobilidade enquanto Direito Social, só venho aparecer com a criação da PEC 90/11 da CF/88, agregando ao Artigo 6º, validando a ideologia do STU. Segundo Quadros (2016), a implantação traria benefícios sociais: a diminuição do tráfego automobilístico urbano, a qualidade de vida do usuário e o menor índice de poluentes. Assim como o SUS, o STU deve ser dever do Estado, e cabe a ele aperfeiçoar as ações desenvolvidas em prol da população – de forma geral; o Direito não é mercadoria e ele não deve ser encarado como tal.

Os processos recorrentes da mobilidade urbana, só ganharam destaque a partir de 2003 com a criação do Ministério da Cidades, que de fato proporão trabalhar sobre a ótica da política pública e integrar o transporte as legislações de uso e ocupação do solo. Neste mesmo ano, se vivenciou as mobilizações estudantis em prol do não

aumento das taxas de transporte, elas chamaram a atenção FNP – Frente Nacional de Prefeitos, que buscaram discutir a desoneração dos custos do transporte público, traçando alternativas que partissem do Estado, causando efeito no bolso dos usuários.

Segundo Ávila (2008), no mesmo período nascia o Movimento Nacional pelo Direito ao Transporte Público de Qualidade para Todos (MDT), que tratou de se apresentar como um movimento em prol da população, pressionando os poderes para atender suas exigências, e assim como o pobre era excluído das terras e se agregados em baixadas e cada vez mais, ele também era excluído do uso do transporte.

Foram essas e outras ações públicas que levaram ao Projeto de Lei 1.687/2007, que de acordo com Ávila (2008), vem com o objetivo de propor uma mudança institucional do que se conhece como mobilidade urbana, estabelecendo princípios, diretrizes e instrumentos "para que os municípios possam executar uma política de mobilidade urbana que promova o acesso universal à cidade e às suas oportunidades, contribuindo para o desenvolvimento urbano sustentável" (Ávila, 2008.p.17).

O direito social não deve ser comercializado enquanto mercadoria, a moral burguesa em sua essência é vazia, priorizando o lucro, sobrepõem a ética; Segundo Lessa e Tonet (2008), aos burgueses cabe estabelecer regras e leis que todos devem seguir e respeitar, uma recomendação vazia, visto que no âmbito pessoal, violará para o enriquecimento.

No ano de 2018, estudantes pararam o centro de Maceió, objetivando a redução da tarifa de transporte público, por meio de uma articulação coletiva pública, promovendo a percepção geral sobre os aumentos anuais das tarifas e como eles são providos de forças econômicas; e as resposta dos aumentos são a insegurança constante e a ausência de pensamentos em prol do coletivo. Visto que em reportagem ao Jornal de Alagoas, o órgão responsável pelo transporte público de Maceió, considera a implantação de um aplicativo de celular como "a busca de melhorias para o transporte público" , já que todos os cidadão possuem tal aparelho, ou seja, todos os que se fazem presente da cidade formal. Na forma em que, os invisíveis são mascarados e novamente esquecidos e a não cidade, é reproduzida.

Ao fim fica claro, o quanto os condicionantes inerentes à primeira vista conectam a todos os passos dentro da Cidade, que vista sobe a ótica do capital, priorizará o enriquecimento e apropriação, o individualismo ganhará a corrida. A cidade conduzida pelos olhos cansados dos trabalhadores, lhe mostrará, as mazelas e toda a desigualdade social, causada pelo uso e ocupação do solo distribuído pensando de forma econômica.

Será que haverá um meio termo dentro da sociedade capitalista? Poderá apresentar um lapso de tempo, em que a economia cresce e os homens trabalhem cole-

tivamente, sem se impor, sem dominar e escravizar o próximo. Tempos em que a terra seja distribuída por igual, que a cidade possa ser planejada de forma sistêmica e harmônica e não fracionada.

E com tudo isso, fica claro o quanto a segregação espacial influência nos dizeres urbanos e a que a solução para a famosa crise da mobilidade, dos altos tráfegos e congestionamento, não aparecerá magicamente, após a abertura de vias, de viadutos, e túneis; é preciso compreender que o automóvel não deve ser o centro do planejamento urbano.

Referências

ALMEIDA, Luiz Sávio de. Traços e troças: literatura e mudança social em Alagoas – Estudo em homenagem a Pedro Nolasco Maciel. Maceió: EDUFAL, 2011.

CAVALCANTI, Débora de Barros. Lutando por um lugar na cidade de Maceió, Brasil. GEO UERJ: 2017.

GOMIDE, Alexandre de Ávila. Agenda governamental e o processo de políticas públicas: o projeto de lei de diretrizes da política nacional de mobilidade urbana. 2008. Disponível em:<http://www.ipea.gov.br/portal/index.php?option=com_content&view=article&id=4891>. Acesso em: 15 de abril de 2018.

GEHL, Jan. Cidade para pessoas; tradução Anita Di Marco. 3 edº. São Paulo: perspectiva, 2015.

GORENDER, Jacob. Gênese e desenvolvimento do capitalismo no campo brasileiro. In: STEDILE, João Pedro. A questão agrária no Brasil: o debate na década de 1990. 2 edº São Paulo: Expressão Popular, 2013. P.19-53.

HARVEY, David. A produção capitalista do espaço. São Paulo: Annablume, 2005.

HOLANDA, Sérgio Buarque de. Raízes do Brasil. 26 edº. São Paulo: Companhia das Letras, 1995.

JACOBS, Jane. Morte e vida de grandes cidades; tradução Carlos S. Mendes Rosa. 3 edº. São Paulo: Editora WMF Martins Fontes, 2011.

MACIEL, Osvaldo B. A. Filhos do trabalho, apóstolos do socialismo: os tipógrafos e a construção de uma identidade de classe em Maceió (1895/1905). Dissertação de mestrado. Universidade Federal de Pernambuco. 155 p. Recife – PB. 2004.

MARICATO, Erminia. O impasse da política urbana no Brasil. 3º ed. Petrópolis, RJ: Vozes, 2014.

LEITÃO, Karina Oliveira; FERREIRA, João Sette Whitaker. O direito à cidade: para além de uma visão instrumental e pela dimensão espaço-temporal da disputa pela mobilidade. p.33 -40. In ALMEIDA, Evaristo. Mobilidade urbana no Brasil. São Paulo: Editora Fundação Perseu Abramo, 2016.

LESSA, Sérgio; TONET, Ivo. Introdução à filosofia de marx. 1º ed. São Paulo: Expressão Popular, 2008.

PIMENTEL, Karin Daniele de Araújo. Segregação espacial: à margem do concreto, do urbano e do direito. Disponível em: http://luizsaviodealmeida.blogspot.com/2015/10/karen-daniele-de-araujo-pimentel.html. Acesso em: 23 abril de 2018.

QUADROS, Meire. Sistema único de transporte (STU): o ponto de vista do usuário. In: ALMEIDA, Evaristo. Mobilidade urbana no Brasil. São Paulo: Fundação Perseu Abramo, 2016. P. 344-346.

RIBEIRO, Luiz Cesar de Queiroz. Dos cortiços aos condomínios fechados: as formas de produção da moradia na cidade do Rio de Janeiro. 2ºed. Rio de Janeiro: Letra Capital, 2015.

RESENDE, Paulo Tarso Vilela de; SOUSA, Paulo Renato. Mobilidade urbana nas grandes cidades brasileiras: um estudo sobre os impactos do congestionamento. 2009. In: FDC – Fundação Dom Cabral. Caderno de ideias CI0910.

SANTOS, Milton. A urbanização desigual: a especificidade do fenômeno urbano em países subdesenvolvidos. 3º ed. São Paulo: Editora da Universidade de São Paulo, 2012.

SANCHES, Carolina. Frota de veículos cresce 12% em dois anos em Alagoas. In: G1. Disponível em: <http://g1.globo.com/al/alagoas/noticia/2017/01/frota-de-veiculos-cresce-12-em-dois-anos-em-alagoas-diz-detran.html>. Acesso em:26 de maio de 2018.

SCARINGELLA, Roberto Salvador. A crise da mobilidade urbana em São Paulo. Disponível em:<http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0102-88392001000100007>. Acesso em: 15 de abril de 2018.

6.2 A terra viva: o uso da técnica da constelação sistêmica na hipótese Gaia

Caroline Vieira Ruschel

Abstract

This paper is a result of a transdisciplinary legal research, which sought to respond the following question: could the Systemic Constellations (HELLINGER, 2001) help in the resolution of environmental conflicts? The case study revealed a deviant aspect. Nonetheless, it was able to prove a hypothesis that has long been debated, in an interdisciplinary manner, within different branches of science: the Gaia hypothesis (LOVELOCK, 2006), which detected that the planet Earth is self-organized and that it only maintains its balance because it is a living system. This hypothesis is viewed differently by various scientists. However, using new scientific paradigms, such as the uncertainty principle and the observer's influence on the observed object (HEISENBERG, 1995; 1996), the autopoiesis (MATURANA; VARELA, 2001), the morphic fields (Sheldrake, 1995; 2013; 2014) and the phenomenological research developed by Hellinger (2001), it is perceived that, through systemic constellations, the human being can access the morphic field of planet Earth. That result can prove the Gaia hypothesis. This paper sought, therefore, to investigate if the "self-organizing Earth" theory could be proven through the Systematic Constellation technique. The method used was the abductive (PEIRCE, 1986), with hypothetical inference that by proving that something can be, creates new explanatory hypotheses, not previously contained in the premises.

Keywords: Gaia Hypothesis. Systematic Constellation. New scientific paradigms.

1. Introdução

Este trabalho originou-se de uma pesquisa jurídica transdisciplinar, que procurava verificar o seguinte problema de pesquisa: as constelações sistêmicas, difundidas por Bert Hellinger, poderiam auxiliar nas resoluções de conflitos ambientais?

Com o estudo de caso, percebeu-se um aspecto desviante, mas que poderia comprovar uma hipótese que há muito tempo vem sendo debatida de forma interdisciplinar nos diversos ramos da ciência: a hipótese Gaia, de James Lovelock (2006), que detectou que o planeta Terra é auto-organizador e que a Terra somente mantém o equilíbrio porque é um sistema vivo.

O método de abordagem utilizado será o abdutivo, já que o trabalho não pode ser classificado apenas com o método dedutivo, que parte de uma premissa geral e extrai uma conclusão já contida nas premissas, e nem indutivo, que não consiste em descobrir ou criar algo de novo, mas, sim, de confirmar uma teoria através da experimentação, partindo de premissas específicas. Charles Sanders Peirce (PEIRCE, 1986) propõe uma lógica abdutiva que é uma inferência hipotética (um lampejo, uma ideia, um ato de insight) que, provando que algo pode ser, cria novas hipóteses explicativas, não contidas nas premissas (FELIX, 2018).

Segundo Pinto (1995), a abdução engloba dedução e indução. Com a dedução, o fato de ter a regra geral como premissa inicial; como a indução, arrisca um palpite que pode dar errado. "A abdução está entre a indução e a dedução. No entanto, ela difere das duas pela maior possibilidade de erro implícita na hipótese que ela lança, porque é fácil perceber como, tanto a indução quanto a dedução, estão baseadas na experiência" (PINTO, 1995). Mesmo assim, segundo Peirce (1986), o raciocínio abdutivo é típico das descobertas científicas revolucionárias.

Nesse sentido, o trabalho parte de uma premissa dedutiva com a apresentação do conceito de hipótese Gaia e dos Campos Morfogenéticos e ao final, utiliza o estudo de casos com o uso da técnica[1] de constelação familiar em conflitos de direito ambiental e da possibilidade do acesso aos campos mórficos, fato que demonstra a linha de raciocínio abdutivo do presente trabalho.

Para tanto, começaremos com os referencias teóricos e suas pesquisas, em especial James Lovelock (2006) e Rupert Sheldrake (1995; 2013; 2014a), para em seguida expormos a técnica das constelações sistêmicas. Ao final, traremos a análise sobre a possibilidade do acesso aos campos mórficos dos seres vivos não humanos do planeta terra. Nesse sentido, estudamos as Constelações Familiares nos casos de conflitos jurídicos, dentro do Estado de Santa Catarina, bem como material audiovisual específico de sessões de constelações realizadas sobre as Unidades de Conservação da Área de Proteção Ambiental (APA) Baleia Franca. Importante mencionar que neste capítulo, uma linguagem terapêutica própria da técnica será utilizada, reproduzindo de forma fidedigna a experiência e os resultados encontrados.

2. Referencial teórico

2.1. A hipótese gaia

Lovelock (2006), na década de 60, era um dos pesquisadores da NASA que pesquisava sobre a vida em outros planetas. Nessa pesquisa, ele e seu colega Dian Hitchcock, propuseram a análise da composição química da atmosfera dos planetas com a hipótese que, se os gases da atmosfera estivessem em equilíbrio químico, provavelmente esse planeta poderia ser considerado morto. No entanto, se a atmosfera estivesse fora de um equilíbrio químico, este fato sugeriria a presença de vida, já que os organismos vivos são obrigados a fazer parte do ar como fonte de matéria prima.
Ao examinar como era a atmosfera da Terra, Lovelock percebeu sua instabilidade e nesse momento vislumbrou a hipótese de Gaia (LOVELOCK, 2006, p. 21-26):

A atmosfera da Terra era uma mistura de gases extraordinária e instável e, no entanto, eu sabia que sua composição se mantivera constante ao longo de períodos de tempo bastante extensos. Poderia ocorrer que a vida na Terra não apenas formasse a atmosfera, mas que também a regulasse – mantendo-a em uma composição constante e em um nível favorável para os organismos? (LOVELOCK, 2006, p. 22).

Nesse sentido, Lovelock (2006) passou a estudar o que ele chamou de uma explicação químico-bio-geo-cibernética da vida na Terra, reconhecendo que a sua atmosfera é um sistema aberto, afastado do equilíbrio, caracterizado por constante fluxo de energia e matéria e como um sinal revelador de vida, conforme identificado por Prigogine na mesma época. Ele passou a denominar tal campo de estudo de geofisiologia, ou seja, a maneira como a Terra viva funciona. Segundo o Lovelock (2006, p. 26), "a geofisiologia ignora as divisões tradicionais entre as ciências da Terra e as da vida, que concebem a evolução das rochas e a evolução da vida como duas ciências separadas". Desta forma, reconhece esses dois processos "como uma única ciência evolutiva que, quando adequadamente estudada, pode explicar eficazmente a história de todo o planeta" (LOVELOCK, 2006, p. 26).

Como é que a Terra mantém uma composição atmosférica tão constante se esta é composta de gases altamente reativos? Até que ponto uma atmosfera instável poderia ser adequada em composição para a vida? Foi então que comecei a imaginar que talvez o ar não fosse apenas um meio ambiente para a vida, mas também uma parte da própria vida. Em outras palavras, parecia que a interação entre a vida e o ambiente, da qual o ar é uma parte, era tão intensa que o ar poderia ser considerado como uma pele de gato ou o revestimento de um ninho de vespas: sem vida, mas feito por seres vivos para suportar um dado ambiente (LOVELOCK, 2001, p. 87).

O termo "Gaia" surgiu somente na década de 70, por sugestão do romancista Willian Golding, em homenagem a deusa da Terra, Gaia, da mitologia grega. A hipótese Gaia vem sendo ignorada pelos cientistas, ao invés de criticada. Segundo Lovelock (2001; 2006), os geoquímicos acreditam que embora existam alterações na composição da Terra, estas são passivas e não constituem um tipo de controle.

Para ficar mais fácil a visualização, o físico americano Jerome Rothstein fez uma analogia com a sequoia, árvore gigante existente na Califórnia, que possui mais de 97% de sua estrutura morta e apenas 3% viva, que corresponde a delgada camada circunferencial de células vivas que envolve a madeira e fica sobre a casca, assim como as folhas, flores e semente, mas que constituem uma fração muito pequena de massa da árvore (LOVELOCK, 2006, p. 31 - 32). Segundo Lovelock (2006, p. 31 - 32), "a sequoia gigante assemelha-se a Gaia porque a Terra também é formada por uma enorme massa de matéria morta, com uma delgada camada de organismos vivos encerrados dentro de uma pele transparente e protetora de ar".

Em suma, a Terra somente mantém o equilíbrio porque é um sistema vivo. Não há como dizer quem veio primeiro, se a vida ou as condições para a vida. O ar é ao mesmo tempo uma parte da própria vida e uma condição para a vida. A interconexão entre todos os seres do planeta, vivos ou não, é o que mantém as condições ideais para que a vida aconteça. Desta forma, percebe-se que este experimento nos mostra que somos uma unidade e que há uma interconexão entre todos os seres que aqui habitam.

2.2. A teoria dos campos

Os campos mórficos, tais como os campos da física, são regiões não materiais de influência que se estendem no espaço e se prolongam no tempo. Isto quer dizer, que todos os seres, inclusive os humanos, possuem uma mesma memória coletiva e que todos, sem exceção, também contribuem para essa memória coletiva (SHELDRAKE, 1995, p. 14).

São os campos mórficos que auxiliam para que as pessoas aprendam, cada vez mais fácil e rápido aquilo que um número importante de indivíduos já tenha aprendido antes, como a linguagem, o andar de bicicleta, as habilidades com computadores e tablets. Sheldrake (1995) batizou essa hipótese de causalidade formativa, que "sugere que a natureza das coisas depende de campos, os campos mórficos" e que cada tipo de sistema natural possui o seu tipo de campo. Por sua vez, estes campos "moldam os diferentes tipos de átomos, de moléculas, de cristais, de organismos vivos, de sociedades, de costumes e de hábitos de pensamento" (SHELDRAKE, 1995, p. 15).

Quando um sistema organizado particular deixa de existir – quando um átomo é desintegrado, quando um floco de neve se derrete, ou quando um animal morre – o seu campo organizador desaparece do lugar específico onde existia o sistema. Mas, em um outro sentido, os campos mórficos não desaparecem: são padrões de influência organizadoras potenciais, susceptíveis a se manifestarem fisicamente de novo, noutros tempos, noutros lugares, por todo o lado, onde e sempre que as condições físicas forem apropriadas. Quando é este o caso, encerram uma memória das suas existências físicas anteriores (SHELDRAKE, 1995, p. 15).

O processo pelo qual o passado se torna presente dentro do campo mórfico chama-se "ressonância mórfica" e "implica a transmissão de influências causais formativas através do espaço e do tempo. A memória no seio dos campos mórficos é cumulativa e é essa a razão pela qual todas as espécies de fenômenos se tornam cada vez mais habituais por repetição" (SHELDRAKE, 1995, p. 15).

Assim sendo, vemos a ciência novamente induzindo a pensar na criação de novas alternativas para a resolução de conflitos dentro do poder judiciário. A crise dentro dessa esfera existe, pois as ações tomadas e os processos existentes se baseiam única

e exclusivamente em paradigmas científicos ultrapassados. É preciso incluir a complexidade dentro das ações que já existem para a construção de um poder judiciário que de fato dirima conflitos entre pessoas e entre elas e o Meio Ambiente.

Em suma, os campos mórficos manifestam-se e evoluem no tempo e no espaço e são influenciados por aquilo que aconteceu efetivamente no mundo. Os campos mórficos são encarados num espírito evolucionista, ou seja, eles têm influência sobre formas, escolhas e padrões de uma determinada organização de indivíduos (SHELDRAKE, 1995, p. 9 - 16).

As Constelações Sistêmicas auxiliam ao acesso ao campo morfogenético humano e, com as pesquisas desenvolvidas neste trabalho, demonstraram ser possível o acesso aos campos mórficos também dos seres vivos não humanos, conforme veremos a seguir.

2. O planeta terra auto-organizador e o acesso ao campo morfogenético por meio das constelações sistêmicas

2.1. Origem, conceito, leis universais norteadoras

As constelações sistêmicas, também conhecidas como constelações familiares tiveram sua origem sob diferentes influências da ciência, e da medicina psiquiátrica, com Sigmund Freud, Carl Gustav Jung e Jacob Moreno, dentre outros[2]. Bert Hellinger não foi o precursor das constelações familiares, mas auxiliou na difusão da técnica no mundo inteiro, após conhece-la através de Ruth Mc Clendon e Les Kadis (VIEIRA, 2017, p. 62).

Entende-se por constelações familiares ou constelações sistêmicas uma técnica ou um método terapêutico, que tem como objetivo esclarecer a conexão que existe entre os membros de uma família por meio da ressonância mórfica e que, normalmente, está emaranhado em seu campo familiar, com a capacidade de mostrar o diagnóstico de determinado conflito. Ela busca a causa do problema, mostrando para a pessoa que pretende resolver o seu conflito como ela deve agir, qual a postura que ela deve assumir, para ficar mais próxima de uma solução.

Elas podem ser conduzidas em grupo, com o auxílio de outras pessoas, ou individualmente, com a ajuda de bonecos. Segundo Hellinger (2008, p. 11), nas constelações em grupo "o participante escolhe outros integrantes do grupo para representar os membros de sua família, colocando-os no recinto de modo que as posições relativas de cada um reproduzam as da família verdadeira".

Desta maneira, os participantes passam a ser modelos vivos do sistema familiar da pessoa a ser constelada. Conforme Hellinger, (2008, p. 11) "o mais incrível é que, se a pessoa coloca a sua 'família' com toda autenticidade, os representantes passam a sentir e a pensar de modo muito parecido com o dos membros verdadeiros, mesmo sem conhecimento prévio".

Adhara Campos Vieira define as constelações familiares como:

> Técnica terapêutica breve, orientada para soluções, que visa reincluir pessoas excluídas de um sistema, reconciliar partes dessa rede em conflito e reordenar as estruturas de ordem do sistema observado. É baseada nas leis sistêmicas ou ordens do amor, sintetizadas por Anton Suitbert Hellinger, conhecido atualmente como Bert Hellinger, a saber: 1) vínculo, relativo ao direito de pertencimento; 2) ordem, relacionada à hierarquia; e 3) equilíbrio, referente às trocas nas relações, sejam elas, parentais, fraternas ou conjugais, se familiares e societárias ou de subordinação, se vinculadas a estruturas organizacionais (VIEIRA, A. C., 2016. p. 13).

As constelações familiares apoiam-se nos 3 princípios ou leis acima[3] que devem ser respeitados para que o sistema permaneça em harmonia: o equilíbrio, o pertencimento e a ordem. Importante destacar que estas leis não foram criadas ou descobertas por Hellinger como muitos pensam (VIEIRA, A. C., 2016, p. 15). Hellinger, precursor da técnica das constelações familiares, baseou-se em análises empíricas e em trabalhos científicos que já vinham dando resultados em terapias familiares, concluindo que estas três leis devem ser respeitadas.

Segundo Hellinger,

> Em todos os nossos relacionamentos, as necessidades fundamentais atuam umas sobre as outras de maneira complexa: 1) a necessidade de pertencer, isto é, de vinculação; 2) a necessidade de preservar o equilíbrio entre o dar e receber; 3) a necessidade da segurança proporcionada pela convenção e previsibilidade sociais, isto é, a necessidade de ordem (HELLINGER, 2008, p. 16).

O fato desviante é que tal técnica transdisciplinar utilizada por Hellinger por mais de 40 anos, auxiliou na comprovação daquilo que Sheldrake (1995) vinha observando no campo das ciências naturais e o que Lovelock (2001; 2006) demonstrou com a hipótese Gaia, de que a terra é auto-organizada e que a vida na terra contribui para as condições da própria vida. Abaixo fizemos uma apresentação de um estudo onde tal técnica foi utilizada.

No entanto, dentre os vários instrumentos que vêm sendo utilizados de forma transdisciplinar, temos a constelação familiar que nos auxilia a acessar o 'campo' e precisamos testá-la, para ver se ela pode ser utilizada nos conflitos ambientais. Precisamos dar início a essa caminhada que aparenta ser utópica, verificando as vias que ela nos proporcionará.

Escolhemos um caso para apresentarmos neste trabalho tendo em vista a limitação do espaço. Convidamos a consteladora familiar Gicelma Lima, para fazer a experiência. Convidamos servidores do Estado (FATMA), Prefeitura de Florianópolis e moradores locais. Também convidamos pesquisadores da UFSC e do IFSC (Garopaba) para participarem do experimento. Os trabalhos foram realizados em outubro de 2017,

na presença da pesquisadora Caroline Vieira Ruschel. Além disso, foram realizadas filmagens com consentimento de todos os participantes, desde que tais filmagens não fossem divulgadas para fins não científicos. O relato dos casos foi baseado no filme realizado.

Importante esclarecer, ainda, que a linguagem utilizada não é científica. Apresentamos, na integra, o relato do que aconteceu na experiência, sem alterar uma palavra. As transcrições literais das falas foram mantidas entre aspas e em itálico. Em um primeiro momento, aparenta um jogo teatral em que todos acham que sabem tudo. No entanto, não podemos esquecer que estamos falando de novos paradigmas científicos, de transdisciplinaridade, onde acessamos, com as ferramentas adequadas, outros níveis de realidade. Por esta razão, todas as falas, ações, emoções das pessoas participantes, bem como da consteladora familiar, refletiram o acesso ao campo de informação (ressonância mórfica) dos casos analisados, também estudado no início desse trabalho.

2.2. Relato de Experimento: APA da Baleia Franca

A consteladora coloca vários representantes para as baleias, já que o objetivo da APA é a proteção da baleia franca. Ao pedirem para as baleias olharem para a representante da lei, elas mencionam que não é bom olhar para a legislação. A consteladora então pede para as baleias falarem para a representante da lei: "Por quê?". A representante da lei fica tonta e não consegue olhar para as baleias.

A consteladora menciona: "Então gente, aquilo que é da natureza é muito maior [...]. Por mais que a gente queira enquanto humanos, colocar ordem, elas [baleias] são maiores, entende? Quando vocês olharem mais para as baleias, as leis perdem força."[4] O representante da lei abraça, já no chão, o representante do conflito. O representante do poder também vai para o chão. A consteladora menciona: "Olha que interessante gente, os conflitos, a leis e o poder do Estado..., não tem força nenhuma" frente às baleias. O representante do conflito ficou de costas para as baleias, demonstrando que os conflitos são humanos e não tem nada a ver com as baleias. O representante do Estado menciona que "eu estava mais preocupado com as leis".

A consteladora pede para o representante do Estado falar: "Até hoje, de fato, eu nem enxergava vocês. Talvez eu nem conheça vocês. Mas o meu papel aqui é criar leis". Uma das baleias menciona que ficou enjoada com essa colocação do Estado. A consteladora pede para o representante do Estado falar: "Queridas baleias, é bem difícil ficar nesse lugar onde estou. Muitas vezes, não sei para onde estou indo. Apenas executo". Quando o representante do Estado fala, o representante do conflito perde força e o representante das leis sente-se um pouco melhor.

Então a consteladora pede para que o representante da lei fale para o representante do Estado: "Quando eu sou criada eu tenho força, mas quando eu olho para elas [ba-

leias], eu enfraqueço. Elas são muito maiores". O representante do conflito começa a chorar. A consteladora pergunta se os representantes das baleias querem virar de costa para os seres humanos e eles respondem que não. A consteladora fala: " Vocês amam os seres humanos, né?". Pede então para as baleias falarem: "Aqui tem amor, muito amor e respeito, muitas vezes nós não compreendemos, o porquê".

O representante do conflito menciona que é tudo tão pequeno perto da natureza que está atrás dele. "Parece que lá atrás é tão grande, divino... e aqui... tão pequeno". A consteladora coloca, então, mais dois representantes, uma para a ordem e o outro para o cuidado. Nesse momento o representante do Estado levanta, ganha força. O representante da lei diz que tem vontade de ir até o representante da ordem, mas que não tem forças.

A consteladora fala: "Existe um bom propósito, mas talvez, não esteja sendo aplicado da forma correta". Umas das representantes das baleias fala: "Gente, deu pena [dos seres humanos]". A consteladora explica: "Tanto que as leis enfraquecem! Não existe conflito quando a gente compreende que eles tentam ter cuidado. Porém, quando você cria a lei, você quase que provoca o ser humano, para ele pegar o que é preservado". Outro pesquisador fala: "A lei já vem do conflito". E a consteladora exclama: "Exato!".

A consteladora então faz uma fala de que quando os seres humanos usam da natureza, eles têm um objetivo[5], no sentido de que ambos estão em interdependência. Vida e morte para que a vida continue.

Pede para as baleias falarem: "Obrigada! Nós seguimos com a nossa espécie e desejamos sucesso em vossas experiências". As baleias, diante das leis, enfraquecem. A consteladora fala: "Os conflitos são uma tentativa do humano de sobrevivência. A tentativa de colocar uma ordem". O representante do conflito diz que está se sentindo mal, então a consteladora pede para as baleias sentarem e menciona que agora vai olhar para o que há de verdade em relação ao conflito. O representante do Estado menciona que se sente cansado antes de começar o trabalho. O representante da ordem e do cuidado estão bem. As baleias ficam alheias ao conflito. A consteladora fala: "Onde fica pesado? Nos conflitos, nas leis e no Estado". O representante do conflito menciona que quer entrar em um buraco. Um dos participantes menciona: "Que é o que o que a sociedade faz, esconde os seus conflitos".

A consteladora pede para o representante da ordem exclamar para o representante do conflito: "Você também faz parte, está tudo bem pra mim. Através de ti, eles [seres humanos] crescem, eles compreendem e eles aceitam a beleza que é estar na vida".[6] Ao colocar um representante para a justiça, os representantes do Estado e das leis sentem-se melhor. Ao colocar um representante para o sucesso, ou seja, um representante para a resolução do conflito, a lei fica pesada e o representante de todas as baleias que morreram, que entrou no campo depois e olhou para o cuidado, fica muito emocionado.

Os representantes das leis e do Estado querem empurrar o sucesso. O representante do Estado empurra o sucesso e fala: "Eu não gosto quando você chega. Parece que, aí sim, eu tenho a certeza que eu não sei o que estou fazendo. E eu quero fazer o melhor". O representante do conflito levanta com essa fala e sai. A consteladora coloca dois representantes para o equilíbrio. O representante das leis diz gostar do equilíbrio, mas o representante do Estado diz que ficou com medo, achando que o equilíbrio iria atacar. O representante do Estado vai para o lado da justiça.

Então a consteladora mostra a ordem que se estabelece: o cuidado vai para perto das primeiras baleias que morreram e que fizeram com que os seres humanos se movimentassem para a sua proteção. Depois a consteladora pede para o representante do Estado (que está sentindo-se mal) falar para o representante das baleias que morreram: "Eu sinto muito! Mesmo! [ele fala muito emocionado]. Eu só estava tentando sobreviver e ser justo com a minha família. Eu estou aprendendo a aceitar que este é o movimento da vida! Em detrimento da tua morte, a minha sobrevivência. E agora eu compreendo que esse é o meu sucesso também. Então eu fico em paz. Que a tua espécie siga viva conosco, com a minha família também.

A consteladora pede para o Estado olhar para todos e menciona: "A origem dos conflitos está naqueles que a gente perdeu. Então quando conseguimos olhar com amor para tudo, o sucesso pode chegar".

A consteladora pede para o sucesso falar: "Obrigada, todos vocês merecem estar aqui. Tomem o meu amor, tomem o cuidado, que vai dar tudo certo! Todas as espécies têm um bom lugar, como vocês todos". O representante do sucesso, ao olhar para o representante das baleias mortas, sente muita dor. A consteladora diz que "Foram essas mortes que nos movem a lutar pela preservação das baleias, dos nativos... na verdade é pelas tristezas que foram geradas. Mas aqui tem algo muito maior, que é o destino. O destino é muito maior que nós. E quando a gente olha com respeito para os destinos, inclusive eles [espécies ameaçadas e mortas] ficam em paz".

O Estado quer pegar o conflito de volta. A consteladora pede para o Estado falar: "Eu estou aprendendo a viver sem vocês! Oi conflito, eu preciso te falar, por enquanto, tu ainda é minha força, só contigo conflito, que eu consigo seguir".

Pede para os representantes das baleias mortas falar para o Estado, que representa a tentativa de zelo, cuidado e ordem: "Enquanto vocês precisarem do conflito para terem um valor, muitos serão como eu, vítimas". A consteladora então explica que:

> "Não existem vítimas, existe um destino. Se conseguirmos olhar com respeito para o destino, aceitamos o nosso destino. O nosso grande problema é querer sempre potencializar as vítimas e culpar alguém".

No fim, a consteladora pede para o representante das espécies mortas - aqui esse representante se confunde com todas as vítimas humanas ou não - agradecer ao representante do Estado. O representante das vítimas não consegue dizer e pergunta porque ele deve agradecer. A consteladora responde que é porque o Estado está tentando fazer algo. Mesmo de forma errada o Estado tenta resolver. A consteladora então mostra o valor de todos que estão ali naquele momento, tentando fazer algo pelo Recursos Naturais Comuns que são de todos. Nesse ponto, a constelação se desdobra e sai do caso da APA da Baleia Franca, encerrando-se.

3. Considerações finais

Com o presente trabalho, demonstra-se que é possível acessar o campo morfogenético dos seres vivos não humanos e do planeta terra. Conforme verificado no experimento apresentado, os seres humanos não só conseguem acessar o campo mórfico, mas perceber a inter-relação entre todos os seres, em consonância com a Hipótese Gaia de James Lovelock, de que todas as formas de vida auxiliam nas condições para a vida no planeta.

Notes:
[1] Por falta de um termo melhor para definir o que ocorre nas vivências de constelação familiar, utilizaremos a nomenclatura 'técnica'. No entanto, o termo deve ser entendido dentro do contexto da complexidade, de forma transdisciplinar, dialógica, recursiva e hologramática, pois não há um passo a passo lógico e linear para condução das constelações familiares.
[2] Para maior informações sobre a origem das constelações familiares ver 'A constelação sistêmica no judiciário', de Adhara Campos Vieira (2017).
[3] Hellinger classificou como "lei", pois não importa se o indivíduo a conhece ou não. Ela irá atuar indistintamente a todos (CASTRO, 2017, p. 48).
[4] Aqui o que se percebe é que os seres humanos estão desconectados da natureza e por isso precisam impor com as leis. A frase da consteladora remete ao fato de que se os seres humanos voltarem a se conectar de fato com a natureza e com o seu propósito enquanto humanos, automaticamente as leis perdem força, ou seja, deixam de ser necessárias.
[5] Recordamos aqui dos ensinamentos de Maturana e Varela (2001), qual seja, cada um percebe o mundo conforme suas experiências. Muitas vezes o que é errado para um é o mais correto para o outro. Aqui fica clara a postura do não julgamento.
[6] Em um movimento de inclusão dos conflitos.

Referências

FELIX. Luciane. Charles Sanders Peirce – A Lógica Pragmática. Conhecimento sem fronteira: artigos de filosofia. Disponível em: <https://goo.gl/nVLDTS>. Acesso em: 07 jan. 2018.

HEISENBERG, Werner. Física e Filosofia. Brasília: Ed. Universidade de Brasília, 3. ed.,1995.

_____. A parte e o todo: encontros e conversas sobre física, filosofia, religião e política. Rio de Janeiro: Contraponto, 1996.

HELLINGER, Bert. Ordens do amor: um guia para o trabalho com Constelações Familiares, São Paulo: Cultrix, 2001.

_____. A simetria oculta do amor. São Paulo: Cultrix, 2008.

_____. O amor do espírito. Tradução: Tsuyuko Jinno – Spelter, Lorena Richter, Filipa Richter. 2. ed. Goiânia: Atman, 2011a.

_____. Amor à segunda vista. Goiânia: Atman, 2011b.

_____. Um lugar para os excluídos. Belo Horizonte: Atman, 2014a.

_____. Pensamentos a cominho. Belo Horizonte: Atman, 2014b.

LOVELOCK, James. Gaia: um modelo para a dinâmica planetária e celular. In: THOMPSON, William Irwin. Gaia: uma teoria do conhecimento. São Paulo: Gaia, 2001.

_____. Cura para um planeta doente. São Paulo: Cultrix, 2006.

_____. Gaia: alerta final. Rio de Janeiro: Intrínseca, 2010.

MATURANA, Humberto; VARELA, Francisco. A árvore do conhecimento: as bases biológicas da compreensão humana. São Paulo: Athena, 2001.

MORIN, Edgar. Introdução ao pensamento complexo. Porto Alegre: Sulina, 2005a.

PEIRCE. Charles Sanders. Semiótica e filosofia. São Paulo: Cultrix, 1986.

PINTO, Júlio. 1, 2, 3 da Semiótica. Belo Horizonte: UFMG, 1995

SHELDRAKE, Rupert. A presença do passado: A ressonância mórfica e os hábitos da natureza. Brasil: Instituto Piaget, 1995.

_____. Uma nova ciência da vida. A hipótese da causação formativa e os problemas não resolvidos da biologia. São Paulo: Cultrix, 2013.

_____. Ciência sem dogmas: a nova revolução científica e o fim do paradigma materialista, São Paulo: Cultrix, 2014a.

VIEIRA, Adhara Campos. A constelação sistêmica como política pública para a resolução de conflitos. Rev. Fórum Trab., Belo Horizonte, v. 5, n. 22, p. 09-29, jul./set., 2016.

_____. A constelação sistêmica no Judiciário. Belo Horizonte: Editora D'Plácido, 2017.

6.3 Adaptation and resiliency to economic tough times by low income families in southwestern Nigeria

Bridget Itunu Awosika

Abstract

The contemporary Nigerian family faces serious threat from unemployment, low income and economic tough time resulting hunger and youth restiveness which threatened the family. This paper sought to find out the causes, effects and coping strategies of low income families in South Western Nigeria. Seven hundred and twenty (720) low incomes public servants and private business operators in the Southwest of Nigeria were chosen using the stratified random sampling technique to respond to a questionnaire on demographic situations, income, family economic copying strategies. The instrument was given face and content validation and used for data collection. Collected data were analyzed using simple frequency counts and percentages. The results showed that 24%, 18%, 22%, 28% and 16.5% of the respondents practiced home gardening, food preservation, co-operative buying, renovation, simple mending and poultry farming respectively. It also revealed that only 26% had the opportunity of skill acquisition during their school days, while 74% agreed to acquire skills to augment the family income if such opportunities were available. Findings from the study were discussed in line with existing literatures and it was concluded that skill acquisition and usage of identification 'special aptitudes' of family members could be invested in to empower families for improved income, quality living and family sustenance. The paper recommended that old skill acquisition centers be rejuvenated and upgraded to create avenues for in-service skill acquisition opportunities for low income earners as additional sources of income, for self-reliance and family sustenance. It was also recommended that compulsory Family Life Education (FLE) is introduced into the Junior and Senior Secondary School Curriculums to lay the foundation for future family life skills and family sustenance strategies.

Key words: Family, Economic Downturn, Adaptation and Resiliency, Empowerment.

1. Introduction

The Webster's New World College Dictionary, defines the family as a social unit consisting of partners (husband and wife), children born or adopted by such parents, uncles, aunts, cousins, relatives and all those who claim descent from a common ancestor. According to Awo (2009), the family is a basic social institution, the smallest and personal of all social groups; made up of persons united by ties of marriage, blood

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or adoption and characterized by common residence and economic cooperation. The family which is started by a man and his wife has basic functions of socialization, reproduction, transfer of cultural norms, values and family standards to impart into its members while the members reciprocate by living above board in the upliftment of family ethos and values as good ambassadors at home and abroad. Suffice is to say that social experiences of adolescents and youth associations, peer groups, school experiences and other social interactions with their impact on later civic attitudes and experiences have their foundations laid in the family. The core values of social capital such as norms of reciprocity and generalized trust, which are the traits acquired early in life from within families remain stable throughout one's lifetime and are predictive of stable and successful adult relationship formation and secured bond as parents with children (Stolle & Hooghe, 2004).

In a typical Nigerian family, the woman is seen as the 'home maker/keeper' who sees to the welfare of the entire household in unison with her spouse. Apart from sharing joy, experiences, affection and companionship, the welfare of any household including good food, comfortable and safe shelter, adequate functional clothing, adequate and safe healthcare services and schooling are at the auspices of home makers. That is why the situation in families where needs cannot be met usually results in conflicts and threatened become break-up if not properly handled. Causes of family conflicts are many and interrelated; some are caused by financial instability, sexual disharmony, behavioral maladjustments (alcoholism, smoking, wife/husband battering, nagging, incompatibility, unmet needs and expectations, jealousy, anger, violence and extra-marital affairs and poverty (Anyakoha and James, 2004). Poverty has been defined as the state of being extremely poor! The World Bank's definition of poverty says: poverty is the inability of one person to make up to $1 (One US Dollar) a day.

2. Problem of the study

Many families cannot cope with unemployment, under-employment, poor salaries and other economic downturn indexes. Conflicts are commonplace in the family due to the inability to adequately meet basic needs. Engagement of home managers in extra economic activities is ineffective due to soaring inflation rates, delay in payment of salaries and high government's demands of tax and Vats from Small and Medium Enterprises (SMEs).

2.1 Objectives of the study

The objectives of the study were to find out existing coping strategies adopted by families and alternative means to assist the population to survive in harsh economic situations for better well-being and sustainability in families.

2.2   Research questions

1.   What were the effects of economic hard times on Families in the study area?
2.   How were families in the study areas copying with economic hard times?
3.   What were the additional activities that could assist families to further cushion the effects of economic downturn and achieve well-being and sustainability?

3. Methodology

The survey design was used to collect data from respondents through a structured questionnaire administered on seven hundred and twenty (720) low income earners with salary range of: eighteen to fifty four thousand Naira (N18, 000 to N54, 000) in public service and private businesses selected though purposive sampling technique in the study area.

3.3 Validation and adminitration of instrument

Instrument for data collection was a questionnaire tagged Economic Coping Strategies (ECS) which was face validated and treated with test-retest method and Cronbach alpha instrument to determine its reliability (0.83). The instrument was personally administered on respondents and retrieved.
3.4 Results

Table 1: Rrespondents' demographic data

Age Range	N	%
20 – 30 years	101	12.4
30 – 40 years	78	24.3
40 – 50 years	142	43.9
Above 50 years		20.8
Marital Status		
Separated	68	21.7
Widowed		15.5
Married	253	62.8
Educ. Background		
Pry Education	88	13.0
Secondary Education	211	24.3
National Diploma.	162	22.5
Non formal Education		40.5

Source: Researchers Field Survey 2014

In table 1 above, 12.4% of respondents were in the age range of 20 – 30 years, 24.3% were in the age range of 31-40years, while 43.9% and 20.8%, were in the age range of 41- 50 and above 50 years respectively . In the same table 1, 21.7% of respondents were separated, 15.5% were widowed, while 62.8 % were married. The educational backgrounds of respondents were 13% primary education, 24.3% secondary education, 22.5 % tertiary and 40.5% non-formal education respectively.

Table 2:   Effects of economic tough times on families

Item	N	%
Conflicts	289	55.0
Poor Nutrition		89.5
Poor Education	272	84.7
Inadequate Income	318	97.1
Poor Housing	185	77.6
Inadequate Clothing	285	83.5
Inability To Meet other Obligations	304	94.7

Source: Researchers Field Survey 2014

In the table above, 55.0 % of respondents agreed that economic tough times brought conflicts into families, 89.5% agreed that it resulted in poor nutrition while 84.7 % agreed that it led to poor education in families. In the same table, 97.1%, 77.6%, 83.5% and 94.7% respectively agreed that economic tough times resulted in inadequate income, poor housing conditions, inadequate clothing and inability to meet other family obligations.

Table 3: Econmic Coping Strategies

Item	N	%
Cooperative buying	130	18.0
Home Stead Gardening	173	24.0
Poultry Keeping	119	16.5
Home Stead Fish Farming	38	5.3
Tie/Dye/ Renovation	158	22.0
Mending and Recycling	202	28.0
Food preservation	173	24.0

Source: Researchers Field Survey 2014

In table 3, 18.0% and 24.0% of respondents were involved in cooperative buying and home gardening as copying strategies, while 16.5%, 5.3%, 22.0%, 28.0% and 24.0%; were into poultry keeping, homestead fish farming, tie/dye/renovation, mending/ and recycling, and food preservation strategies respectively.

Discussion

The demography of the respondents as revealed in table 1; showed that homes where wives were fairly more educated: 24.3% and 22.5% seemed to more access to incomes from salaries and other sources than those without same educational background. This could be the major reasons why respondents had to look sideways for other ventures and incomes for augmentation and for family survival and sustainability in a persisting economic dwindling situation. This becomes more expedient when one considers the level of poverty in Nigeria culminating in poor home conditions, quality of life and living, youth unrest, 'street child syndrome' and family instability. From the point of view that women are more saddles with the responsibilities of home making in Nigerian in addition to paid jobs, one could agree with the need for innovate financial activities to sustain their families in economic downturn situations as husbands alone cannot meet the demands of the homes. According to Owino (2009), the home would become economically fragmented if wives lose their means of incomes without private economic activities to sustain the homes. As pointed out by Owino (2009), in the case of Kenyan women of the Mount Selgon District, women in Southwestern Nigeria have similar opportunities of farming because they live around the rain forest region. The area is about the most fertile area for economic agricultural activities that could provide families with improved menu from fresh green vegetables, protein sources from the poultry while excesses could be sold to improve family income.

Even women who are in the lower cadre income due to low educational background should become more actively involved in farming using the traditional methods of poultry, home gardening and cultivation of maize, cassava, yams, vegetables etc. By so doing, they could use the droppings from the poultry as organic fertilizers for greater and safer yields from the crops planted. Apart from farming, the women could get involved in other 'self-help' economic projects by obtaining revolving loans for petty trading to get extra money to help themselves and their families. The economic advantage of using renovation and textiles mending as confirmed in table 3 with the production of soft furnishing items was very tremendous. The process of cutting, sewing, tie/dye and batik can help women to train and work up their bones and muscles to persevere, improve as they relax their nerves after the activities mentioned above (Awosika, 2003). Many psychiatric patients who practiced sewing have become less aggressive after the production of articles for household and personal use (Awosika, 2003). The steps taken in the aspects of renovation and restructuring of old but useful clothing items like the application of decorations through tie-dye and

batik media are cheaper ways to procure interior decorations which family budgets can conveniently accommodate.

As confirmed in table 3 of this study, traditional poultry keeping involves the rearing of local breeds of fowls and birds allowed to roam about the street and left to fend for selves without any special provision for food to meet the requirements for body maintenance, hence they lay small white shelled eggs. Such birds/poultry products are good scavengers, very broody and have high resistance to diseases and pests. Modern poultry keeping by rearing of special breed birds called pullets for egg production and broilers for meat production is another addition which families in the study area could practice in addition to traditional poultry farming to improve family nutrition and income. Free or open range system of poultry rearing allows birds to roam around their owners' vicinity making it possible for the cocks to mate with the hens when both are matured to lay eggs. The hens practice natural incubation for about 28 days on the laid eggs and hatch them to produce younger ones and continue the traditional poultry farming cycle.

The prevalence of poverty in Nigeria according to Ezema (2001) has been described as a state of living within which people lack the purchasing power and sufficient access to socio-economic services resulting in limited income generation opportunities, poor quality education, unemployment, malnutrition, inadequate clothing, poor housing conditions, prostitution, crime, sickness kidnapping, etc. To overcome the manifestation of poverty, an individual needs to look sideways for available environmental resources to generate other incomes apart from regular salaries to effectively meet the numerous needs of the family. As shown in table 3 of this study, respondents were able to engage in home gardening and poultry keeping are pointers to the main reason their families are above board.

Basic resiliency activities in families should be development through training and skill acquisition so that beneficiaries could apply the scientific knowledge from the training to meet needs and solve the problems associated with life and living. Family well-being will receive a push up when members become capable of practicing simple renovation and textile decoration with tie/dye and batik to achieve comfortable home interiors (Awosika, 2013). This is in agreement with the position of Ogunnniran (2000) that traditional employment is automatically available for every individual who is ready to put indigenous technology to use and produce items/services that consumers need for daily survival. Lemchi (2002) agreed with the above by confirming that people should do away with phobia and explore the opportunities in skill acquisition for self-development and prevention of hunger.

Conclusion

Poverty has been seen by many schools of thought and in this study as the bane of family crises and family instability resulting in divorce, domestic crimes, and fi-

nancial crises, unmet needs and so on. Consequently, it is not debatable that the community of academics does need to speed up efforts to explore the threats posed to human civilization by poverty and propagate resilient theories and practices to curtail the problems, miseries, unrest and fear caused by poverty, overindulgence and underutilization of indigenous technology as exemplified by respondents in this study. Existing relevant programmes in schools should be well funded with the provision of contemporary equipment and tools for effective knowledge dissemination while compulsory skill acquisition for all citizens is entrenched in the constitution of the country so that indigenous knowledge can be used to solve the problems of unemployment because 'an idle mind is the devil's workshop.

References

Anyakoha, E. U. and James, M. B. (2004). Conflicts Resolution Practices of Couples within families in Borno State of Nigeria. Journal of Home Economics Research. Vol.5 (4) 27 – 30.

Awo, O. K. (2009) Exploiting Home Economics Education for Marital Conflict Resolution in Nigeria. Paper Presentation at the 7th Annual national Conference of National Association for the Promotion of Studies in religion, Education, Languages and General Studies (NAPSPELGS). 9th – 13th March 2009, FCE Kontangora Niger State

Awosika, B. I. (2003): Acceptability of Creative Patchwork For Interior Decoration By Low Income Earners In Ondo State, Nigeria. Unpublished, M.Sc Thesis, The University of Agriculture, Abeokuta, Nigeria,

Awosika, B. I. (2013): Entrepreneurship in Textiles production: Means to Self-Actualization and Poverty Reduction among Women in Purdah In Ondo State, Nigeria.

Ezema, (2001). Teaching Clothing and Textiles in Secondary Schools. A Case Study of Delta State. Journal of Home Economics Research Association of Nigeria. Vol. 5 (1) Pp. 63-67

Lemchi. (2002): Clothing and Textiles Occupation. Journal of Home Economics Research Association of Nigeria. Vol. 4 (1) Pp. 102-107

Ogunniran, T. O. (2000): Vocational Education and Small Business Entrepreneurship in a Free Market Economy. Journal of Business Management Education. Vol. 1, (2) Pp. 87-95.

Owino, Harriet o. (2009): Mother Tongue Literacy as a Tool for Promoting Economic Justice among Women in Marginalized societies: A Focus on Sabaot Women in MT Elgon District, Western Kenya. NURTURE Research Journal for Human Civilization Pakistan Home Economics Association. Vol. (1) Issue (3) 2009), 49 - 51

Stolle, D. & Hooghe, M. (2004): The Roots of Social Capital: Attitudinal and Network Mechanisms in the Relation between Youth and Adult Indicators of Social Capital'. Acta Politica, Vol: 39, 422–441.

United Nations Organization (2014): The institution of Family. Retrieved 20/4/16 from: http://www.un.org/esa/socdev/family/Publications/mtintro.pdf
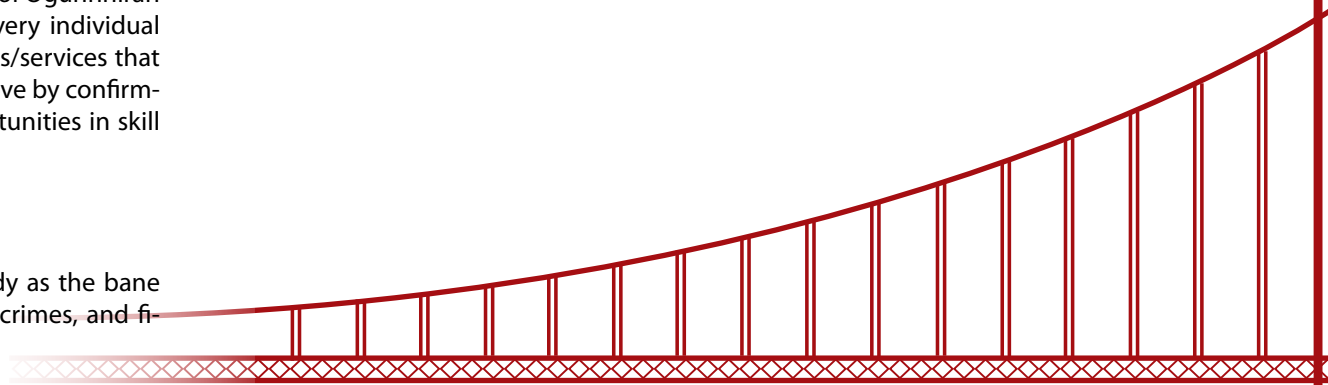
6.4 Anthropic action at cruz village, municipality of delmiro gouveia – al, lower são francisco

Adriana Maria Cunha da Silva, Janniera Mariana dos Anjos Lima, Maria Leonalda Nunes Lima & Wilma Amâncio da Silva

Abstract

The village Cruz is located in the city of Delmiro Gouveia-AL, which is part of the Low São Francisco. Because it is a beach resort frequented by the population, the goal of the study was to survey the impacts on this recreational area through the checklist method. The following impacts were listed: disturbed riparian vegetation due to the construction of small houses (shacks), the proliferation of aquatic weeds in the river, the garbage in the margins or near the river, coming probably from the local regulars and tourists, swimmers and owners of small shacks present in place, the presence of pets and droppings of other animals, car wash and the presence of a fish farm, with over 40 cages approximately. If these impacts are occurring alone does not affect the balance of the environment. The human action generates the cycle of cause and effect which man himself suffers the consequences with other living beings. It is suggested that the municipal authorities do campaigns of education and environmental monitoring more often.

Keywords: Beach resort. Checklist. Impacts. Environment. São Francisco River.

Resumo

O povoado Cruz está localizado no município de Delmiro Gouveia-AL, que faz parte do Baixo São Francisco. Por ser um balneário bastante frequentado pela população, o objetivo do estudo foi realizar o levantamento dos impactos causados nesta área de lazer através do método de checklist. Foram listados os seguintes impactos: a mata ciliar perturbada devido à construção de pequenas casas (barracos), a proliferação de macrófitas aquáticas no espelho d´água, disposição de resíduos nas margens ou nas proximidades do rio, oriundos provavelmente dos frequentadores do local, como turistas, banhistas e donos dos pequenos barracos presentes no lugar, à presença de animais domésticos e excrementos de outros animais, lavagem de automóveis e a presença de uma piscicultura, com mais de 40 tanques-rede aproximadamente. Tais impactos se ocorridos isoladamente não afetam o equilíbrio do ambiente. A ação antrópica gera o ciclo de causa e efeito cujo próprio homem sofre as consequências com os demais seres vivos. Sugere-se que o poder público municipal faça campanhas de Educação e fiscalização ambiental mais frequentemente.

Palavras-chave: Balneário. Checklist. Impactos. Meio Ambiente. Rio São Francisco.

Introduction

The São Francisco Basin has a total area of 640,000 km2, spanning the states of Minas Gerais, Bahia, Pernambuco, Alagoas, Sergipe, Goiás, and the Federal District (BRASIL, OAS, 1989). With its spring located in the Serra da Canastra, in the state of Minas Gerais, at 1600 m altitude and crossed to 2700 km until reaching a mouth in the Atlantic Ocean, between the states of Sergipe and Alagoas (TUNDISI et al., 1999, p. 162).
Based on peculiar characteristics of the river and its main tributaries, the valley is divided into four large areas: High São Francisco - from the sources to the city of Pirapora; Middle São Francisco - from Pirapora to Remanso; Submedium - from Remanso to Paulo Afonso and Lower São Francisco - from Paulo Afonso to his mouth. (GODINHO & GODINHO, 2003).

The region of Lower San Francisco occupies an area of 32,013 km2, with an extension of 247 km (MARTINS et al., 2011). It comprises from the municipality of Paulo Afonso - BA to the mouth of the Atlantic Ocean, between the states of Sergipe and Alagoas. In this section of the Basin, the waters run slowly and in the plain still receive marine influences (FREITAS, 2014).

Its geomorphology can be characterized by the occurrence, from east to west, of three morphostructural domains: Domain of sedimentary deposits, Domain of Remnants of Roots of Deployment and Domain of the Remobilized Massifs (CODEVASF, 2002). The vegetation cover is represented by extensive caatinga areas (MEDEIROS et al, 2014).

The municipality of Delmiro Gouveia - AL is located in the extreme west of the State of Alagoas and its municipal area occupies 608,491 km^2, inserted in the mesoregion of the Alagoano Semiarid, according to the Brazilian Institute of Geography and Statistics - IBGE (2014).

As the municipality has several villages bordering the above-mentioned river, some of these have watery-resorts quite frequented by the population in general, mainly by bathers, among them is the village of Cruz Community, according to the intergenerational knowledge the same originated from the visit of the entourage of D. Pedro II in 1878, in order to construct the line of train of Great Western station, that came from the city of Jatobá - PE to Piranhas - AL. As at that time there was only one small house in the area, D. Pedro II was staying with his caravan in this place, to which were part two slaves, Apolinário and Silvana, who fled and hid in the banks of the São Francisco River, giving the current name to the village, wherein the place where the slave Silvana was buried there is a cross in her honor.

The frequency of bathers in this area of recreational use is initially triggering visual impacts, which will be pointed out using the technique known as checklist, which is

relevant because it does not come into contact with social actors or biological factors. According to Silva (1999:64), "this method consists of the sighting and the listing of consequences (environmental impacts) when considering the transforming capacity of the physical, biotic and anthropic environment".

In view of the above, this work aimed to perform a survey of the impacts caused in this area of leisure.

Methodology

Study area

The present study was carried out in the resort of Cruz Community, according to figure 1, located between coordinates 9°25'59.95" S and 38°06'18.40" W and has 123 resident families, most of whom survive small-scale fisheries, fish farming and agriculture, according to the Municipal Secretariat for Rural Development and Agriculture - SEAMDRA (2015).

Figure 1 - Riverside resort of Cruz Community, municipality of Delmiro Gouveia-AL.
Source: Adapted from Google Earth (2015).

Data Collection and Analysis

Data were collected through holistic observations and previous photographic records of the site from April to October 2015.

For the analysis of the data, a survey of the environmental impacts, known as Checklist according to figure 2, was carried out in loco in October of the current year. According to this methodology, this is an auxiliary tool for the elaboration and analysis of the questionnaires necessary for the execution of the research and has as its benefit the immediate use in the qualitative evaluation of the most relevant impacts (MARCHESAN; RAMOS, 2012).

( ) Presença de mata ciliar. Qual o estado? ( ) preservada ( ) perturbada
( ) Proliferação de macrófitas no espelho d`água
( ) Disposição de resíduos nas margens ou nas proximidades
( ) Acesso de animais domésticos ao corpo d`água
( ) Lavagem de automóveis
( ) Presença de Empreendimentos. Qual?_____
Outras anotações:

Figure 2 - Checklist board applied locally at Cruz Community Riverside resort in October 2015.

It was also used a traditional bibliographic review, where Botelho et al (2011) is known as a narrative review, based on the use of peculiar practices that seek to search for a particular subject in literature collections. The bibliographic survey was carried out during the year 2015 and the information obtained through the checklist was analyzed and discussed throughout this article.

Results

Given with what was listed, five impacts were observed: disturbed riparian forest, macrophyte proliferation in the water mirror, residues on the banks and in the vicinity of the water body, presence of domestic animals and excrements of other animals, presence of automobiles within the body of water, presence of an enterprise in the body of water.

Discussion

It was evident that the riparian forest is disturbed to the detriment of the construction of small summer houses located right on the river bank, according to Figure 3.

Figure 3 - Disturbed riparian forest

The ciliary forest is conceptualized by Castro; Castro; Souza (2013) as forest systems naturally prescribed in bands along riverbanks and streams, in the vicinity of lakes, dams, and springs. The function of the ciliary forest is to reduce silting and degradation of the environment and as a natural form of processing and transformation of the environmental diversity.

According to the Socio-Environmental Institute (2006), its destruction eliminates nutrient and energy sources by altering the food chain, increasing sediments due to erosion (sand and clay), removing algae, fungi and bacteria that cover the riverbed, interfering in the balance of the aquatic environment, leading to the extinction of species of fish that live in the areas of the springs and head of rivers.

Brazilian legislation emphasizes this issue through the Brazilian Forest Code (Law 12.651, dated 05/25/2012), which establishes vegetation strips that must be protected around water bodies and springs, as a permanent preservation area (PPA). Still within the national legislation, the town of Cruz is inside the Natural Monument of the River São Francisco - MONA, where the construction of such houses (shacks) has been prohibited since the creation of its Decree in 2009, to which the inspection body is a responsibility of the Chico Mendes Institute for Biodiversity Conservation - ICMBio.

Another impact observed was the proliferation of macrophytes in the water mirror according to Figure 4, where they have a relevant function in the dynamics of aquatic ecosystems and in natural conditions they perform the primary productivity, serving as food for other organisms, storage and cycling of nutrients (NASCIMENTO, et al, 2008).

Figure 4 - Proliferation of macrophytes in the water.

However, as Nascimento (2009) highlights, some aquatic species can develop dense populations, causing damage to the biological balance, and anthropic activities, occurring due to changes in the environment, usually caused by man himself.

Eutrophic environments are conducive to floating aquatic macrophytes that can cover large areas and have high biomass values, to the detriment of the characteristics of artificial eutrophication in lakes and reservoirs, such as high concentrations of nutrients in water, especially nitrogen and phosphorus, which facilitate growth and proliferation of these aquatic plants (THOMAZ and BINI, 2003).

The intense growth of aquatic macrophytes, according to Pompêo (2008), can alter water quality and interfere with its multiple uses such as extraction of water for public supply, navigation, agriculture and fishing, leisure, tourism and public health , this way it becomes a problem not only environmental, but also economic and social (NASCIMENTO, 2009).

Another aggravating factor is the disposal of waste along the banks and near the water body, probably coming from local residents such as tourists, bathers and owners of the small shacks present in the place, even with the presence of a trash bin and warning sign, according to Figure 5.

Figure 5 - Disposal of waste on the banks and river

The effects of this improper waste disposal practice in valleys, on the banks of streets and rivers or in waterways, may cause negative impacts, among others, the contamination of water bodies, silting, flooding, proliferation of disease transmitting vectors, visual pollution, unpleasant smell and contamination of the environment (MUCELIN, BELLINI, 2008).

This provision does not comply with Law 12,305/10, which deals with the National Solid Waste Policy, which describes in its articles the proper disposal of all wastes.
It was also seen, the easy access of domestic animals to the body of water, like cats, besides the presence of excrements of other animals, according to Figure 6.

Figure 6 - Presence of domestic animals and excrement of other animals.

Feces from parasitized animals deposited in the environment can contaminate the soil and cause disease in people. Several parasites are identified in the microbiological analyzes of sediments through several studies (MAIER et al., 2003). The resort sand is an excellent means of transporting several species of intestinal parasites transmitted by animals that travel freely through it (PEDROSA, et al., 2014; BRASIL, MS, 2005).

In the water we observed cars, left there and intended to be washer further, as depicted in Figure 7.

Figure 7 - Cars within the body of water

Car wash produces waste, because when washing, there may be detergents of various types, biodegradable or not, dust, soot, grease, gasoline among others, which can cause serious impacts to the environment. In water mixed with the products used to clean the vehicles, there are some chemical elements, such as: Fluorine, Nitrates, Lead, among others, provoking intoxications, besides the formation of deformed foams in the water bodies, promoting the development of several species of microorganisms, mainly bacteria and acting as a vehicle for the parasites (TEIXEIRA, 2003).

The substances used in the car washing process are toxic and are capable of causing serious damage to the natural environment, and public health. The lubricating oil presents organic acids and heavy metals within its composition, classified by the ABNT-Brazilian National Standards Organization as hazardous waste (NBR-10004).

According to Silva and Oliveira (2011), studies show that automotive oil can deplete the water supply of an entire city, a single liter of this oil can contaminate one million liters of water and cause havoc in water treatment plants as well as polluting the water resources that receive these waters when they are discharged into drainage networks.

The presence of a fish culture in the water body was also verified, with approximately 40 fish breeding cages, as visible in figure 8.

Figure 8 - Fish farming with approximately 40 cages

These ventures, when not adequately monitored, may result in several impacts to the aquatic ecosystem such as: increased Nitrogen and Phosphorus from the feed used to feed the fish, consequently causing the proliferation of macrophytes; escape of exotic species, being a threat to native species, among others (FERRAZ, 2014).

In this context, the aforementioned corroborates with Arêas et al (2014), who reports that the introduction of exotic species in aquatic environments is one of the most relevant impacts for the extinction of native species, both for the support capacity of these environments, as well as for the fact of some species to be carnivorous and to feed on other fish.

According to Costa et al. (2009), the vigorous use of culture in fish cages concentrates a considerable volume of food inputs for the production of fish in high densities in a reduced area, with the consequent launching of food waste, feces and excreta directly into the environment, where, according to Mallasen et al (2012), such dumping is a strong potential for environmental impact.

Final Considerations

The factors listed if occurring sporadically and isolated do not significantly affect the equilibrium of the aquatic environment, otherwise when they occur together they can generate many consequences to the environment.

Faced with what has been raised, it is noticeable that man is the only agent that causes impacts to the natural environment that he needs for his survival, generating a cycle of actions and reactions to which he and other living beings suffer the consequences.

Based on the above, it is necessary to work continuously on Environmental Education and Inspection through the municipal public authority and its implementing agencies, together with the active participation of the community, in order to sensitize them about the responsibility that each one has in relation to conservation of this ecosystem.

References

BRAZILIAN ASSOCIATION OF TECHNICAL STANDARDS. NBR 10004:2004: Solid waste - Classification. Rio de Janeiro: ABNT, 2004. 77 p.

ARÊAS, S.M.; TRINDADE, T.C.; LIMA, A.M.M. de; MOURA, Q.L.de; ALMEIDA, J.B. A. de. Socio-environmental dynamics of freshwater fish farming in tanks as an alternative to local production in Amazonian environments. Agro@mbiente On-line Magazine, Boa Vista, v. 8, n. 2, p. 278 – 287, May/Aug. 2014.

BOTELHO, L.L.R.; CUNHA, C.C.A.; MACEDO, M. The integrative review method in organizational studies. Electronic Journal Management and Society, v. 5, n. 11, p. 123, 2011. Available at: <http://www.gestaoesociedade.org/gestaoesociedade/article/viewFile/1220/906>. Accessed on: May, 10 2015.

BRAZIL. Ministry of Health. Secretariat of Health Surveillance. Infectious and parasitic diseases. Pocket guide. Brasília: Ministry of Health, 2005. 320p.

CASTRO, M.N.; CASTRO, R.M.; SOUZA, P.C. The Importance of Riparian Forest in the Context of Soil Conservation. Electronic Journal of Education of Araguaia University, 4: 230-241. 2013. Available at: www.fara.edu.br/sipe/index.php/renefara/article/viewFile/172/156>. Accessed on Dec, 26 2015.

DEVELOPMENT COMPANY OF THE SÃO FRANCISCO AND PARNAÍBA VALLEYS. Integrated project management of land-based activities in the São Francisco Basin (ANA/GEF/PNUMA/OEA): Subproject 2.1 – Thematic Mapping of Land Use in Lower São Francisco. Brasília: CODEVASF, 2002. 35 p.

NATIONAL CONGRESS. Forest Code. Law Nº 12.651, of May, 25 2012. Brasília: Brazil, 2012. 12 p.

NATIONAL CONGRESS. National Policy on Solid Waste. Law Nº 12.305, of August, 02 2010. Brasília: Brazil, 2010. 24 p.

NATIONAL CONGRESS. San Francisco River Natural Monument. Decree w/N, of Jun, 03 2009. Brasília: Brazil, 2009. 08 p.

COSTA, T. V.; SILVA, E. C. S.; OSHIRO, L. M. Y. The potential of aruanã Osteoglossum bicirrhosum (Vandelli, 1829) (Osteoglossiformes, Osteoglosidae) for captive breeding. Acta Amazônica, Amazonas, v. 39, n. 2, p. 437-443, 2009.

FERRAZ, D. A. Fish production in six municipalities in the south-central mesoregion of Bahia: technical and socio-environmental aspects. 2014. 86 f. Dissertation (Master degree in Environmental Sciences) - State University of Southwest of Bahia, Itapetinga, 2014.

FREITAS, L. O. Etnoecology of manual fishermen of the Canyon of São Francisco River. 2014. 129 f. Dissertation (Master degree in Human Ecology and Socio-environmental management) – University of the State of Bahia, Paulo Afonso, 2014.

GODINHO, H.P.; GODINHO. A.L. Brief view of São Francisco: Water, fish and fishermen of São Francisco

of Minas Gerais. Belo Horizonte: PUC, Minas Gerais, 2003.

BRASILIAN INSTITUTE OF GEOGRAPHY AND STATISTICS. Data of the Municipalities. Delmiro Gouveia, Alagoas: IBGE, 2014. Available at: < http://cidades.ibge.gov.br/xtras/perfil.php?codmun=270240>. Accessed on: Jan, 03 2015.

INSTITUTO SOCIOAMBIENTAL. Riparian Forest: Importance, conservation and recovery. Ribeira, 2006. 21 p. Available at: <http://www.ciliosdoribeira.org.br/sites/default/files/arquivos/ApresentacaoMataCiliar-CampanhaRibeira24-05-07.pdf>. Accessed on: Dec, 26 2015.

MALLASEN, M.; CARMO, C. F.; TUCCI, A.; BARROS, H. P.; ROJAS, N. E. T.; FONSECA, F. S.; YAMASHITA, E. Y. Water quality in the fish farming system in net-tanks in Ilha Solteira reservoir, SP. Fishing Institute Bulletin, São Paulo, v. 38, n. 1, p. 15-30, 2012.

MARCHESAN, M. T. N.; RAMOS, A. G. Check list for the elaboration and analysis of questionnaires in belief surveys. Electronic Journal of Linguistics, v. 6, n. 1, 2012.

MARTINS, D. M. F.; CHAGAS, R. M.; NETO, J. O. M.; JÚNIOR, A. V. M. Impacts of the construction of the Sobradinho hydroelectric power plant on the Lower São Francisco flow regime. Brazilian Journal of Agricultural and Environmental Engineering, Campina Grande, v. 15, n. 9, p. 1054-1061, Aug. 2011.

MEDEIROS, P.R.P.; SANTOS, M.M; CAVALCANTE, G.H.; SOUZA, W.F.L.; SILVA, W. F. Environmental characteristics of Lower São Francisco (AL/SE): effects of dams in material transport at the continent-ocean interface. Geochimica Brasiliensis, Lower São Francisco, v. 28, n.1, p. 65-78, 2014. Available at: <http://www.geobrasiliensis.org.br/ojs/index.php/geobrasiliensis/article/download/384/416>. Accessed on Dec, 26 2015.http://dx.doi.org/10.5327/Z0102-9800201400010007

MINISTERY OF MINES AND ENERGY. Underground water supply sources project design. Alagoas: PRODEEM.2005. 21 p.

MUCELIN, C.A.; BELLINI, M. Garbage and Environmental Impacts Perceived in the Urban Ecosystem. Sociedade e Natureza, Uberlândia, v. 20, n. 1, p. 111-124, jun. 2008. Available at: http://www.scielo.br/pdf/sn/v20n1/a08v20n1. Accessed on Dec, 26 2015.

NASCIMENTO, P.R.F.; PEREIRA, S.M.B.; SAMPAIO, E.V.S.B. Dense Egeria biomass in the reservoirs of Paulo Afonso - Bahia hydroelectric plant. Weed plant, Viçosa, v. 26, n. 3, p. 481 – 486, 2008.

NASCIMENTO, P.R.F. Floristic survey and productivity of aquatic macrophytes occurring in limnetic environments in the state of Pernambuco - Brazil. Recife: [s. n.], 2009.

PEDROSA, E. F. N. C.; CABRAL, B. L.; ALMEIDA, P. R. S. F.; MADEIRA, M. P.; CARVALHO, B. D.; BASTOS, K. M. S.; VALE, J. M. Environmental Contamination of Beach Sand of Fortaleza-CE. J. Health Biol., Ceará, v. 2, n. 1, p. 29-35, 2014. Available at: <http://www.periodicos.unichristus.edu.br/index.php/jhbs/article/download/43/43>. Accessed on Dec, 26 2015.http://dx.doi/10.12662/2317-3076jhbs.v2i1.43.p.29.2014

POMPÊO, M. Monitoring and management of aquatic macrophytes. Oecol. Brazil, v. 12, n. 3, p. 406 – 424, 2008.

MUNICIPAL SECRETARIAT FOR RURAL DEVELOPMENT AND AGRICULTURE. Data from Residents in the Delmiro Gouveia municipality, Alagoas. Delmiro Gouveia: SEAMDRA. 2015. 100 p.

SECRETARIA MUNICIPAL DE URBANISMO. Evaluation of the presence of fungi and pathogenic bacteria in the sands of two beaches with low hydrodynamics and high human occupation on the coast of the city of Rio de Janeiro. Rio de Janeiro: Coleção Estudos Cariocas, 2003. 15 p.

SILVA, E. Environmental Impact Assessment Techniques. Viçosa, MG: CPT, 1999.

SILVA, T. A.; OLIVEIRA, K. M. Disposal of lubricating oils and their packaging: a case study of gas stations and workshops in the city of Ituiutaba, state of Minas Gerais. OBSERVATORIUM: Electronic Journal of Geography, v.3, n. 7, p. 101-114, Oct. 2011.

TEIXEIRA, P. C. Use of dissolved air filtration in the treatment of vehicle washing effluents for the recycling of water. 2003. 199 f. Dissertation (Master degree in Civil Engennering) – State University of Campinas, São Paulo, 2003.

THOMAZ, S.M.; BINI, L. M. Ecology and management of aquatic macrophytes. São Paulo: EDUEM, 2003.

TUNDISI, J. G.; TUNDISI, T. M.; ROCHA, O. Ecossystems of interior waters. In: Rebouças, A.C.; BRAGA, B.; TUNDISI, J. G. (Org.). Fresh water in Brazil: ecological capital, use and conservation. São Paulo: Escritura, 1999.

6.5 Luces y sombras de la evaluación del progreso en la Agenda 2003 de NNUU: revisión de las dimensiones e indicadores de género incluidos en el ODS5

Cristina Bernis y Carlos Varea

Resumen

La Agenda 2030 para el Desarrollo Sostenible de Naciones Unidas (NNUU) establece que las desigualdades de género se manifiestan en todas y cada una de las dimensiones del desarrollo sostenible y asignó 14 indicadores al ODS5, creado para evaluar la igualdad de género. Las primeras evaluaciones alertaron sobre la escasa disponibilidad de indicadores simples de género y sobre la necesidad de nuevas propuestas. Se compara la información sobre brecha de género proporcionada por el ODS5 con la de otros índices compuestos de género, previamente propuestos y utilizados por NNUU. Los resultados se analizan según las dimensiones e indicadores incluidos en cada índice, y se reflexiona sobre la urgencia de contar con indicadores claramente definidos, para medir todas las dimensiones que definen género, en particular, las relacionadas con el uso del tiempo.

Abstract

The 2030 Agenda for Sustainable Development of the UN, states that gender inequalities are manifested in each and every one of the dimensions of sustainable development, assigning 14 indicators to SDG5, created to evaluate gender equality. The first evaluations warned of the scarce availability of gender indicators and of the need for new proposals. This presentation compares the information on the gender gap provided by SDG5 with that provided by other gender composite indexes, previously proposed and used by UN. The results are analyzed according to the dimensions and indicators included in each index, and the urgency of having clearly defined indicators is considered in order to measure all the essential dimensions that define the gender gap, in particular, those related to the use of weather

1. Introducción

Desde la década de los años noventa se han propuesto diferentes índices para evaluar el progreso en la igualdad de género y su contribución al desarrollo sostenible. Estos índices se establecen seleccionando conjuntos de indicadores simples (variables) que informan sobre las diferentes dimensiones del género. Hay siete dimensiones del género globalmente aceptadas (Educación, Salud, Trabajo, Dinero, Tiempo, Poder y Violencia), de las cuales seis son compartidas por mujeres y hombres,

son evaluables en ambos sexos y todos los indicadores registrados por sexo y edad proporcionan información sobre ellas. Los indicadores para su evaluación se pueden expresar como ratios femenino/masculino para evaluar brecha de género, o referidos exclusivamente a mujeres (de manera obligatoria cuando son exclusivos de ellas, como los ligados a violencia de género y a salud sexual y reproductiva, o de manera optativa, cuando exista información también para hombres).

La selección de los indicadores para evaluar progreso en los objetivos de igualdad de género y la manera de introducirlos y combinarlos, así como el número de dimensiones que permitan su evaluación pueden modificar sustancialmente la puntuación obtenida por cada país en el ranquin mundial, lo que ha generado una amplia discusión sobre la evaluación del género, con sugerencias para modificar los primeros indicadores elaborados y la inclusión de las nuevas dimensiones de Trabajo, Dinero y Poder (UN, 2015).

La incorporación de estas sugerencias ha modificado notoriamente las puntuaciones obtenidas por numerosos países y los ránquines internacionales correspondientes. Así, ha mejorado la posición de algunos países en rápida transición económica y socio-ambiental (como Brasil, México, Rusia, India, China y Sudáfrica) (Ukhova, 2015), pero también la de muchos países subsaharianos caracterizados por malos indicadores de Salud y Educación pero mejores en Trabajo y Poder; por el contrario, ha empeorado la de algunos países europeos, del Mediterráneo Oriental y del Norte de África (Klasen y Schüler, 2011). En esta línea está también el índice Global de Brecha de Género, expresamente diseñado en 2006 por el Foro Económico Mundial para clasificar los países por su proximidad a la igualdad de género y no por el empoderamiento de las mujeres: la secuencia temporal de sus resultados incluye entre los diez primeros a tres países africanos y desplazan a posiciones finales del ranquin a algunos países árabes y de Europa del Este y Sur.

La Agenda 2030 para el Desarrollo Sostenible establecida por Naciones Unidas (NNUU) en 2015 plantea que la igualdad de género funciona como un catalizador para el progreso del conjunto de sus 17 Objetivos de Desarrollo Sostenible (ODS), dado que se manifiesta transversalmente en todas las dimensiones del desarrollo sostenible. Surgen así dos nuevos índices destinados a evaluar género y desarrollo sostenible (UN, 2015): los correspondientes al ODS5 (Lograr la igualdad entre los géneros y empoderar a todas las mujeres y las niñas), definido específicamente para evaluar brecha de género y empoderamiento de mujeres y niñas, y a otro global, el ODSI (Sachs et al., 2016), destinado a evaluar cómo influyen la brecha de género y el empoderamiento de las mujeres sobre la consecución global de los 17 ODS propuestos. Las sucesivas publicaciones de Sachs y colaboradores (Sachs et al., 2016, 2017, 2018) proporcionan, a través de las puntuaciones obtenidas para cada objetivo y para su conjunto, una importante referencia metodológica y una ruta para avanzar, pero también advierten de las limitaciones en disponibilidad de indicadores y de la cautela con la que se debe abordar las evaluaciones.

El informe de UN Women (2018) también alerta sobre esta grave situación, tanto porque hay seis ODS ciegos al género (sin indicadores para su evaluación), como porque incluso el indicador específico de género, el ODS5, solo tiene disponibles cinco de los 14 indicadores inicialmente seleccionados. El informe termina subrayando la urgencia de una revolución estadística a nivel de los registros nacionales para visibilizar a las mujeres y sugiere la incorporación de nuevos indicadores, como los 66 procedentes de la encuesta realizada entre investigadores y expertos para cubrir las carencias señaladas. El grupo de Sachs está siendo pionero en este sentido, con la incorporación de nuevos indicadores, que permiten incluir mayor número de países y mayor precisión en los resultados (Sachs et al., 2018), de tal manera que sus informes —ampliamente difundidos— son una importante referencia metodológica con una creciente influencia sobre las hipótesis de trabajo y las conclusiones de la investigación en el mundo académico y sobre la toma de decisiones políticas y ciudadanas, que se establecen las prioridades de actuación.

Como ecólogos humanos con experiencia en investigación poblacional sobre género y salud en las diferentes etapas de la vida nos interesan especialmente los indicadores que evalúan esos aspectos, tanto por su estrecha relación con el uso del tiempo (dimensión no incluida en ninguno de los índices analizados) como por informan sobre procesos biológicos modulados por circunstancias de género, cuya interacción debe ser bien comprendida a la hora de interpretar los resultados (Bernis et al., 2010). Así, en el presente trabajo nos interesa conocer el grado de concordancia en puntuación obtenida por un mismo país para el ODS5 (Sachs et al., 2017) con la asignada con índices específicamente diseñados para evaluar tanto brecha de género como desarrollo (Índice de Desigualdad de Género, IDG, en inglés, Gender Inequality Index: UNDP, 1995) o exclusivamente brecha de género y sus tendencias temporales, independientemente de las circunstancias globales en las que ocurran (Brecha de Género Global, BGG, Global Gender Gap: World Economic Forum, WEF, 2018).

En este trabajo se pretende cubrir un triple objetivo: primero, identificar los países con máximas diferencias positivas y negativas en su ranquin entre el ODS5 y los índices IDG y BGG, en función de las dimensiones que evalúan y los indicadores de género que comparten; segundo, comprender las causas de esas diferencias; y, tercero, reflexionar sobre la necesidad de interpretar correctamente la información de los diferentes indicadores de salud sexual y su interacción con otras dimensiones de género, como el uso del tiempo.

2. Material y métodos

El trabajo analiza una amplia base de datos de 157 países que incluye para cada uno de ellos las puntuaciones globales correspondientes a los tres índices de género considerados (ODS5, IDG y BGG), el conjunto de los indicadores que se utilizan para su cálculo y el rango internacional obtenido para cada uno de ellos. También se han in-

cluido otros cuatro indicadores simples no valorados en la estimación de los índices de género, seleccionados porque proporcionan información indirecta sobre la dimensión tiempo y su uso diferencial por mujeres y hombres, tanto respecto a gestión ambiental como respecto a cuidados: el registro nacional de los nacidos menores de cinco años, la Tasa global de fecundidad, la tasa de envejecimiento y la proporción de población rural. Así, los análisis que se describen a continuación utilizan un conjunto de 23 indicadores, de los cuales 13 informan específicamente sobre mujeres, siete sobre brecha de género a través de los corresponden a ratios femenino/masculino, y tres son indicadores globales que informan sobre aspectos reproductivos, de cuidados y de uso del tiempo.

La Tabla 1 sintetiza la información sobre los tres índices de género analizados e incluye las recientes puntuaciones obtenidas por los países que ocupan el primer y último lugar en el ranquin mundial. Los tres índices solo comparten dos indicadores (uno para evaluar Poder (presencia de mujeres en el parlamento nacional) y otro para Trabajo (participación femenina en la fuerza de trabajo). Todos comparten información sobre cuatro dimensiones (Educación, Salud, Trabajo y Poder), dos la comparten sobre Dinero (ODS e IDG) y ninguno informa sobre Violencia ni sobre Tiempo (en relación a cuidados, ocio, gestión ambiental, etc.). Ninguno de los países con datos disponibles alcanza la máxima puntuación en ninguno de los tres índices considerados. En general, los países con las mejores y peores puntaciones presentan mayor coincidencia en los rangos obtenidos por los tres índices, aunque no coincidan exactamente en los puestos.

Tabla 1. Definición, dimensiones de género, indicadores y países de inicio y cierre del ranquin internacional de los tres índices. (Fuentes: WHO, 2016; UNICEF, 2016; UNDP, 2017; y WEF, 2017.)

	Índice de desigualdad de género (IDG)	ODS5	Índice global de brecha de género (BGG)
Definición	Mide la pérdida en desarrollo humano resultante de la desigual distribución de riqueza, poder y beneficios, entre mujeres y hombres.	Mide la igualdad de género y el empoderamiento de mujeres y niñas.	Mide el progreso hacia la paridad de género, clasificando los países por su proximidad a la igualdad de género y no por el empoderamiento de las mujeres o su nivel de desarrollo.
Dimensiones	-Educación -Salud -Poder -Trabajo	-Educación -Salud -Poder -Trabajo -Dinero	-Educación -Salud -Poder -Trabajo
Indicadores	-Mujeres con al menos algo de educación secundaria (% hombres). -Mortalidad materna (100.000 nacimientos) -Tasa de natalidad adolescente (%) -Mujeres en la fuerza de trabajo (% hombres) -Mujeres en el parlamento nacional (% hombres)	-Años de escolaridad en mujeres (% hombres) -Demanda insatisfecha de anticoncepción (%) -Mujeres en la fuerza de trabajo (% hombres) -Brecha salarial de género (% mujeres/hombres) -Mujeres en el parlamento nacional (% hombres)	-Tasa de alfabetización femenina sobre la masculina (%) -Tasa de matrícula primaria neta femenina sobre la masculina (%) -Tasa de matrícula secundaria neta femenina sobre la masculina (%) -Tasa bruta de matrícula terciaria femenina sobre la masculina (%) -Proporción de sexos al nacer (nacimientos niñas/niños) -Esperanza de vida saludable de mujeres (% hombres) -Mujeres en la fuerza de trabajo (% hombres) -Igualdad salarial entre mujeres y hombres para similar trabajo (%) -Brecha salarial de género (% mujeres/hombres) -Legisladoras, altos funcionarias y gerentes (% hombres) -Mujeres profesionales y trabajadores técnicas (% hombres) -Mujeres en el parlamento nacional (% hombres) -Las mujeres en puestos ministeriales (% hombres) -Número de años con una Jefa de Estado (en los últimos 50 años) (% hombres)
Puntuaciones	Rango (0-1) 2015 0,993 (Noruega) 0,776 (República Centroafricana)	Rango (0-1) 2015 0,878 (Islandia) 0,695 (Yemen)	Rango (1-100) 2016 95,2 (Suecia) 14,2 (Yemen)

En primer lugar, se evalúan las diferencia entre el rango asignado por el ODS5 respecto a los índices IDG y BGG separadamente, estableciéndose dos grupos de 40 países con discrepancias máximas positivas (20) o negativas (20) en el ranquin internacional entre el índice ODS5 y los índices IDG y BGG. En segundo lugar, se realizan sendos Análisis de Componentes Principales (ACP) sobre los dos conjuntos de países establecidos con el objetivo de sintetizar la información común que proporcionan las 23 indicadores simples, que están estrechamente correlacionadas entre sí. La revisión de los resultados permite etiquetar a los cuatro primeros teniendo en cuenta que estos componentes expresan niveles de variabilidad independientemente establecidos a partir de las agrupaciones de los indicadores originales.

Tabla 2. Los 40 países con máximas diferencias de ranquin mundial en función de las diferencias negativas y positivas entre los índices ODS5 y IDG. (Fuentes: WHO, 2016; UNICEF, 2016; UNDP, 2017; y WEF 2017.)

Países que encabezan las máximas diferencias con mejor posición para ODS5 que para IDG			Países que cierran las máximas diferencia con peor posición para el ODS5 que para el IDG			
País	ODS5	IDG	ODS5-IDG		SDG5	IDG	ODS5-IDG
Zimbabue	22	117	-95	Túnez	97	56	41
Nicaragua	19	96	-77	Armenia	102	59	43
Namibia	26	101	-75	EAU	91	44	47
Sudáfrica	12	84	-72	Singapur	59	11	48
Malawi	70	135	-65	Kuwait	115	67	48
Ruanda	17	78	-61	Serbia	87	38	49
Ecuador	23	82	-59	Malasia	110	58	52
Kenia	69	127	-58	Malta	95	42	53
Bolivia	35	91	-56	Líbano	133	77	56
Cuba	39	87	-52	Croacia	88	31	57
Laos RP	8	60	-48	Albania	108	49	59
Jamaica	51	99	-48	Turquía	126	66	60
México	29	70	-41	Grecia	84	23	61
Colombia	44	83	-39	Japón	85	21	64

Países que encabezan las máximas diferencias con mejor posición para ODS5 que para IDG			Países que cierran las máximas diferencia con peor posición para el ODS5 que para el IDG			
Mozambique	94	130	-36	Corea Rep.	77	10	67
Argentina	37	72	-35	Bahréin	119	46	73
Paraguay	62	97	-35	Montenegro	112	33	79
Zambia	81	115	-34	Arabia Saudí	128	48	80
Costa Rica	28	61	-33	Omán	145	52	93
Bangladesh	80	111	-31	Bosnia	132	34	98

3. Resultados

Nuestro análisis se centra en los países con máximas discrepancias (positivas o negativas) en el ranquin internacional respecto a los índices ODS5 e IDG (Tabla 2) y respecto a los índices ODS5 y BGG (Tabla 3). Los países del primer grupo con mejores posiciones en el ranquin internacional para el ODS5 que para el IDG pertenecen a tres áreas geográficas diferentes: África Tropical y del Sur, América del Sur y Central, y Pacífico Oriental. Los países con los peores posicionamientos para el ODS5 respecto al IDG pertenecen a la Europa Mediterránea y Oriental, Próximo Oriente y Sudeste Asiático, en 11 de los cuales más del 40% de su población es musulmana.

Los países del segundo grupo, aquellos que encabezan las mejores posiciones en el ranquin internacional por las puntuaciones del ODS5 respecto a las de la BGG, pertenecen a todas las áreas geográficas internacionalmente establecidas, mientras que los países con posicionamientos mucho peores para ambos índices son mayoritariamente países de la Europa del Este, del África Subsahariana y del Sudeste Asiático. Las diferencias en rango asignadas oscilan entre 31 y 95 puestos para los países con mejor posición para ODS5 que para IDG, y entre 41 y 98 puestos para los que tienen peor posición para el ODS5 que para IDG; y entre 25 y 70 puestos, y entre 27 y 70 respecto de la BGG, respectivamente.

Para evaluar el peso diferencial de las diferentes dimensiones de género y sus combinaciones en la caracterización de los dos grupos de países se han realizado sendos ACP (Tabla 4). Los cuatro componentes del análisis realizado para el grupo de países con máximas diferencias en ranquin entre el ODS5 y el IDG explica el 82,4% de la variabilidad: el C1 se etiqueta por los indicadores correspondientes a las dimensiones Educación, Salud, trabajo y Poder; el C2 por aquellas relativas a Salud, Dinero y Poder, el C3 a Educación y Salud y poder; y el C4 a Salud, Trabajo y Violencia.

Por su parte, los cuatro componentes del ACP correspondiente a los países con máximas diferencias en el ranquin entre el ODS5 y la BGG explica el 69,4% de la variabilidad: el C1 se etiqueta por las dimensiones Educación, Salud, Dinero y Poder; el C2 por Salud, Trabajo, Dinero y Poder; y el C3 por Educación y Salud. En ambos grupos, el componente 1 (C1) diferencia a los países con peor posición por el ODS5 que para los otros dos índices, mientras que los componentes 2 (C2), 3 (C3) y 4 (C4) matizan otras diferencias y semejanzas entre grupos de países.

Tabla 3. Los 40 países con máximas diferencias de ranquin mundial en función de las diferencias negativas y positivas entre los índices ODS5 y BGG. (Fuentes: WHO, 2016; UNICEF, 2016; UNDP, 2017; y WEF, 2017.)

Países que encabezan las máximas diferencias con mejor posición para ODS5 que para BGG				Países que cierran las máximas diferencia con peor posición para el ODS5 que para la BGG			
País	ODS5	BGG	ODS5-BGG		ODS5	BGG	ODS5-BGG
China	29	100	-70	Camerún	114	87	27
Méjico	77	81	-52	Irlanda	36	8	28
Hungría	62	103	-43	Liberia	136	107	29
R. Checa	70	88	-43	Panamá	75	43	32
R. Corea	91	118	-41	Bangla-desh	80	47	33
Madagas-car	85	80	-39	Croacia	88	54	34
Chipre	22	92	-38	Guinea	147	113	34
Paraguay	56	96	-34	Montene-gro	112	77	35
Brasil	97	90	-33	India	143	108	35
Malawi	23	101	-31	Tanzania	107	68	39
Austria	8	57	-30	Ghana	117	72	45
Myanmar	115	83	-30	Uganda	90	45	45
Japón	51	114	-29	Serbia	87	40	47
EAU	28	120	-29	Bulgaria	65	18	47
Nepal	39	111	-28	Burundi	71	22	49
Zimbabue	128	50	-28	Lesoto	122	73	49
Kazakstán	12	52	-27	Filipinas	68	10	58
Italia	69	82	-26	Mozam-bique	94	29	65
Portugal	119	33	-26	Bosnia	132	66	66
Bélgica	59	31	-25	Albania	108	38	70

Respecto a los indicadores introducidos en el análisis, es interesante revisar su inclusión o ausencia en cada componente, porque definen sus dimensiones y su agrupación de manera independiente. A modo de ejemplo, comparamos la situación para los dos C1 de ambos grupos de países (Tabla 4). Respecto a la dimensión Educación, en ambos grupos de países contribuyen sobre todo la Tasa de mujeres alfabetizadas y la Proporción de mujeres en educación terciaria, más que los correspondientes ratios femenino/masculino, que suelen ser mayores para las mujeres que para los hombres. Los siete indicadores introducidos de la dimensión Salud contribuyen al C1 del grupo de países con máximas diferencias ODS5 e IDG, correspondiendo los máximos pesos a la Esperanza de vida en buena salud de las mujeres y a la Tasa de fertilidad adolescente, seguidos por la Mortalidad materna y la Fecundidad global.

En cambio, en el segundo grupo de países, solo contribuyen cinco indicadores de Salud, todos ellos con pesos elevados (encabezados, con signos opuestos, por la Mortalidad materna y la Esperanza de vida en buena salud), incluida la Proporción de sexos al nacer, con un peso que duplica el que tiene en el otro grupo. La dimensión Trabajo no contribuye al C1 del primer grupo y sí lo hace con peso elevado en el segundo. Los dos indicadores de la dimensión Poder se incluyen en los C1 de ambos grupos de países, que comparten una mayor contribución dela proporción de mujeres parlamentarias que del ratio femenino/masculino en el parlamento. Finalmente, la dimensión Violencia no contribuye al C1 en ninguno de los grupos de países. Todos los indicadores globales introducidos, salvo la Tasa de registrados al nacer de menores de 5 años, tienen un peso importante en los C1 de ambos conjuntos de países.

Tabla 4. Resultado de los ACP mostrando el peso de los indicadores y las dimensiones que los definen.

Dimensiones	Indicadores	Países con máximas diferencias ODS5-IDG				Países con máximas diferencias ODS5-BGG			
		C1	C2	C3	C4	C1	C2	C3	C4
Educación	Tasa de alfabetización en mujeres (%)	,784		,427		,854			
	Ratio mujer/hombre Tasa de alfabetización (%)	,626		,580		,698		,571	
	Tasa de mujeres en educación primaria (%)	,326		,729				,545	
	Ratio mujer/hombre en educación primaria (%)			,832		-,479		,809	
	Tasa de mujeres en educación terciaria (%)	,942				,801			
	Ratio mujer/hombre en educación terciaria (%)	,775				,631			-,305
Salud	Mortalidad materna (por 100.000 nacimientos)	-,759	,378	-,441		-,963			
	Fertilidad adolescente ‰	-,824	,436			-,846			
	Demanda insatisfecha de anticoncepción (%)	-,355		-,704				-,795	
	Ratio de nacimientos de niñas/niños (%)	-,319	,691		,388	-,793	,463		
	Esperanza de vida en buena salud de mujeres	,867		,349		,937			
	Ratio mujer/hombre Esperanza de vida (%)	,518				,736			
Trabajo	Participación de mujeres fuerza de trabajo (%)	-,764			,404		,695		-,387
	Ratio mujer/hombre fuerza de trabajo (%)	,853							,904
Dinero	Ingresos estimados de mujeres ($ EEUU)		,933			,796	-,306		,488
	Ratio ingresos estimados mujer/hombre (%)		,895			-,716	,350		,500
Poder	Mujeres parlamentarias (%)	,798				,766			,555
	Ratio mujer/hombre en el parlamento nacional	,330	,344	,545		-,487	,474		,425
Violencia	Violencia de género a lo largo de la vida (%)				,942		,907		
Globales	Tasa global de fecundidad	-,760	,437	-,325		-,903			
	Registro de nacimientos menores de 5 años (%)				,941				
	Ratio dependencia (población >65/<15 a.) (%)	,898	-,303			,962			
	Población rural (%)	-,831				-,932			

Finalmente, como resume la Tabla 5, los resultados del ACP permiten comprender la complejidad de las interacciones entre indicadores y dimensiones a través de su contribución diferencial en peso a los Componentes obtenidos mostrados en la Tabla 4.

En el primer grupo con máximas diferencias ODS5 e IDG, la dimensión Salud contribuye a los cuatro componentes, Poder a tres (C1, C2 y C3), Educación y Trabajo, a dos (C1 y C3), mientras que Dinero y Violencia contribuyen a un único componente cada uno (C2 y C4, respectivamente). En el segundo grupo —máximas diferencias ODS5 y BGG—, ninguna dimensión contribuye a los cuatro componentes, como ocurría con la salud en el grupo anterior; las dos más representadas y con mayor peso son Dinero y Poder, incluidos en los C1, C2 y C3; Educación, Salud y Trabajo solo contribuyen a dos componentes (las dos primeras al C1 y al C3; la tercera, al C2 y C4).

Tabla 5. Resumen de las semejanzas y diferencias en las dimensiones de género y en los indicadores globales propuestos que definen los componentes principales en los dos grupos de países analizados con máxima diferencias respecto a las puntuaciones de los índices de género.

	Países con máximas diferencias ODS5-IDG				Países con máximas diferencias ODS5-BGG			
	C1	C2	C3	C4	C1	C2	C3	C4
Dimensiones de género	Educación		Educación		Educación		Educación	Educación
	Salud	Salud	Salud	Salud	Salud	Salud	Salud	
	Trabajo			Trabajo		Trabajo		Trabajo
		Dinero			Dinero	Dinero		Dinero
	Poder	Poder	Poder		Poder	Poder		Poder
				Violencia		Violencia		
Indicadores Globales	TGF	TGF	TFG		TGF			
	TD	TD			TD			
	PR				PR			
				RN				

(*Indicadores globales propuestos, TGF: Tasas global de Fecundidad; TD: Tasa de dependencia; PR: Población rural; RN: Registro de nacidos menores de cinco años.)

4. Discusión

Conseguir en 2030 el cumplimiento de los ODS y sus metas, incluidas las correspondientes al ODS5, específico de género, es el gran reto que debemos afrontar en los próximos años. En última instancia, el avance se evalúa a través de las puntuaciones conseguidas en cada Objetivo, siendo muy importante contextualizar las proporcionadas por el ODS5 respecto a otros índices de género ampliamente utilizados, así como comprender las diferencias en los ránquines internacionales que asignan a cada país, ya que de ello depende la toma de decisiones políticas y los objetivos de las investigaciones a realizar.

Sin embargo, las decisiones de actuación no solo deben tener en cuenta las puntuaciones obtenidas en función de las dimensiones de género incluidas y de los indicadores utilizados para su evaluación, sino también la correcta compresión de lo que miden esos indicadores. Así, respecto a las dimensiones de género, ninguno de los tres índices considerados incluye información sobre uso del Tiempo ni Violencia. Los análisis evidencian que los dos grupos de países analizados con máximas discrepancias en el posicionamiento asignado por el ODS5 respecto a IDG y la BGG comparten Salud y Poder como las dimensiones con mayor peso en su caracterización, y que difieren esencialmente en el mayor peso diferencial de la dimensión Trabajo en el primero de ellos frente al mayor peso que tiene al de Dinero en el segundo.

Para evaluar las dimensiones de género es fundamental comprender qué estamos midiendo, tanto respecto la representatividad de la población analizada como respecto a la compleja interacción entre sexo y género. La representación parlamentaria de las mujeres, ilustra nuestra primera consideración, porque un mayor número de parlamentarias no implica necesariamente mayor poder real de las mujeres ni mejores condiciones para la mayoría (Wakefield, 2017). No es casual que los países africanos y, en menor grado, algunos asiáticos y latinoamericanos con mejor ranquin internacional para el ODS5 que para el IDG tengan una elevada representación parlamentaria pero muy malos indicadores de salud.

Los indicadores de salud sexual y reproductiva ejemplifican la segunda situación, porque se correlacionan estrechamente con todas las dimensiones de género al tiempo que información sobre la interacción entre biología, salud y género a través de la discriminación en el uso del tiempo por su control social, cultural y político. Nos centramos en tres de ellos: Proporción secundaria de sexos (incluido en BGG), Esperanza de vida en buena salud en mujeres (incluido en IDG) y Tasa global de fecundidad (propuesto por los autores).

La Proporción secundaria de sexos es un importante indicador demográfico, biológico, sanitario y sociocultural, tradicionalmente expresado en Biodemografía como número de niños nacidos por cada 100 niñas y de manera inversa en la BGG. Globalmente, en todas las poblaciones del mundo nacen menos niñas que niños, aunque existe una variabilidad bien documentada. En las poblaciones del África Subsahariana y afroamericanas nacen 97 niñas por cada 100 niños; en las europeas y americanas, 95,2; y en muchas asiáticas, 90 niñas por cada cien niños (Visaria, 1967). Sin embargo, en las últimas décadas se ha detectado un aumento de la proporción de mujeres en los nacimientos de países europeos y americanos (Grech et al. 2003; Bernis et al. 2010), frente a una marcada disminución en otros mayoritariamente asiáticos. El aumento proporcional de nacimientos femeninos, se ha ligado con la presencia de tóxicos ambientales y con la transformación de los patrones reproductores y sanitarios (maternidades tardías y progresiva medicalización del parto: Varea et al., 2015, 2018). Mientras que la reducción detectada de nacimientos femeninos

se atribuye a una clara discriminación contra de las niñas que impide su nacimiento, y se asocia con las nuevas de técnicas de diagnóstico e intervención prenatal en poblaciones con elevado control de la fertilidad y clara preferencia por el nacimiento de varones (Grech et al., 2003). China e India son los máximos representantes de esta última situación (Yi et al., 1993; Sahni et al., 2007), con proporciones secundarias de sexos de 82 y 90 niñas por cada 100 niños, respectivamente. Algunos países de Europa del Este sugieren una tendencia semejante, pero menos acentuada, cuyas causas deben ser investigadas. La mayor contribución de las niñas a los nacimientos africanos (siempre por debajo de 100%), refleja esencialmente diferencias sexuales, no de género, en el sentido de que los varones en todas las etapas de la vida, incluidas las prenatales, son más sensibles a malas condiciones ambientales (Kraemer, 2000).

En igualdad de condiciones ambientales, las mujeres tienen mayor esperanza de vida que los hombres por razones biológicas relacionadas con la reproducción (Bernis, 1991; Catalano y Bruckner, 2006). En las últimas décadas ha mejorado sensiblemente la esperanza de vida en ambos sexos y se ha reducido la discriminación contra las mujeres, de manera que 2016 solo dos países mantienen mínimas diferencias en la Esperanza de vida en buena salud contra de las mujeres (Mali, -0,9 años, y Bhutan, -0,4), aunque la persistencia de mínimas diferencias positivas a favor de las mujeres, registradas en países con elevado nivel económico (Emiratos Árabes Unidos, 0,7 años, o Arabia Saudí, 0,8) también indican discriminación de género. Comprender por qué ocurren esas situaciones y corregirlas es fundamental.

Las tendencias en la Tasa global de fecundidad condicionan el crecimiento poblacional, el ritmo de envejecimiento y los problemas ambientales ligados a la superpoblación, pero también condicionan el uso del tiempo de las mujeres, mayoritariamente dedicadas a ello en todas las sociedades, además de realizar otros trabajos productivos, olvidándose con excesiva frecuencia que los trabajos asociados a producción y cuidado de la vida humana son imprescindibles para mantener los servicios socio-ecosistémicos y la propia sostenibilidad de los ecosistemas (Herrero, 2010). El uso del tiempo es la dimensión de género peor conocida, incluso para los países Europeos (EIG, 2017). Países como Chad, donde solo se registran en torno al 20% de los nacidos menores de cinco años llustra bien la urgente necesidad de mejorar los registros estadísticos para visibilizar a las mujeres (UN Women, 2018), ya que su adecuado registro daría solidez a mucha información disponible, y permitiría conocer la proporción de niños dependientes e inferir el tiempo de cuidados requeridos.

Mientras no se dispongan de eso datos, ni se sistematice su interpretación, es importante conocer y utilizar todos los recursos disponibles que permitan ilustrar esos aspectos del género, y hacerlos accesibles a la ciudadanía, el mundo académico y los responsables de las políticas locales. Entre otras aportaciones alternativas, sugerimos consultar el Museo Virtual de ecología Humana (2018) como herramienta de trabajo para cubrir esos objetivos.

5. Conclusión

Todos los indicadores desagregados por sexo proporcionan información valida sobre la situación global de género, que debe ser contrastada e interpretada. Ninguno de los índices revisados incluye todas las dimensiones de género ni alcanza la máxima puntuación en ningún país. En la última década la salud ha retrocedido en países, que tienen una elevada representación de parlamentarias, lo que evidencia que las mujeres han ganado más asientos en el parlamento que poder real en los aspectos esenciales de sus vidas, incluido el control del tiempo y la eliminación de la violencia. La aproximación al poder no debe ser solo política, sino cultural, incluyendo tanto tradiciones y conocimiento no formal, como aspectos sociales y religiosos. Todo índice, en suma, debería incluir algún indicador al menos sobre cada una de las dimensiones generalmente incluidas en la definición de género (Educación, Salud, Trabajo, Dinero, Poder, Tiempo y Violencia), pero todos carecen de las dos últimas. Consideramos Salud y Tiempo dimensiones esenciales para evaluar género por su transversalidad. Finalmente, si el género no se integra y prioriza en las estrategias estadísticas y en los procesos de recopilación en datos regulares, se mantendrá la insuficiencia de datos de género y la imposibilidad de evaluar adecuadamente su progreso, y de priorizar las adecuadas decisiones políticas para avanzar.

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Referencias

Bernis, C. (1991). Diferencias sexuales en los patrones de salud y enfermedad a lo largo del ciclo vital: interpretación biocultural. En Bernis, C., Demonte, V., Garrido, E., González, MT, de la Torre, I. (eds.). Los estudios sobre la mujer: de la investigación a la docencia (pp. 15-30), Madrid: IUEM-UAM.

Bernis, C., Varea, C., Montero, P. (2010). Tendencias temporales de la proporción de sexos en España 1900-2007: factores causales y consecuencias biosanitarias. En Gutierrez, E., Sánchez, A., Galera, V. (eds.) Diversidad Humana y Antropología Aplicada (pp. 325-339), Alcalá de Henares: Universidad de Alcalá.

Catalano, R., Bruckner, T. (2006). Male lifespan and the secondary sex ratio. American Journal de Human Biology, 18(6): 783-790.

EIG (2017). Gender Equality Index 2017: Measuring gender equality in the European Union 2005-2015. European Institute for Gender Equality.

Grech, V., Vasallo-Agius, P., Savona-Ventura, C. (2003). Secular trends in sex ratios at birth in North America and Europe in the second half of the 20th century. Journal of Epidemiology Community Health, 57(8): 612-615.

Herrero, Y. (2010). El factor de género como impulsor directo de cambio de los ecosistemas: el papel de los cuidados. En Viota Fernández, N. y Maraña Saavedra, M. (coord.) Servicios de los ecosistemas y bienestar humano. La contribución de la Evaluación de los Ecosistemas del Milenio (p. 37-46), Bilbao: UNESCO Etxea/Centro UNESCO del País Vasco.

Sachs, J., Schmidt-Traub, G., Kroll, C., Durand-Delacre, D. and Teksoz, K. (2016). SDG Index and Dashboards. Global Report. New York: Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN).

Sachs, J., Schmidt-Traub, G., Kroll, C., Durand-Delacre, D. and Teksoz, K. (2017): SDG Index and Dash-

boards Report 2017. New York: Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN).

Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., Fuller, G. (2018). SDG Index and Dashboards Report 2018. New York: Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN).

Klasen, S., Schüler, D. (2011). Reforming the gender-related development index and the gender empowerment measure: Implementing some specific proposals. Feminist Economics, 17(1): 1-30.

Kraemer S. (2000). The fragile male. BMJ 321(7276): 1609–1612.

Museo Virtual de ecología Humana (2018). http://museoecologiahumana.org/.

Sahni, M., Verma, N., Narula, D., Varghese, R. M., Sreenivas, V., Puliyel, J. (2008). Missing girls in India: Infanticide, feticide and made-to-order pregnancies? Insights from hospital based sex-ratio-at-birth over the last century. PLoS One, 3(5):e2224.

Ukhova, D. (2015) Gender inequality and inter-household economic inequality in emerging economies: exploring the relationship, Gender & Development, 23(2): 241-259.

UN, (2015). Transforming our world: the 2030 agenda for sustainable development. New York: United Nations.

UNDP (1995). Human Development Report 1995. New York/Oxford: Oxford University Press.

UNDP (2017). Human Development for Everyone. Human Development Report. New York: United Nations Development Program.

UNICEF (2016). The State of the World's Children 2016: A fair chance for every child. New York: UNICEF.

UN Women (2018). Turning promises into action: Gender equality in the 2030 Agenda for Sustainable Development. New York: UN Women

Varea, C., Bernis, C., González, A. (2015). Biosocial aspects of fetal growth and birth outcome. In Sidkhar, M. (ed). Human growth: the mirror of the society (196-207), Delhi: B.R. Publishing Corporation.

Varea, C., Terán J.M., Bernis, C., Bogin, B. (2018). The impact of delayed maternity on birth outcome in Spain, 2007-2015: An assessment by population attributable fraction. Women and Birth, 31: e190-e196.

Visaria, P. (1967). Sex ratio at birth in territories with a relatively complete registration. Eugenics Ouarterly, 14(2): 132-142.

Wakefield, S. (2017). Transformative and feminist leadership for women's rights. Washington D.C..: Oxfam America Research Backgrounder Series.

WHO (2016). World health statistics 2016: monitoring health for the SDGs, sustainable development goals. New York: WHO.

World Economic Forum (2017). The global fender gap report 2017. Geneve: World Economic Forum.

Yi, Z., Ping, T., Baochang, G., Yi, X., Bohua, L. Yongpiing, L. (1993.) Causes and implications of the recent increase in the reported sex ratio at birth in China. Population and Development Review, 19(2): 283–302.

6.6 Cross-cutting artistic creations, between sciences, humanities and technology: towards a meta-vision of sensitive data and dialogue?

Emeline Gougeon

Abstract

Although full of unknowns, nowadays neurosciences consider consciousness as a communication network between different brain areas, rather than a specific and singular cerebral region. Wouldn't it be the same for the mind?

On many other aspects of our hypermodern societies, a transition from a culture of object to a culture of flux takes place; or aren't we in an in-between?

Eco-psychological approach, philosophy of mind through the notion of extended cognition, artistic perspectives, and relevant knowledge through different cultures teach us that it is necessary nay vital to (re)develop and fix integrative connections with the living, human and non-human.

Inseparable from the body and an ecological environment, made up of conscious and unconscious mechanisms, the mind is itself an integrative and complex system of information. It is the process by which we give meaning; we produce forms; we communicate with ourselves and others, with the world in its richness and complexity.

Beyond visible spectrum in a dominant techno-symbiotic configuration, cross-cutting artistic creations may help to approach these hypotheses of the mind as a flow and a more sensitive dialogue within human beings, and with their environment.

Keywords: Sensitive dialogue, mind, environment, coupled system, communication network

1. Introduction

Seeing and being aware of the world in its richness and complexity is related to our thinking skills, our capabilities of perception and the possibilities to have feeling, intentionality and consciousness. In other words, it is linked to this complex system we called mind and whose nature remains undetermined. Nonetheless, we admit that this integrative set of processes and functions is composed of conscious and unconscious mechanisms; it is linked to body and brain, seat of cognition; and that this whole, as for it, is inseparable from an environment (from life very close to nature to urban, artificial, technological milieus, range to which must be added cultural and social impacting contexts).

As mentioned, what is fascinating is that, although enabling us to dialogue with our self and the other (human and non-human, verbally or not, consciously or not); to understand and interact with the world in responding to stimuli with some kind of

agency, yet some modalities of the mind and our psychological life (also named psyche) are still largely unknown. The fact remains that we are partially aware of some of these unknown either it be through psychosomatic phenomena (marks of psychological states on bodily processes), intuition and mind-body methods; or the manner with which landscapes and territories may shape personalities and mentalities. Likewise, as we learn from behavioral and forest bathing studies , how being in contact with some animals and/or with nature may make individuals feel less stressed for instance. We are sometimes surprised to realise how some social and familial situations may be transmitted and/or reproduced from one generation to the next; conditioning, and unconscious and deeper psychological levels that psychoanalysis and social psychology study. Mindsets often play a significant and sometimes determining role helping to face hardships inherent to life, just as when surpassing oneself through demanding professions or sports competitions for example. Other recent scientific studies have also pointed out the importance of gut and its dialogues with our brain. The transmission of information from the intestine may even impact our mental moods; this beyond our conscious control .

As an important step, by means of the considerable recent technological bounds such as with fMRI or CT neuro-imaging, neurosciences have pushed further the study of the brain, the observation of electrical and chemical activities of cerebral regions and neurons, mapping their connections as well as detecting structural changes while meditating for instance. From such developments, it appears that any mental states and fluctuations seem to be visible with the help of technology. For all that, and despite the development of international centers dedicated to brain study and its cartography, this gigantic cerebral web remains finally partially understood. Furthermore, its relations with the mind are still the subject of many discussions, both philosophically and scientifically. In the documentary "La Fabrique du cerveau" (directed by Cécile Denjean, 2017), Marcel Just, Professor of Psychology at Carnegie Mellon University recalled that "a thought is defined on a much larger scale than a neuron or group of neurons". Professor of Neuroscience at Duke University Miguel Nicolelis, as for him, explained that "what works for the motor cortex does not work, does not necessarily apply to higher functions, it is delicate. We can take some information out of the brain and transfer them into a digital signal, but for most things that are really important to us as human beings we can not". Some parts of our higher mental functions, such as consciousness, affectivity and what questions humankind, are irreducible to a digital signal or mental calculation; or it is at the risk of reducing them. Thenceforward, the study of the mind seems to be more than the study of the brain.

2. Cross-questionning the concept of mind with art

To sum-up and as admitted, the mind is this mixed entity in which biological, cognitive, representational, socio-cultural and environmental aspects are intimately linked. And in the presence of a latent aporia, this paper still aims at focusing on this concept of mind as a complex and integrative "thinking-feeling process". More precisely, it tends to approach part of these links, relations, information we, our mind and body, may exchange within our self, and potentially less obviously with external agents/elements, with other humans and environments. Being non-visible, non-visual, these links and relations may be considered as subtle. In other words, what is underlying here is the hypothesis that the mind operates as mode and network of communication, as a set of a wide variety of links, whose some are subtle.

To approach such a set of links, from the mind and psychological life's unknown modalities mentioned earlier and from blind spots of some of our science models sometimes leading to the production of decontextualized knowledge, art is a singular prism. We will see in the following paragraphs why such an assertion. We will then explore a few examples of specific cross-cutting artistic creations between sciences, humanities and technology and try to perceive how they may help to approach subtle relations of the mind. The underlying question of my research is the following: could we head towards a kind of meta-vision of sensitive information of the mind with our environment(s)?

In the line of great thinkers, prehistorian Jean Clottes recalls in his book "Pourquoi l'art préhistorique?" (Folio Essais, 2011) that the emergence of art could be linked to a dawning psyche/mind, to first interrogations of human beings on their future and what surrounds them. Artistic experience is linked to the access of first abstract and symbolic thoughts, to capacities of interpretation, thus, the possibility of giving meaning. This expresses certain awareness and distancing from material contingencies (although without being able to escape from them). In that sense, according to the prehistorian, art could be consubstantial to human mind. From this hypothesis, art appears to be a very singular prism; and this, even though art is a pure concept that needs to be explained to be understood. "First human beings were not in an historic perspective of the aesthetics forms when drawing on cave's walls. However with artistic creation, we, human beings, access to a statement of a form that tells something about us and about life, about the links we, existing and thinking being, have developed with the world", links between the tangible and the intangible, the visible and the non visible. "Art is the question of not going to the thing to reach by the most direct way, but to make detours that will give the links we maintain with the world something richer" . In helping creating new forms and ideas, art actively contributes to life experience. Art opens spaces. Through this perspective of partial detachment from material reality, art and mind, and this creative faculty and potential, have created with the world dialogical spaces in which exchange of information and links are revealed and developed.

At a time where information as a recent concept is constantly redefined, a lecture at ENS Paris for Post-Digital Seminar comes to my mind. The one of philosopher

Mathieu Triclot referring to cybernetics pioneer John von Neumann and one of his books "The Computer and the Brain" (Yale University Press, 2012). Triclot read this question from von Neumann's book: "what if this mathematical language we use to understand mechanisms of the living could only be a second language, a language derivative from a primary language"? Making an analogy with a quote assigned to writer Victor Hugo, could art, in its consubstantiality with the mind, be this form that would allow an intangible or subtle background to rise to the surface of the real, to the surface of materiality?

Just as science is the approach to the real through methodology, replicable experiments and mathematical language or as Buddhism approaches the real through meditation and contemplation, we perceive that art is another manner to apprehend reality. To contemplation, inner dialogues and a kind of detachment from material contingencies, art adds this creative potential enriching our links to the world. Moreover, related to feelings, intention and subjectivity, art offers in its modern form interesting dialogues with other fields of knowledge, especially with sciences, human sciences and technology. Within this framework of enrichment and openness to other contents, to other dimensions and information that also seem to be different from physical reality, we are at the heart of a space working between inner and external worlds, from visible and non-visible elements. On many aspects of our post-Duchampian and hypermodern societies, a transition from a culture of the object to a culture of the flux seems to take place; or wouldn't we be in an in-between?

3. The mind as mode of communication - exchange of information

In his latest book titled "La communication du vivant" (Odile Jacob, 2017), French biologist Joel Bockaert develops the theory according to which "communication is necessary and even consubstantial with life and its evolution". There are tremendous levels of communication. Whether at the level of the cells within the same organism; or with other organisms such as bacteria that communicate with their host organism; through social behaviors including non-verbal and intra-psychic communication, life has developed through communication and in becoming more and more complex. Today, neurosciences are already tending towards a consideration of consciousness more as a mode of communication between different brain areas, rather than consciousness as a single region of the brain. Couldn't this be the access to a scientific wider/more open consideration of the mind? The mind, linked to a body and an environment, as a mode of communication, as an exchange of information. We know that inside the brain regions and cells communicate between them. We know that higher cognitive functions are in correlation. Through the work of Portuguese-American neuroscientist Antonio Damasio, we know that we can not in some way separate reason and feeling/emotion; emotions allow us to adapt to the environment, thus, they are part of the reason, consequently they are part of life and all we produce. As introduced and differently grasped by Eastern philosophies such as

through Traditional Chinese Medicine, we are also more and more aware of the inner dialogues, often very subtle and complex, that operate between our mind and body, within our whole body, often beyond our conscious control. This inner life also called psyche is a world in itself.

3.1 listening to the trees

In collaboration with INRA, Art&Science International Institute of Sorbonne University and Orange Telecom RDD department Orange Art Factory, Russian media artist and Professor at Sorbonne University Olga Kisseleva has recently developed EDEN (Ethical Durable Ecology Nature) project. EDEN focuses on this new kind of organic network based on vegetal medium. With the aim to contribute to landscape protection and restoration, the project has been made possible by collaborations with scientists and the help of new digital technology. The different installations and devices developed within this framework have enabled communication between different trees (T2T – Tree to Tree), and between trees and human through a special network (T2N). In 2018, for one of the latest installations, the artist has established communication with Kauri, endangered species[9], of Waikato Park.
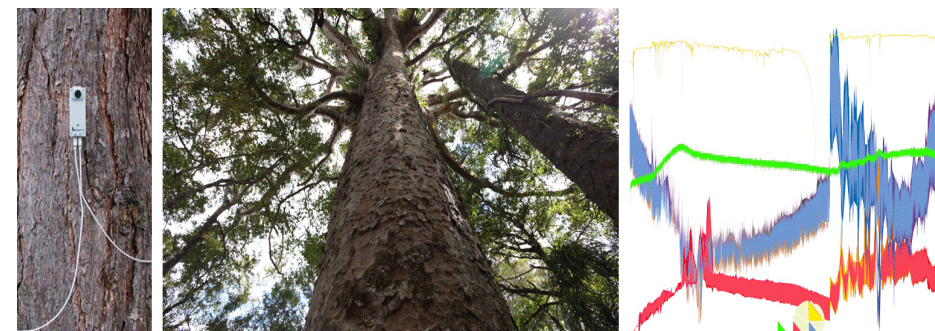

Figure 1 – Installation functioning sensor, chosen tree and transcription of the liquid circulation dynamics in the trunk of the tree, Olga Kisseleva: EDEN Waikato, New Zealand, 2018

Technically speaking, with the analysis of the data and through the installation, the team was able to connect the biorhythm of the plants with their surrounding world in using plants' expressive language, which is infrasound and vibration. The artist explains "this network helped trees to optimize their vital mechanisms and to protect themselves from potentials aggressors, and especially from the kauri dieback".

"Through the contact with human body the chosen tree acquires an organic sound identity in a form resembling a heartbeat. Thus, interacting with the installation becomes a meditative moment, both collective and intimate, symbolically reflecting the viewer's own body".

Figure 2 – Image, Olga Kisseleva: EDEN Waikato, New Zealand, 2018
© Olga Kisseleva

Within the framework of EDEN, the communication was widely experimented in France with urban trees, in Northern Europe with drunken forest, in Japan with Pines and Elms, in Australia with Wolemi. The project transforms the tree encrypted communication into a comprehensive, open network and makes perceptible these non-visual information.

Greatly concerned about the alteration of nature and the responsibility resulting from it, the artist recalls us:

"all vegetal species can communicate with its environment. Instead of words they use different kinds of molecular emission. (…) The communication can be established between trees of the same species, but it can also be addressed to a different organism: insect, or animal, including human".
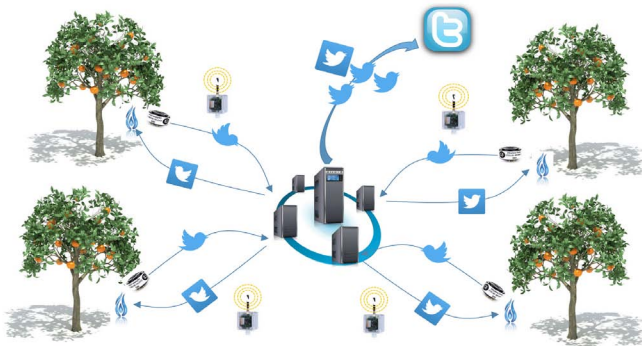

Figure 3 – Representation, Olga Kisseleva: EDEN communication T2T
© Olga Kisseleva

In a recent radio show , French biologist and botanist, specialist on tropical rainforests and tree architecture, Francis Hallé explained how, in amazon rainforest, trees suffering from heat can call for rain. Trees emit a specific molecule that once in the air engenders the formation of storm and rain, specifying that this admitted capacity may be generalizable to other regions as EDEN shows. The biologist also added that we know nothing about plant world, the essential remains to be discovered. Isn't it the same for the mind? How do we develop a research that enable us to study the mind as this complex system linked to a body and that interacts in very subtle ways with the environment?

And just as scientists discover that trees communicate with each other in sharing molecular information thus developing a non visual communication, and just as we receive and are physically and mentally sensitive to external factors such as the photons of the sun, the rate of sunshine for instance as well as to many other particles and factors in the environment, could the mind and body also be a process of subtle exchange of information with other human beings and part of the living? For instance, in some cases, when we feel at ease or on the contrary uncomfortable in the presence of other individuals, are we sharing information: do we share information beyond physical and material barriers? What kind of exchanges and information could it be?

During her talk in October 2017 hold by the Chaire Edgar Morin de la complexité, French paleoanthropologist Anne Dambricourt-Malassé reminded of the markers of our identity as human. Humanisation is the combination of three elements: first, our verticality which is also the verticality of the central nervous system; second, the idea of an ongoing process (this internal process, organized, self-organized, and that becomes more and more complex, process that, since, has never stopped); and the third distinctive feature is our consciousness (from self-awareness to the otherness). "Contrary to hominization that is determined, as embryonic origin of verticality shows, humanisation is what is not genetically encoded. Humanisation is what is not acquired, not determined. Humanisation is fragile. It is the ethical relation/connection with life, which is impossible without understanding the environment and our links with it. (…) There is a deep affiliation with the history of the universe. This mechanism of evolution is within us".

Through the consideration of the mind as mode and network of communication, from rational thinking to affects having their own rationality, could the mind be a kind of several-level channel? Could it be a several-way channel whose some levels operate when dialoguing beyond the visible with the environment and ourselves; a several-way channel which allows consciousness and ethical relation to life? An attentiveness towards a kind of "world's conscience" as understood in Japanese and Buddhist traditions that doesn't separate human and nature, seeking harmony between human and earth .

3.2 As in an in-between

Some recent fields and theories, such as in philosophy of mind with the notion of extended cognition and mind, postulate that the mind could be not contain only within the limits of our brain and skin. For philosophers and cognitive scientists Andy Clark and David Chalmers, it is arbitrary to say that the mind is contained only within the boundaries of the brain and skin. Because external objects play an important role in helping cognitive processes, the mind and the environment act as a coupled system. This idea of a coupled system can be found in contemporary physics that, since Einstein, has reassessed the concepts of time, matter and reality. The introduction of this polysemic concept of information, which forms the basis of all new technology, also plays a key role in such developments.

Among others, the principle of psychophysical unity of researchers Basil Hiley and David Bohm based on the quantum potential, and for which life would work from within, then merging with the field of a universal movement. Or the physicist Philippe Guillemant who, from the consideration of information's vacuum and the intangible configuration of the universe, has developed a theory of retrocausality based on the extra space-time dimensions, vibrations and atemporal information to which the mind and consciousness could be connected . In Guillemant's work, extra space-time dimensions could be linked to our psyche. Consciousness would thus participate in the configuration of the universe, by recording information in the universe in the present and by configuring the future of the universe. Although taking into account that "it is very likely that most of the time consciousness does not structure anything, that the universe is already structured, that everything happens as if the reality were independent of us", however, the physicist develops the idea that this is not always the case; in other words "the universe is considered as a universe of information partially configured as quantum mechanics already shows, and consciousness, as for it, is here as an interface to help the universe to acquire information".

The following cross-cutting artistic project was on view at the Grande Halle de la Villette in Paris until early September 2018. It is the immersive exhibition Au-delà des limites (Beyond the Limits) by Japanese collective teamLab, which is composed of artists, programmers, engineers, 3D animators, mathematicians and architects. Through this immersive project, teamLab tried to develop a kind of unifying movement between individuals and digital worlds helping visitors to perceive interactions beyond some limits.
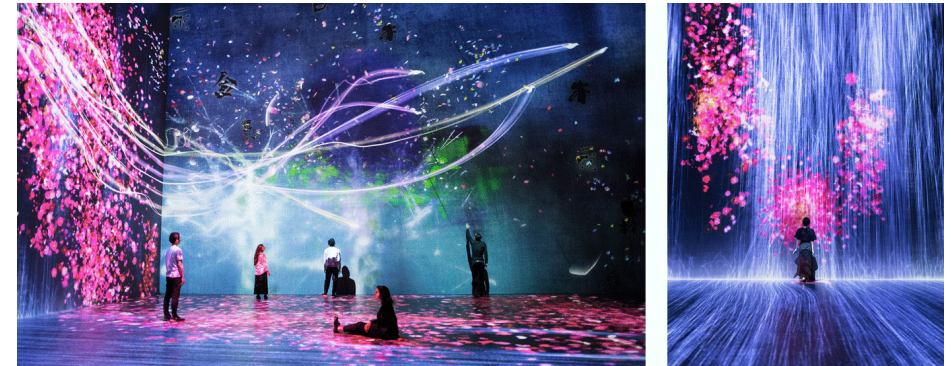

Figure 4 – Exhibition view, teamLab: Au delà des limites, 2018, Grande Halle de la Villette, Paris
© teamLab

This project is based on two premises. First, people develop relationships with others, and recognize the world through their own bodies. Second, in the mind, boundaries between different thoughts are ambiguous. They influence each other and sometimes mix with each other. There are continuous movements and relationships that are created between humans and their environment(s). "Visitors are kind of lost in a world of artworks. Without interruption, these are transformed according to the presence and the movements of each visitor. The works can also move freely. Even in being sensitive to interactions with visitors, the works remain autonomous. They transcend their borders, giving birth to a limitless world".

There is no continuity of time in Japan but rather an "eternal present" ; a Japonese notion almost impossible to express for our Western philosophies. However, it is this idea that there is "only a succession of instants and intervals that arise within a transitional space" . In Japanese and Zen cultures, vacuity is also the reservoir of infinity. Contemporay physics meets this idea in discovering that vacuum composes the most part of our universe and ourselves , and that it is full of information, full of energy. All these hypotheses, visualisations and displayed creations tend to let us perceive and foresee intangible information and reality. The subtle and porous nature creates a kind of in-between. This permeability questions reciprocally the receptiveness and openness of our beings with our environment(s) and the world. This in-between also raises the question of the relationality of things constituting the world as well as our own composition.

This notion of relationality refers in some ways to Colombian anthropologist Arturo Escobar who, in his French-translated book Sentir-penser avec la Terre (Seuil, 2018) , described it as a space that enables thoughts to re-engage with life. By analogy and extension, the mind and the environment could be conceptualised as a process, a system and a space; an information spaces system. As importantly in my research, as asks the anthropologist, how do we reactivate relationality?

We may briefly mention here another installation by Russian artist Olga Kisseleva who proposed with the interactive installation It's time to put the visitor in presence of some of one's own modulations in relation to the concept of time. Conceived in 2010 with applied electronics research professor Sylvain Reynal (ETIS, CNRS), and exhibited at Ural Industrial Biennial of Contemporary Art, Ekaterinbourg, and at Louvre-Lens, the creation took the form of a self-managed electronic clock based on the heartbeat and body temperature of the interacting audience. The emotional state of the individual is measured by biological sensors that make move the clock forward or backward according to the individual's own rhythms.

3.3. Among other unresolved burning points

The incomplete representation of the mind is partly due to the number of unknown aspects of the functioning of the brain and its links with the body. And mainly, the mind remains a conundrum due to its intangible, non-visible aspects. Its complex conceptualisation also confronts us to objective and subjective points of view. Among stimulating points, we do not know how unconscious and intangible psychological mechanisms marking the body exactly work. We don't know how thoughts, mental images and feelings emerge from electrical signal.

This question of the emergence of thoughts recalls a work from French artist Michel Paysant. Part of his Eye-Drawing series, it is titled Dessiner mon père de souvenir avec les yeux.

Michel Paysant uses eye-tracking technique to make drawings either from real, physical visual supports or from mental representations or memory as for this work.
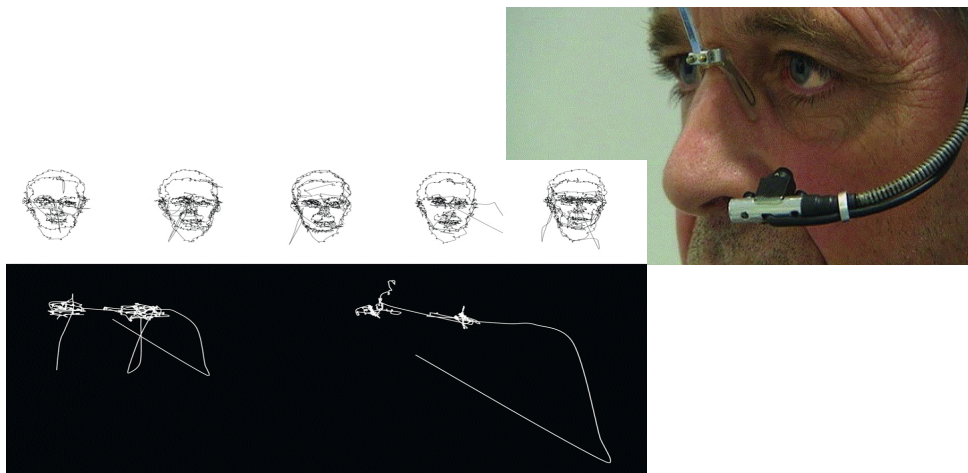
Figures 5 & 6 – Michel Paysant with an eye-tracker & Dessiner mon père de souvenir avec les yeux, 2004 © Michel Paysant

During a lecture at La Sorbonne in 2016, the artist shared his surprise with the likeness of his drawing; not that he had no memories of his father, but surprised by the accuracy of the result of what his eye drew from memories. Many aspects are very interesting here. Among others, the one linked to a fundamental question in art: the question of the work of art and the creative gesture. Here, the eye is the main tool, helped with technology. In this specific Eye-drawing made from memory, it questions the links between the eye and the mind, the psyche. It also questions its links with the hand when this latter is used to draw or paint. When artificial intelligence experts create robots artists, what does creating mean? Moreover, as mentioned, how a thought, a memory, a feeling emerge from electrical signal?

4. Conclusion

Cross-cutting artistic projects, between humanities, technology and sciences work on making phenomena perceptible. Beyond the visible, they give another glimpse of the system the mind may shape with the body and the environment. Crosschecking research perspectives about the mind shows us the relevance of complementarity in terms of methods, knowledge and perceptions. This combination also makes the mind central on one hand to navigate complexity, and on the other hand eventually to accompany human-environmental solutions for a challenging future. Studying the mind as a complex and integrative "thinking-feeling" coupled system with the environment requires an open, flexible and watchful approach.

Concurrently, we must wonder: how can we study, describe and think about the exact same system that enables us to objectify and reason, that produces and/or is the fruit of different levels of conditioning? In that sense, this echos Iranian philosopher Reza Negarestani that requires for the description of the mind a fundamental critique of the structures that regulate, channel and constrain our experiences . Bounding with the development of general artificial intelligence that brings together the issues of human intelligence and collective intelligence, the question and description of the mind is a burning topic.

Collective book co-edited by French philosopher Pierre-Antoine Chardel and graphic designer Olaf Avenati Datalogie. Formes et Imaginaires du Numérique (Loco ESAD Reims, 2016) investigates and highlights the questions about data and their processing, raising awareness on the production of meaning, on the use of data, which includes the development of such technologies. By resonance, the idea of this research is to develop transversal and critical approach and space applied to the subtle links we may develop and maintain with our self, the other and our environment(s). It is also the question of what makes sense. I will thus conclude in quoting anthropologist Philippe Descola in his lecture at College de France in 2017 during Les Natures en questions symposium. To me, his words could be applied to the question of the mind: "Nature is a metaphysical fact before being a physical, social, political, epis-

temological fact". Speaking about this mysterious passage from the sensible to the intelligible, Descola recalled that "the mental procedures used in rational or magical knowledge are the same, it is the selected properties that are different". That is why it appears that "we need dialogues, there is translation to be done". Refering to Michel Serres'work, and in some ways the framework of the actor-network theory in sociology, we need translation; a translation that consists in linking elements that are a priori immeasurable and incommensurable.

Notes:

1On this topic: Li, Q. (2018). Shinrin Yoku. The Art and Science of Forest Bathing. London: Penguin Books Ltd.
2Although it is a growing field in medicine, this gut-brain axis has been popularise by student Giulia Enders in her book titled Gut: The Inside Story of Our Body's Most Underrated Organ (Greystone Books, 2015).
3Concept in reference to philosopher Christine Buci-Glucksman in her book L'Esthétique du Temps au Japon. Du Zen au Virtuel (2001, Editions Galilée)
4Quotes from French writer Luc Lang during his participation in the discussion L'Art nous rend t-il plus intelligent?. Series of conferences Les Lundis du Grand Palais.
5Lecture of Mathieu Tricot for Post-Digital series with Iranian philosopher Reza Negarestani. Seminar held by ENS Paris. Tricol's lecture was titled Retour à la cybernétique. Ontologie et politique de l'information.
6Bockaert, J. (2017). La Communication du Vivant (pp.12). Paris: Odile Jacob.
7Neurologist Lionel Naccache interviewed by Mathilde Wagman. Les Frontières du Conscient. In (radio show) Les Passeurs de Science. France Culture. July 2016. Available on https://www.franceculture.fr/emissions/les-passeurs-de-science-le-cerveau/les-frontieres-du-conscient
8In Reference to Olga Kisseleva's installation Listen trees accross the Jordan river (part of EDEN project, 2017).
9Endangered species due to Phytophthora agathidicida, pathogen discovered in 2009. "There is no cure for kauri dieback, and the disease kills most if not all the kauri it infects". Kauri trees are naturally found in New Zealand, throughout the upper North Island, in the Northland, Auckland and Waikato regions.
10Les capacités insoupçonnées des arbres. In Le Temps d'un Bivouac. France Inter. Broadcasted on August 24, 2018 and available on https://www.franceinter.fr/emissions/le-temps-d-un-bivouac/le-temps-d-un-bivouac-24-aout-2018
11In reference to the book of Bouissou, J.M. (under the direction). (2014). Esthétique du quotidien au Japon (pp186-188). Paris : Editions du Regard.
12Guillemant, P. (2014). La Route du Temps. Paris: Le Temps Présent. And Guillemant, P. & Morisson, J. (2015). La Physique de la Conscience. Paris: Trédaniel.
13Delay, N. (2004). Le jeu de l'éternel et de l'éphémère (pp 7). Paris : Editions Philippe Picquier.
14Luminet, J.P. (Jan. – Feb. 2016). Copernic, Galilée, Newton, Einstein.. Trois mille ans de cosmologie, Six leçons d'humilité. L'Obs Hors-Série. Dernières nouvelles de l'Univers, 90-93.
15Based on the article: Escobar, A. (2016). Thinking-feeling with the Earth. Territorial Struggles and the Ontological Dimension of the Epistemologies of the South. AIBR. Revista de Antropología Iberoamericana, 11(1), jan. - apr. 2016, pp. 11-32.
16 These words were part of his lecture titled Unimagining General Intelligence for Post-Digital seminar in October 2017.

6.7 Determinants of green purchase intention (gpi) - implications for marketing communication

Cristina Pinto-Coelho

Abstract

This paper is about the determinants of green purchase intention and the implications for marketing communication.

The research was carried out in the context of Theory of Planed Behaviour (TPB) and aimed to develop an explanatory model for green purchase intention. Data was collected using self-administered questionnaire survey and analysed using structural equations modelling. The findings reported the usefulness of extending the TPB to additional constructs related with green purchase behaviour: ecological consciousness, perceived consumer effectiveness, quality perception and price perception. The proposed model showed a predictive capacity of 52%. The main determinants of green purchase intention were attitude toward buying green products, ecological consciousness and quality perception. Other determinants of green purchase intention were perceived consumer effectiveness (with indirect impact through attitude), perceived behavioural control (with positive direct impact) and price perception (with negative direct impact). We also found that quality and price perceptions showed different mechanisms on influencing green purchase intention; while quality perception's influence was partially mediated by attitude, price perception's influence was essentially a direct influence with no relevant impact on attitude. Social pressure (one of the constructs of TPB) did not influence green purchase intention. Based on these findings, implications for marketing communication strategies are suggested.

Key words: marketing communication, green purchase intention; green products, theory of planned behaviour, structural equation modelling, sustainable consumption.

1. Introduction

Population growth and per capita consumption are often pointed out as two interacting drivers of environmental degradation, stressing the need of profound changes for human behaviour to become sustainable (Fischer et al., 2012). Sustainable consumption and production were identified as prior concerns in Agenda 21 in 1992, constituting the twelfth objective of the United Nations Agenda 2030 for sustainable development (United Nations General Assembly, 2015). According to ample empirical evidence, awareness of the destruction of natural resources and concern for environmental protection are increasingly influencing consumer preferences

and purchasing decisions (Chan, 2001; Diamantopoulos, Schlegelmilch, Sinkovics, & Bohlen, 2003; Kim & Chung, 2011; Teng, Wu, & Huang, 2014). Green markets can be an opportunity to reduce costs, innovate, launch new products and develop new concepts of consumption. The aim of this research is to understand the attitudes of consumers toward the purchase of green products by developing a model identifying the main determinants of green purchase intention, thus providing an additional tool to support marketing communication strategies for environmentally sustainable consumption.

2. Theorethical framework and hypothesis

According to the Theory of Planned Behaviour (TPB), intention is the best behaviour predictor. "Behavioural intentions are indications of a person's readiness to perform a behaviour" (Fishbein M.; Ajzen, 2010). Based on assumptions of Theory of Planned Behaviour (TPB) and literature review, we developed the following hypotheses:

H1: Attitude toward buying green products (ATT) positively influences green purchase intention (GPI).
H2: Social pressure (SOP) positively influences green purchase intention (GPI).
H3: Perceived behavioural control (PBC) positively influences green purchase intention (GPI).
H4a: Ecological consciousness (EC) positively influences attitude toward buying green products (ATT).
H4b: Ecological consciousness (EC) positively influences green purchase intention (GPI).
H5a: Perceived consumer effectiveness (PCE) positively influences attitude toward buying green products (ATT).
H5b: Perceived consumer effectiveness (PCE) positively influences green purchase intention (GPI).
H6a: Quality perception (QUA) positively influences attitude toward buying green products (ATT).
H6b: Quality perception (QUA) positively influences green purchase intention (GPI).
H7a: Price perception (PRI) negatively influences attitude toward buying green products (ATT).
H7b: Price perception (PRI) negatively influences green purchase intention (GPI).

To test the hypothesis, we developed a research model which is an extension of TPB model incorporating environmental variables (ecological consciousness and perceived consumer effectiveness) and marketing variables (quality perception and price perception) in addition to attitude, social pressure, perceived behavioural control and intention (Figure 1).

3. Methods

The model was tested using data from 400 individuals belonging to the target-population under study defined as the population over 18 years of age residing in the Lisbon Metropolitan Area (AML), in Portugal, with secondary, post-secondary and higher education levels. Data was collected using self-administered web final questionnaire survey developed after testing a pilot questionnaire in a sample of 36 individuals belonging to the target population. Quota sampling method was used. Quotas were partially filled, and weighted techniques were used. The survey was carried out from 06.10.2016 to 05.12.2016.

Obtained sample was composed as following: concerning gender, 165 individuals were males (41,2%) and 235 were females (58,8%) - In target population these percentages were, respectively 47,0% and 53,0%; in terms of age, 81 respondents (20,2%) belonged to 18-29 age group, 103 (25,8%) belonged to 30-39 age group, 144 (36,0%) belonged to 40-54 age group and 72 (18,0%) were aged 55 or over - In target population these percentages were, respectively 27,0%, 29,2%, 26,8% and 17,0%; in terms of level of education, 111 respondents (27,8%) had secondary or post-secondary studies and 289 (72,3%) had bachelor's degree or above - In target population these percentages were, respectively 47,0% and 53,0%.

To measure the eight constructs (latent variables) included in structural model - Green purchase intention (GPI), attitude (ATT), social pressure (SOP), perceived behavioural control (PBC), ecological consciousness (EC), perceived consumer effectiveness (PCE), quality perception (QUA) and price perception (PRI) – seven points interval scales were applied to thirty-four items (observable variables) forming multi-item scales.

Factor analysis was applied to access one-dimensionality of each construct and, then, Cronbach's alpha, item-total and inter-item correlations were calculated with the aim to access reliability. Discriminant validity was analysed through a factor analysis with all items, using the analysis of common and specific factors through the principal component method, extraction of factors with eigenvalues greater than one and varimax rotation.

To test hypothesis, partial least squares - structural equation modelling (PLS-SEM) was used. To analyse research model, we followed the two step approach suggested by (Hair et al., 2014): firstly, we evaluated measurement model (outer-model), secondly, we assessed structural model (inner-model) . SPSS and SmartPLS software were used.

4. Results

All eight constructs proved to be one-dimensional. After measurement criteria analysis, one item from PBC and two items from GPI were removed and thirty-one items were retained to measure the eight constructs (retained items and references are listed in Appendix A).

As expected, factor analysis with all retained items presented a solution with eight factors. Confirmatory analysis showed that measurement model complied, in general, with the criteria for assessing its quality. Only PCE construct showed values below the criteria: reliability indicators of PCE1 (0,321) and PCE3 (0,429) were below the threshold of 0,50 and Cronbach's alpha of PCE scale (0,680) was slightly below the threshold of 0,70. However it was decided to maintain this construct into the model for two reasons: convergent validity of the construct, measured by Cronbach alpha, was very close to the threshold and PCE scale is highly referenced in the scientific literature. Table 1 summarizes measurement model results.

Structural model, outlined in Figure 1, showed a predictive accuracy of 0.521, i.e., about 52% of the variance in green purchase intention was explained by the variables of the model. Going back on the model, about 53% of the variance of the attitude was explained by the constructs that precede it. Concerning variables of Theory of Planned Behaviour (TPB), two of them, attitude (with a path coefficient of 0,354) and perceived behavioural control (with a path coefficient of 0,156) influenced significantly green purchase intention, which supported the hypothesis H1 and H3 respectively. Contrary to the TPB, the relationship between social pressure and green purchase intention proved to be not relevant and not significant (path coefficient of 0,019; t = 0,511), which did not support H3. Concerning environmental variables, ecological consciousness had a significant positive direct influence on green purchase intention (with a path coefficient of 0,192) and perceived consumer effectiveness did not have a significant influence on green purchase intention, for a level of significance of 1% (path coefficient of 0,094; t = 1,779). Likewise, H4b was supported and H5b was not supported. Further, a significant positive influence of environmental consciousness (path coefficient of 0,353) and perceived consumer effectiveness (path coefficient of 0,284) were reported on attitude, which supported the hypothesis H4a and H5a. Finally, concerning marketing variables, both quality perception (with a path coefficient of 0,185) and price perception (with a path coefficient of -0,127) had a significant direct influence on green purchase intention, which supported H6b and H7b. While a significant positive influence of quality perception was reported on attitude (path coefficient of 0,295), which supported the hypothesis H6a, price perception's influence on attitude was not relevant nor significant (path coefficient of -0,024; t = 0,650), which did not support H7a.

Constructs	Items	*Outer loadings*	Reliability indicator (i) *>0,50*	Convergent validity			Discriminant validity? (v) and (vi)
				*Cronbach's alpha*1) (ii) *>0,70*	Composite reliability (iii) *>0,70*	AVE (iv) *>0,50*	
GPI	GPI1	0,925	0,856	0,942	0,955	0,811	Yes
	GPI2	0,883	0,780				
	GPI3	0,871	0,759				
	GPI4	0,914	0,835				
	GPI5	0,908	0,824				
ATT	ATT1	0,901	0,812	0,928	0,943	0,735	Yes
	ATT2	0,880	0,774				
	ATT3	0,861	0,741				
	ATT4	0,840	0,706				
	ATT5	0,860	0,740				
	ATT6	0,800	0,640				
SOP	SOP1	0,907	0,823	0,903	0,939	0,836	Yes
	SOP2	0,931	0,867				
	SOP3	0,905	0,819				
PBC	PBC1	0,780	0,608	0,802	0,872	0,695	Yes
	PBC2	0,917	0,841				
	PBC3	0,797	0,635				
EC	EC1	0,843	0,711	0,879	0,917	0,735	Yes
	EC2	0,832	0,692				
	EC3	0,921	0,848				
	EC4	0,830	0,689				
PCE	PCE1	-0,567	0,321	0,680	0,801	0,506	Yes
	PCE2	0,815	0,664				
	PCE3	0,655	0,429				
	PCE4	0,785	0,616				
QUA	QUA1	0,876	0,767	0,868	0,919	0,791	Yes
	QUA2	0,896	0,803				
	QUA3	0,895	0,801				
PRI	PRI1	0,866	0,750	0,813	0,881	0,715	Yes
	PRI2	0,946	0,895				
	PRI3	0,707	0,500				

Table 1 – Measurement Model Results

Figure 1. Research Structural Model and Results
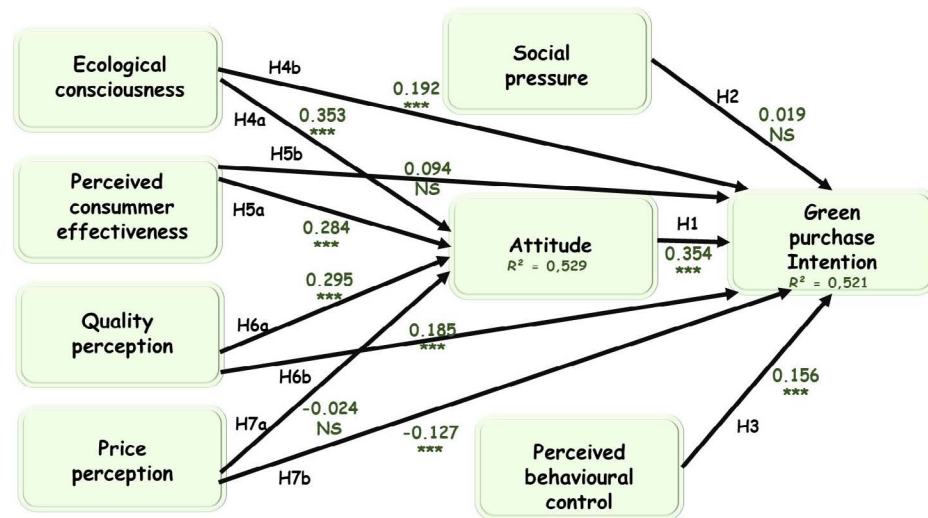
5. Discussion

The attitude was shown to partially mediate the influence of ecological consciousness, perceived consumer effectiveness and quality perception on green purchase intention. The influence of ecological consciousness and perceived consumer effectiveness on attitude supported the findings of earlier studies where ecological consciousness proved to be important in predicting consumer attitude toward buying organic personal care products (Kim & Chung, 2011) and where perceived consumer effectiveness proved to be an important antecedent of attitude (Roberts, 1996) and useful for predicting general pro-environmental behaviours (Vicente-Molina, Fernández-Sáinz, & Izagirre-Olaizola, 2013). The results showed that the negative impact of price perception on green purchase intention was essentially a direct impact, thus not being mediated by attitude, contrary to quality perception; this result supports the idea advocated by some authors that price perception is one of the reasons for the discrepancy between attitudes and intentions or behaviours (Polonsky & Ottman, 1998; Rex & Baumann, 2007). Contrary to what was expected, social pressure did not influence green purchase intention. This result is not consistent with Theory of Planned Behaviour (TPB). It should be noted, however, that in current research, social pressure reflects the injunctive norm (perception of others' approval of behaviour), not including the descriptive norm (which refers to the perception of how others would act, act or acted in the same situation) incorporated by Fishbein into the TPB in 2000 (Fishbein & Ajzen, 2010). Concerning the influence of social pressure on behavioural intention, on the one hand, several researches suggest that social pressure exerts influence on the green buying intention (Bamberg & Möser, 2007; Kalafatis, Pollard, East, & Tsogas, 1999). On the other hand, some examples of empiri-

cal studies found that the relationship between consumer's normative interpersonal influence and purchase of green products was not supported (Chang, 2015) and that social value had no impact on green products choice (Lin & Huang, 2012), which, according to the authors of the study (Lin and Huang) could happen because some interviewees did not feel that "green" increased social approval or made a good impression.

Additionally, measures used to capture the perceived norm or social pressure, often, had contributed less than expected to the explanation of the variance in intentions, so it has been suggested that the normative component should be expanded to encompass its complex facets such as aspects related with self-concepts like self-identity, which can influence intentions and actions (Fishbein & Ajzen, 2010).

6. Conclusion

The results of this research showed that the main predictors of green purchase intention were attitude and ecological consciousness followed by quality perception. Other relevant determinants of green purchase intention were perceived consumer effectiveness, which mainly had an indirect impact through attitude, perceived behavioural control, which had a direct positive impact on green purchase intention and price perception which mainly had negative direct impact.

Overall, the findings supported the applicability and usefulness of Theory of Planned Behaviour (TPB) to explain green purchase intention. As expected, attitude and perceived behavioural control had a significant influence on intention while social pressure, contrary to the stipulated in the theory, did not influence significantly the intention to buy green products, which may be related with the definition of the construct (defined as injunctive norm, not including descriptive norm). The extension of TPB improved the predictive power of the proposed model from 44% to 52%, allowing us to establish an order of importance between the determinants of green purchase intention and to understand the causal relationships between them. The results of the proposed model are illustrated by Figure1.

In terms of marketing communication, the relevant impact of attitude and ecological consciousness on green purchase intention leads us to advise that communication and merchandising campaigns may focus on green appealing. The importance of quality perception's influence on both green purchase intention and attitude toward buying green products highlighted the need to carefully manage consumer's quality perception about green products tackling greenwashing practices, implementing credible communication campaigns and clearly differentiating green products (from similar non-green products). Additionally, competitive price strategies are needed because high price perception may restrict consumer's intention to purchase green products despite their favourable attitudes and high ecological consciousness levels. We also recommend implementing broader distribution strategies and enlarging

the range of available green products in the market, which will increase consumers' perceived behavioural control which, in turn, will positively influence the intention to purchase green products.

Finally, some limitations from this study should be addressed. Firstly, the target population was limited to the metropolitan area of Lisbon and to individuals with education higher than secondary. Future research may consider a diverse demographic population, which will help to report generalized findings. Secondly, social pressure was defined based on injunctive norm, thus, not including descriptive norm concept. Therefore, future studies may include both concepts to measure social pressure and to test its influence on green purchase intention. Further, the study is limited to measuring intention, not actual behaviour. Future studies may explore relationships between actual behaviour or current experience with green products, attitude and green purchase intention. Future research may also focus on product categories exploring specific determinants and may include other consumer behaviours such as product usage and disposal, allowing a broader view on environmentally sustainable consumption.

Acknowledgements

References

Aaker, D., Kumar, V., & Day. (2001). Marketing Research (Seventh Ed).

Antil, J. H. (1984). Socially Responsible Consumers: Profile and Implications for Public Policy. Journal of Macromarketing, 4(2), 18–39. http://doi.org/10.1177/027614678400400203

Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. Journal of Environmental Psychology, 27(1), 14–25. http://doi.org/10.1016/j.jenvp.2006.12.002

Chan, R. Y. K. (2001). Determinants of Chinese consumers' green purchase behavior. Psychology and Marketing, 18(4), 389–413. http://doi.org/10.1002/mar.1013

Chang, S. H. (2015). The influence of green viral communications on green purchase intentions: The mediating role of consumers' susceptibility to interpersonal influences. Sustainability (Switzerland), 7(5), 4829–4849. http://doi.org/10.3390/su7054829

Diamantopoulos, A., Schlegelmilch, B. B., Sinkovics, R. R., & Bohlen, G. M. (2003). Can socio-demographics still play a role in profiling green consumers? A review of the evidence and an empirical investigation. Journal of Business Research, 56(6), 465–480. http://doi.org/10.1016/S0148-2963(01)00241-7

Fischer, J., Dyball, R., Fazey, I., Gross, C., Dovers, S., Ehrlich, P. R., … Borden, R. J. (2012). Human behavior and sustainability. Frontiers in Ecology and the Environment. http://doi.org/10.1890/110079

Fishbein, M., & Ajzen, I. (2010). Predicting and changing behavior: the reasoned action approach. New York: Psychology Press Taylor & Francis Group. Retrieved from http://www.theeuropeanlibrary.org/tel4/record/3000110815367

Hair, Hult, Ringle, & Sarstedt. (2014). A PRIMER ON PARTIAL LEAST SQUARES STRUCTURAL EQUATION MODELING (PLS-SEM).

Kalafatis, S. P., Pollard, M., East, R., & Tsogas, M. H. (1999). Green marketing and Ajzen's theory of planned behaviour: a cross-market examination. Journal of Consumer Marketing, 16(5), 441–460. http://doi.org/10.1108/07363769910289550

Kim, H. Y. (2009). Effects of consumer values and past experiences on consumer intention to buy organic personal care products: An application of the theory of planned behavior.

Kim, H. Y., & Chung, J.-E. (2011). Consumer purchase intention for organic personal care products. Journal of Consumer Marketing, 28(1), 40–47. http://doi.org/10.1108/07363761111101930

Kinnear, T. C., Taylor, J. R., & Ahmed, S. A. (1974). Ecologically Concerned Consumers - Who Are They. Journal of Marketing, 38(2), 20. http://doi.org/10.2307/1250192

Lee, Y. K., Kim, S., Kim, M. S., & Choi, J. G. (2014). Antecedents and interrelationships of three types of pro-environmental behavior. Journal of Business Research, 67(10), 2097–2105. http://doi.org/10.1016/j.jbusres.2014.04.018

Lin, P.-C., & Huang, Y.-H. (2012). The influence factors on choice behavior regarding green products based on the theory of consumption values. Journal of Cleaner Production, 22(1), 11–18. http://doi.org/10.1016/j.jclepro.2011.10.002

Maloney, M. P., & Ward, M. P. (1973). Ecology: Let's hear from the people: An objective scale for the measurement of ecological attitudes and knowledge. American Psychologist, 28(7), 583–586.

Maloney, M. P., Ward, M. P., & Braucht, G. N. (1975). A revised scale for the measurement of ecological attitudes and knowledge. American Psychologist. http://doi.org/10.1037/h0084394

Niaz, M. (2014). Antecedents Affecting Customer ' s Purchase Intentions toward Green Products. Asian Social Science, 5(1), 273–289.

Polonsky, M. J., & Ottman, J. (1998). Stakeholders' Contribution to the Green New Product Development Process. Journal of Marketing Management, 14(212), 533–557. http://doi.org/10.1362/026725798784867707

Rex, E., & Baumann, H. (2007). Beyond ecolabels: what green marketing can learn from conventional marketing. Journal of Cleaner Production, 15(6), 567–576. http://doi.org/10.1016/j.jclepro.2006.05.013

Roberts, J. a. (1996). Green consumers in the 1990s: Profile and implications for advertising. Journal of Business Research, 36(3), 217–231. http://doi.org/10.1016/0148-2963(95)00150-6

Swait, J., & Sweeney, J. C. (2000). Perceived value and its impact on choice behavior in a retail setting. Journal of Retailing and Consumer Services, 7(2), 77–88. http://doi.org/10.1016/S0969-6989(99)00012-0

Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. Information Systems Research. http://doi.org/10.1287/isre.6.2.144

Teng, Y. M., Wu, K. S., & Huang, D. M. (2014). The influence of green restaurant decision formation using the VAB model: The effect of environmental concerns upon intent to visit. Sustainability (Switzerland), 6(12), 8736–8755. http://doi.org/10.3390/su6128736

United Nations General Assembly. (2015). Transforming our world: the 2030 Agenda for Sustainable Development - Resolution A/RES/70/1. Retrieved from http://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf

Vicente-Molina, M. C., Fernández-Sáinz, A., & Izagirre-Olaizola, J.-. (2013). Environmental knowledge and other variables affecting pro-environmental behaviour: Comparison of university students from emerging and advanced countries. Journal of Cleaner Production, 61, 130–138. http://doi.org/10.1016/j.jclepro.2013.05.015

Vilares, M., & Coelho, P. (2005). A Satisfação e Lealdade do Cliente – Metodologias de Gestão, Avaliação e Análise. (E. Editora, Ed.). Lisbon.

Zeithaml, V. (1988). Consumer Perceptions of Price, Quality, and Value. Journal of Marketing, 52(3), 2–22. http://doi.org/10.2307/1251446

6.8 Socioeconomic issues in the paulo afonso archaeological complex and alternatives to heritage management

Abstract

This paper addresses issues related to patrimonial and socioenvironmental management of the Paulo Afonso Archaeological Complex, located in the city of Paulo Afonso, Bahia, Brazil. This archaeological area suffered, during five decades, impacts of activities of extraction of rocks directed to the civil construction that, at the time, was the only source of survival for the surrounding community. These activities interfered directly and negatively in the existing sites of rock paintings. After intervention by the Federal Public Prosecutor's Office, the injurious activities were embargoed, starting a journey in defense of the archaeological heritage but, in contrast, many local residents became unemployed. This article deals with the proposal made by the Center for Archeology and Anthropology of Paulo Afonso - CAAPA of the State University of Bahia - UNEB, to address issues related to patrimonial and socio-environmental management through a Sustainable Management Plan, focusing on the protection of cultural assets , as well as in local socioeconomic development.

KEY-WORDS: management of archaeological heritage, socio-environmental management, rock art.

Introduction

This article approaches the process of sensitization and recognition of the importance of the archaeological patrimony identified in the Paulo Afonso Archaeological Complex, a municipality in the extreme north of Bahia. In addition, the article demonstrates a management proposal for this cultural heritage. The complex contains the villages of Malhada Grande, Rio do Sal and Lagoa das Pedras, and for five decades the complex was exploited by private companies that damaged the environment. The companies carried out the extraction of rocks in archeological sites that contained prehistoric figures. These rocks were used as raw materials for construction and the local residents were the manual workers.

The Paulo Afonso Archaeological Complex is in the homonymous municipality, located in the extreme north of the state of Bahia, northeastern Brazil. The geomorphological unit that composes the region is the sertanejo pediplain near the São Francisco river channel, in the northern portion of the Backwoods of Bahia (central coordinate UTM 8,953,084 / 596,345). Besides being considered an important area of rupestrian records of the Brazilian northeast, it can also be classified as a remarkable landscape, both due to the granite outcrops that give it a specificity in relation to the surrounding areas, as in function of its flora and fauna, typical of the Tropical forest Sazonal biome, better known as Caatinga; attributes that give it the characteristic

of archaeological and landscape heritage (VERGNE, 2005). According to Santos and Souza (1988), two distinct geotectonic domains occur in the region: the range of unfolding of the State of Sergipe (of Proterozoic age) and the North Tucano Basin (of Paleozoic age). In both, it is possible to verify the presence of detrital coverings of the Quaternary, represented by alluvial deposits (op. Cit., 1988). The area was divided into three distinct geological compartments: Vaza-Barris Domain, Macururé Domain and Canindé-Marancó Domain (op. Cit., 1988, p.27), but the Archaeological Area of Xingó, which contains the village of Malhada Grande, belongs, almost totally, to the Dominion Canindé-Marancó. Regarding the climate, the precipitations are medium, with minimum of 413 mm and maximum of 907 mm. The temperatures are high throughout the year (average of 25ºC), which allows the high evaporation rates during the year, around 1200 mm (CHESF / ENGE-RIO, 1993a). Except for the São Francisco river, the availability of water in the region is extremely restricted, since all other rivers are intermittent (CHESF / ENGE-RIO, 1993a, p.161). In relation to vegetation, the caatinga phytophysiognomy is the main vegetation cover of the area: with occurrence of tree and shrub species that present leaves loss during the dry season, succulent and herbaceous species that develop after the rainy season (CHESF / ENGE- RIO 1993b, p.03) and cacti occurring throughout the year. The current fauna of the region, according to EIA-RIMA developed by CHESF, consists of ichthyofauna, carcinofauna, entomofauna, herpetofauna, avifauna and mastofauna, with more than 200 species identified.
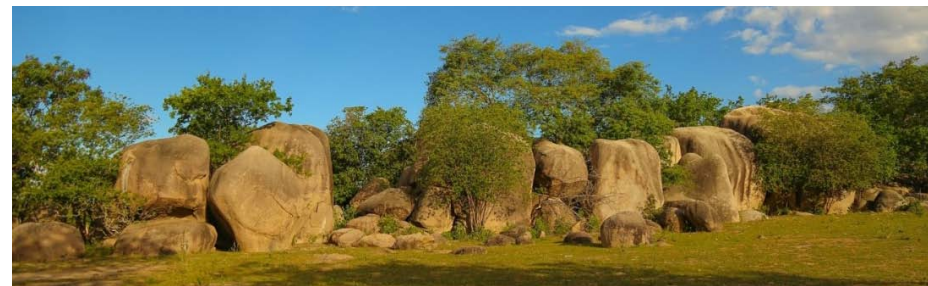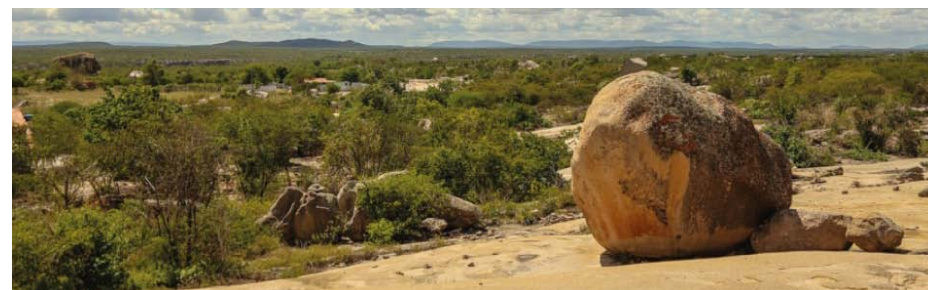
Photos 01 and 02 - Regional landscaping. CAAPA/20018

The rock drawings of the Paulo Afonso Archaeological Complex are in the villages of Malhada Grande, Rio do Sal, Lagoa das Pedras and Tará; the panels are composed almost exclusively of pure traces, that is to say: paintings or engravings that are not recognizable as something of the physical plane. Those panels that exhibit zoomorphic, anthropomorphic or rubber figures usually appear isolated and rarely form a scene (VERGNE, 2004). This style of art does not fit into the much discussed and studied traditions of the Brazilian northeast, being the main ones: Northeast and Agreste (MARTIN, 1999); for Vergne (2004), this style integrates the Geometric Tradition, although there is controversy around the existence or not of this tradition in the northeast of Brazil. However, when analyzing the peculiarities of the panels, the creative, technological, natural and social aspects of the cultural remnants evidenced, it is possible to consolidate the graphics of the Paulo Afonso Archaeological Complex within the Geometric Tradition, as Paulo Afonso Sub-Tradition.

Besides the technical and scientific characteristics demonstrated, there are issues of a much more sensitive nature involving the history of the Paulo Afonso Archaeological Complex: The stone breakers. The relationship between the residents of the surrounding communities and the environment was elevated to predatory status. This is because, once there is no other form of employment, the social actors themselves that make up the local socio-cultural context are encouraged and supported by the power of private initiative. The result of this combination is the destruction of rock sites, and the manual extraction of rock blocks to be used as raw material in construction. As mentioned by Santos (2010), stone breakers, who live in precarious conditions, were submitted politically and ideologically to situations of economic demands that are contrary to the traditions of their ancestors. They surrendered to capitalist impositions to survive. Against this environmental and cultural disaster, the Brazilian Federal Public Prosecutor intervened in an incisive way, impeding activities and, with the support of the State University of Bahia, began a journey to reduce the environmental and property damage caused, avoid future damages and to assist the former stone-breakers involved in the conflict to take up the dignity formerly taken away by the interests of capital. From then on came the idea of the Sustainable Management Plan of the Paulo Afonso Archaeological Complex.

Theoretical and methodological basis

According to Morais (1999), the main theoretical contribution is the subdiscipline Archeology of the Landscape, which has the capacity to deal with the subjects of the design of Archeology in relation to its dimension of planning, management and management of the archaeological heritage, which the author denominates UGGPs (Unidades Geográficas de Gestão Patrimoniais), whose assumptions are marked, mainly, by the use of geotechnologies, (Cf. MORAIS, 1999, p.31). For Criado Boado (1996), Landscape Archeology is a research strategy that intends to construct and interpret the archaeological landscapes from the objects that make it concrete.

To understand and to interpret the spatial distribution of settlements and, consequently, the possible uses of space by previous populations, we use a strategy of investigation, identification and understanding of the archaeological record with the intention of reconstructing archaeological landscapes, as well as the processes of continuity and its changes in the current context. In this interpretation, the archaeological record is recognized as the product of social action. Therefore, archaeological observation is, under the bias of this subdiscipline, capable of enabling the recognition of visible social activities in the landscape. There is an inherent concern with this concept, the use of these methods and techniques that identify archaeological sites arranged in the landscape and interconnected with it, that is, the development of systematic, diachronic and integral studies of the archaeological record and landscape (the latter understood not as a passive entity where social processes occur or as a resource to be explored, rather as a social construction).

Finally, Landscape Archeology aims to analyze the articulation of societies with the surrounding environment as a social totality, searching through the geo factor for a detailed analysis of the elements that integrate the landscape with a view to understanding the interrelationships with societies, because it presents the important characteristic of not being destructive. Taking into account that the archaeological assets are finite, the Archeology of the Landscape values the use of the archaeological survey through the use of the geotechnologies, corroborating appreciably for the preservation of this patrimony (MORAIS, 1999, pp. 31-32).
For the landscape research, the procedures may occur concurrently with the documental / cartographic survey of the area, associated with the bibliographical / historical documentary of the area, leading to prospecting for inventory production of all patrimony arranged in the landscape, archaeological record, of architectural structures and of the landscape itself in geographic and biological suits, properly digitally mapped (SIG) allowing to produce, the exact location of all the evidenced structures. This perspective can be used to reconstruct the past social landscapes through the dense description and subsequent interpretation of the archaeological record, besides pointing out the processes of continuity and change of the use of this landscape.

History, justification and objective

In 2007, there were about 56 families of stone breakers in the community of Rio do Sal (AGENDA, 2007) who were prevented by the Federal Public Prosecutor from continuing to act in the unhealthy activity of extracting rock blocks manually, which in the long run resulted in the irreversible destruction of 48 of the 112 archaeological sites registered on the site and, consequently, mass unemployment in the community. In 2010, with the Institutionalization of the Center for Archeology and Anthropology of Paulo Afonso (CAAPA), State University of Bahia (UNEB, Campus VIII); a proposal was launched to assist public authorities in preserving the archaeological heritage of the complex, to mitigate the negative socio-economic impact indirectly imposed.

Concerned about the possible disappearance of this patrimony, UNEB researchers from various areas of knowledge (Archeology, Ecology, Pedagogy, Geography, Anthropology, Law, History, Tourism, among others) developed actions that focused not only on preservation, but also on management, both in terms of socialization of knowledge and its use of tourism and economy as a promoter of local social development.

Therefore, this research has two central objectives that are distinct and complementary: to foster the sustainable development of the local community, based on socio-economic insertion, social responsibility and socio-educational and cultural integration; to promote scientific-academic research centered on the archaeological works on the dozens of sites of rupestrian figures evidenced in the area, covering the interdisciplinary and multidisciplinary.
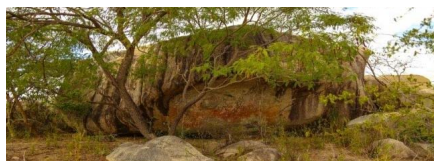
Photos 03, 04 and 05 - Panels with rock records. Photograph: CAAPA / 2018

Proposed sustainable management plan

The proposal of the Sustainable Management Plan for the Paulo Afonso Archaeological Complex was designed based on three main guidelines: academic-scientific, socio-economic and patrimonial management.

As far as the academic-scientific aspect is concerned, the plan is based on a systematic and integral study of the archaeological record, taking as a theoretical-methodological basis the Landscape Archeology approaches, which provide significant alternatives for surveying, researching and preserving cultural heritage. Through archaeological research to recognize the regional settlement system in relation to the physical-biotic environment, from an inter-site perspective, with the survey of the actual number of archaeological sites in the area, it is possible to use an approach that favors geoindicators (landscape) in Archeology, analyze and understand the geomorphology, geology and ecology of the region, with a view to the perspectives of Landscape Archeology to the reconstruction of the scenarios of human occupa-

tion in the past; including raising data that allow a detailed understanding of the regional paleoenvironment, to program the study of operative chains of material culture, in order to understand the technological organization of the groups that inhabited the area. The socialization of knowledge will be based on the publication of results, lectures / seminars at scientific meetings, courses for university students and the regional academic community, as well as the improvement of infrastructure with the construction of walkways that allow the visitation of archaeological sites and the constitution of Paulo Afonso Open-air Museum, as well as the proposal for the construction of a Center for the Culture of Memory in the Territory of the Paulo Afonso Archaeological Complex, with an interdisciplinary character, for the evolution of social processes and the use of the landscape from prehistory to days current.

The socio-economic guideline is based on the principles of integration / insertion through pedagogical actions based on sustainability and social responsibility, fostering the cultural rescue of the residents of the aforementioned villages, integrating them with the projects being presented. In this case, our objective is to present these residents as the main agents of the Sustainable Management Plan of the Paulo Afonso Archaeological Complex, considering the aspects of human life (knowledge, beliefs, techniques, way of life and culture), the greatest asset that may exist. Through workshops, seminars and semi-intensive courses in the various areas that cover the project, aiming at the creation of new fields for economic development and restructuring of existing services and activities, such as tapestries and networks that are very well known regionally.

Photo 06 - Handmade production of carpet and hammock in Malhada Grande. Source: CAAPA,2010

On the actions directed to patrimonial management, the greatest facilitator in the first moment is the archaeological inventory, that not only can as it must be realized by an inter and multidisciplinary team. Constituted by a virtual environment, this inventory must necessarily count on a dense description of all aspects observable in the landscape where the archaeological remains are inserted. It is possible to cre-

ate a digital cartographic base, formed from a geographic information system (GIS), georeferencing all the sites and the archaeological occurrences of the area, aided by a digital bank of images, photographs, rocky site decals, contextualized with all the data obtained the technological analysis of the evidenced material culture.

Final considerations

The proposal of the Sustainable Management Plan of the Paulo Afonso Archaeological Complex is a plausible exercise of application in the area having as a theoretical and methodological contribution the procedures assumed by Landscape Archeology, with a view to the patrimonial protection and the promotion of socioeconomic sustainability. An essential fact to be highlighted is the fragility of this patrimony in the face of the impacts suffered to date, these being worsened continuously by the process of urbanization of the region, especially in small municipalities.

Despite having been efficient in the past, public action has been minimal, even in the face of criticism from the regional academic community, a fact that may lead to the return of the residents to the stone breaking activity, given the reality of poverty in which they live.

The non-destructive Landscape Archeology model can represent an advance in the area's research, developing dense projects for heritage preservation and awareness. Finally, it is important to emphasize that our intention is to integrate the community, to value its traditions, allowing them cultural, social and economic development amidst a preservationist attitude.

Bibliographic references

CHESF/ ENGE-RIO. EIA-RIMA da UHE-Xingó. Tomo I e II, diagnóstico ambiental, meio físico, v. 02 , 1993.

CRIADO BOADO, F. Hacia um modelo integrado de gestión e investigación del patrimonio histórico: La cadena interpretativa como propuesta, PH. Boletín del Instituto Andaluz de Patrimonio Histórico,16, 73-78,1996.

MARTIN, G. Pré-História do Nordeste do Brasil. Recife: UFPE, 1999.

MORAIS, J.L. A Arqueologia e o fator geo. Revista do Museu de Arqueologia e Etnologia da Universidade de São Paulo, MAE/USP, n.09, pp. 03-22, 1999.

SANTOS, F. A. Ecologia Humana: Percepção e saberes ambientais dos quebradores de pedras do Rio do Sal. Trabalho de Conclusão de Curso, Licenciatura em Pedagogia. UNEB, Paulo Afonso, 2010.

SANTOS, R. A.; SOUZA, J. D. (Orgs.) Piranhas:folha SC.24-Z-C-IV, estados de Sergipe, Alagoas e Bahia. Brasília: DNPM, 1988. 123 p. il.: mapas, escala 1:100.000. Programa Levantamentos Geológicos Básicos do Brasil – PLGB.

VERGNE, C. Arqueologia do Baixo São Francisco estruturas funerárias do sítio Justino, região de Xingó, Canindé de São Francisco – Sergipe. São Paulo, MAE/USP, tese de doutoramento, 2004.

VERGNE,C. Arqueologia e turismo: notas sobre os sítios de pintura rupestre no município de Paulo Afonso –BA. Rios-Revista científica da Faculdade Sete de Setembro. Paulo Afonso, FASETE, v.01,pp.130 -138, 2005.

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