



The paradigm of systemic complexity and the sustainability of Homeland Earth: an epistemological view of the Brazilian reality according to the ideas of Edgar Morin

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ABSTRACT. The environmental issue has been built on numerous epistemological and paradigmatic biases, which now reflect the concern with the perpetuation of environmental autopoiesis, and now evidence the asymmetries revealed by the contradictions of stateless capitalism. Edgar Morin, in his various works, exposed the profound nature of the environmental system, based on a careful analysis centered on the principles of reparadigmatization. Starting from this context, the objective of this article was to understand the bases of sustainability by integrating the structuring concepts of eco-organization and environmental complexity, traced by the Moranian paradigm, and their relationship with Brazilian environmental policies. Based on the profound content analysis of the works of this epistemic protagonist, it can be inferred that the paradigm of systemic complexity is not only essential for rethinking the environmental issue in contemporary times, but it is also absolutely possible, as attested by case studies of rural peoples and communities in the State of Amazonas, located in the Brazilian Amazon, here presented. Nevertheless, this article concludes that in order to overcome the supposed dichotomy between economics and the environment and to carry out another 'via' on Homeland Earth, it will be necessary to build a network of solidarity and cooperation between the different actors/subjects/institutions.

Keywords: eco-self-organization; systemic complexity; the 'way'.

O paradigma da complexidade sistêmica e a sustentabilidade da Terra-Pátria: um olhar epistemológico da realidade brasileira segundo as ideias de Edgar Morin

RESUMO. A questão ambiental tem sido alicerçada a partir de inúmeros vieses epistemológicos e paradigmáticos, que ora refletem a preocupação com a perpetuação da 'autopoiese' ambiental, e ora evidenciam as assimetrias desveladas pelas contradições de um capitalismo apátrida. Edgar Morin, em suas diversas obras, expôs a natureza profunda do sistema ambiental, por meio de uma análise criteriosa centrada nos princípios da reparadigmatização. Partindo desse contexto, o objetivo desse artigo foi compreender as bases da sustentabilidade amalgamando os conceitos estruturantes da eco-organização e da complexidade ambiental, traçados pelo paradigma Moriano, e sua relação com as políticas ambientais no Brasil. Pode-se inferir, com base na profunda análise conteudal das obras desse protagonista epistêmico, que o paradigma da complexidade sistêmica é não apenas imprescindível para o repensar da questão ambiental na contemporaneidade, mas também perfeitamente possível, conforme atestam os estudos de caso de populações e comunidades rurais do Estado do Amazonas, na Amazônia brasileira, aqui apresentados. No entanto, o artigo conclui que, para a superação da suposta dicotomia entre economia e meio ambiente e a realização de uma outra 'via' na Terra-Pátria, será necessária a construção de uma rede de solidariedade e cooperação entre os diferentes atores/sujeitos/instituições.

Palavras chave: eco-auto-organização; complexidade sistêmica; a 'via'.

Received on April 18, 2021.

Accepted on May 7, 2021.

Introduction

Discourses on the environmental issue have metamorphosed in the past few decades, perpetuating conventional paradigms, while simultaneously strengthening the emergence of alternative paradigms. This

contradiction, inherent to the complexity of the theme, evidence that the paradigms, instead of being doused by antinomy coexist and are developed from criticisms woven from divergent thoughts. Thus, alternative paradigms, which focus on “new” forms of relationship with nature, more precisely rescue the past base of human reproduction in Gaia (Lovelock, 2001).

Homeland Earth (Morin & Kern, 1995) raised questions about environmental resilience (Leff, 2000, 2004), social reproduction, and the autopoiesis of the environmental system (Maturana & Varela, 1995). Economists, who mostly focus their efforts on maintaining the basis for expanded capital reproduction, in this case raw materials, began to discuss the very foundation of economic relations, highlighting the finitude of natural resources and the perpetual auto-reproduction of the environment (Cechin & Veiga, 2010). Economists such as Georgescu-Roegen (1971, 1993), previously invisible, started to have their narratives featured due to the analytical difficulty of explaining environmental complexity by other dichotomous and non-integrated currents.

Starting from this context, the objective of this article was to analyze the paradigm of environmental complexity, from Edgar Morin (2015a, 2015b), and its relationship with environmental policies in Brazil, in its multiple facets. To achieve the aforementioned objective, bibliographic reviews of Morin’s writings were conducted, with emphasis on the following works: Method 1: The nature of nature; Method 2: The life of life; Method 3: Knowledge of knowledge; Method 4: The ideas; Method 6: Ethics/Science with conscience/The ‘Via’ to the future of humanity/Homeland Earth (Morin, 1998, 1990, 2011, 2013, 2015a, 2015b, 2016).

Then, case studies are presented of rural peoples and communities in the State of Amazonas, located in the Brazilian Amazon, which develop their activities in line with reproductive autopoiesis, that is, the auto-reproduction of the environmental system. The epistemological and paradigmatic entanglement will be unveiled through the materialization of the work developed on the lands, forests, and waters (Witkoski, 2007) centered on a fabric of power that reflects an isomorphic governance (Rezende, 2018), that is, a network of political articulation centered on the resilience of agroecosystems and the role of other subjects/actors/institutions in the web of life (Capra, 1996).

From dichotomy to complexity

The understanding of the environment has always culminated in several epistemological, paradigmatic, and analytical debates. Over the years, several groups have been delineated, some with complementarity and some with antagonistic interests. If we take into account only the discourse of sustainability, we can find the existence of two different categories. In a first group, those who claim to understand the environmental complexity stand out, but often produce speeches and develop actions that do not reflect this complexity. For example, companies include in their portfolios the “green” dimension, but in practice they only consider the environment in a utilitarian perspective, either to maintain the basis for the production of goods or to multiply likes due to ‘green’ marketing. Above all, they defend development, profit, competition, and the market.

In a second group are environmentalists, who understand the functioning and organization of the environmental system and, for this reason, fight in search of social equity and environmental justice (Acsehrad, 2002). These social subjects play a fundamental role in the struggle to guarantee basic rights advocated in the Brazilian Federal Constitution, as explained in Article 225 (Brasil, 2016). They advocate a lifestyle change, less consumption, solidarity, and cooperation.

Certainly, other groups could be mentioned as constituents of this antagonism/complementarity of existing environmental paradigms; however, we cite only two to exemplify the different angles and views that permeate the environmental issue in contemporary times.

In a country like Brazil, where many poverty pockets still exist, goal of economic development is natural, which inevitably leads to some sacrifice of the environment, especially with the construction of project with significant impact, such as hydroelectric plants, offshore oil exploration, mineral extraction, and intensively mechanized agriculture. Although economic development must be pursued, environmental damage should be as minimum as possible, always within the limits established by the environmental system. This complex problem demands equally complex solutions.

This complexity present in society is reflected in the environmental legislation itself, which, in due proportions, addresses the main concerns of environmentalists and society at large. However, in the exercise of daily life, either due to the pressure exerted by the interest of big capital or the lack of the supervisory bodies, practice has not been very coherent and has not contemplated the configuration of the hologram of

environmental complexity. Hence, the State, which should lead the mediation process for environmental policies, ends up incorporating the 'developmentalist' notion (Veiga, 2007), sometimes accentuating the dichotomy between society and nature, which has been so combative in recent decades.

Part of this issue derives from the myopia of the state bureaucracy itself, which does not see that public policy intervention domains are always complex domains, as Morin would say, and elaborates policies as if they were not, operating by the principle of disjunction, reduction, and abstraction. Sustainable development, which involves the interaction between the social, the natural, and the economic, is certainly one of the greatest challenges of contemporary times.

Science, in principle, seeks to serve society. Therefore, society undergoes and passes through long and successive metamorphoses, so science also metamorphosed. The progress of knowledge necessarily takes place by disrupting and breaking closed systems, which does not provide by itself the attitude of resistance. Theories require a methodology that is both open (which integrates old ones) and specific (description of complex units). Science, in Edgar Morin's perspective, must be viewed transdisciplinary. From this perspective, many international conferences have been organized to discuss the main environmental problems that plague humanity and have counted on the participation of a wide range of specialists from different areas of knowledge, as well as representatives of social movements, companies, Nation States, NGOs, and others (Montuori, 2013).

Such events have borne fruit and strengthened the development of an 'epistemology of the south' (Santos & Meneses, 2010), built by people of different ethnicities and places in Gaia, making themselves worthy and respected for their ancestral knowledge, while still epistemologically questionable, have contributed to the progress of science. In this context, the starting point, which motivated the production of the intellectual craftsmanship in this article, focused on the identification of the origin and the execution of successful strategies that amalgamate local development with ecosystemic sustainability. However, these initiatives have remained invisible, either because they are not within what is considered to be "governance" or because they serve interests other than the hegemony.

Such actions, which will be explained in the third section of this text, are practiced and often devoid of the action by the State, given that local interactions can generate behaviors that emerge from the bottom up, leading to the self-organization of the system, without need for central control.

To build the *Via*, recommended by Morin, the web of environmental governance must be expanded to include the myriad of actors/subjects/institutions involved in the construction of environmental policies, in monitoring, in implementation, in modification, and in the setting of new possible 'vias' and routes. Leaving the dichotomy and diving into the range of environmental complexity is a necessary effort. Necessary for science, for society, for companies, and for the State.

This contemporary indispensability has at stake the very survival of the human species. This recognition did not come from catastrophic views, but from the understanding of the functioning of the environmental system and its consequences on life in Gaia. This observation emphasizes that we are not in the environment, we are not part of the environment, but we ARE the environment. We live in an eternal interdependence between the biological dimension and the anthropo-social dimension. This is the uniduality that produces and reproduces life on Earth.

The sustainability paradigm: nature supporting the economy

For a long time, the discourse was propagated that the capitalist system would lead to the extinction of family-based agriculture and establish destructive tentacles in all areas of society. However, capitalism has been reconfiguring itself and weaving other socioeconomic relations with those who have other ways of relating to nature and natural resources. Paulino (2006) states that the capitalist system has been nourishing, unlike other non-typically capitalist systems. An example of this is that 70% of the food consumed in Brazil comes from family farming.

Conservation Units, for example, which are one of the main Brazilian strategies for environmental preservation and/or conservation, have been successful in most proposals, but not always. Such barriers materialize due to numerous aspects, such as the lack of integration with other environmental policies, dichotomous approach to management processes, little emphasis on strengthening local governance, and non-deliberative social participation (in most cases). These aforementioned elements reveal that the success of environmental policies and the construction of sustainability as a paradigm (Freitas & Freitas, 2016) will only occur when we recognize the complexity of the environmental issue.

Especially the Conservation Units for Sustainable Use, a category created in the perspective of integrating nature conservation with human occupation in the area and their respective economic activities (very much related to the notion of sustainable development), are proving to be a great challenge in terms of their effectiveness. Many do not have a management council, existing only on paper, or do not have a Management Plan, which regulates the use of existing resources at the site, which is one of the vital conditions for the full functionality of the UC. It is necessary to study the location, resources, populations and their interactions so that management agreements and management plans can be built together with social actors, and that way, building an effective management.

Given the above, the questions that arise are: How long will it take for the State to recognize the urgency in mitigating environmental problems as a principle of conservation of life? How long will it take for companies to change their ways of producing goods to guarantee their own expanded base of capital reproduction? These questions can have several answers, as Morin (2015a) makes explicit in his writings, uncertainty is the only certainty we have. However, Morin outlines the ways to get there: understanding environmental complexity; the engendering between ethics, solidarity, and human relations; and the reconfiguration of the relationships that people establish with the world.

There is a growing movement around these issues. The United Nations (UN), for example, has acted decisively in actions aimed at sustainable development in several countries. The United Nations Development Program (UNDP) has financed various projects aimed at the conservation of socio-biodiversity, and the protection of the traditional knowledge of the Amazonian peoples. These actions, even though they are not developed throughout Brazil, consist of relevant advances that are in line with Brazilian environmental policy.

There is much to be done, but mosaics are being formed from new ways of seeing the world, in alternative paradigms, such as agroecology (Altieri, 2012), and in other types of development, such as good living (Alcântara & Sampaio, 2017). Two paths are possible: the gradual transformation in production and consumption or confronting a serious environmental and civilization crisis. As it is, it will not be possible to sustain the environment, let alone humanity. The shift can be for precaution or remediation. Conjectures are now delineated, futuristic and realistic. Companies, societies, countries, and Nation States should focus their efforts on creating macro- and micro-policies aimed at environmental sustainability.

This is about the maintenance of life in Gaia, the perpetuation of raw materials essential for human reproduction, and the sovereignty and food security of global society. Therefore, sustainability is highlighted as a paradigm, because from it all other forms of socioeconomic relations will be woven. The world must be viewed under the paradigm of complexity and sustainability, only then will we recognize the necessity of reformulating production and consumption patterns, and in the very notion of development, to transform this logic of economics into the logic of well-being.

The materialization of epistemologies of the south and the construction of the ‘via’ for the future of humanity

In the previous topics, we highlighted the roots of sustainability as a paradigm, the bases of environmental complexity, and the relationship between Brazilian environmental policies and its intrinsic interests. The programs and projects developed under the framework of environmental legislation in Brazil have generated advances towards mitigation of environmental problems and the conservation of socio-biodiversity. However, these policies have not materialized in an integrated way, generating satisfactory results only in the chosen territories. This lack of integration ends up producing ‘islands’ of preservation and/or conservation, sidelining the complexity that characterizes Brazilian ecosystems.

However, many achievements have been achieved with collective engagement and with the social participation of the peoples that guarantee the sustainability of the Amazon. These are initiatives that characterize what Santos and Meneses (2010) calls ‘epistemologies of the south’, which are forms of knowledge production and *praxis* centered on counter-hegemonic archetypes. We can mention, in this context, the Farmers’ Market of the Family Farmer of the Amazon (AGROUFAM - Feira Livre do Agricultor Familiar da Amazônia), organized by the Center for Socioeconomics (NUSEC) of the Federal University of Amazonas (UFAM). This event is held monthly and has the participation of approximately 150 families, from 9 municipalities in the state of Amazonas.

This initiative brings the university closer to society, guarantees healthy food to the people of Manaus, increases the income of producing families, supports the agroecological transition, and creates mechanisms

to strengthen social organizations. This is an example of the implementation based on the pillars of communion, cooperation, agroecology, solidary economy, well-being, and environmental sustainability. For these reasons, AGROUFAM can be considered an archetype of an epistemology of the south, because in addition to being a market, it is a venue for the exchange of knowledge and information between students, companies, teachers, consumers, rural producers, among other social subjects.

Another interesting example of an initiative that crystallizes the 'other via' is the work carried out by the Association of Rural Producers of Carauari (ASPROC - Associação dos Produtores Rurais de Carauari), which has been combining local development with conservation of agroecosystems, as well as the management of pirarucu. The many results include increased fishing stock, increased community income, and provision of healthy food for consumers. Countless successful cases exist in and outside Amazonia, created on a sustainable basis. If these projects were connected and integrated, more families would benefit, and more territory would be protected.

The notion of modern myth of untouched nature (Diegues, 1994) is in the past. Scientists and farmers from different parts of the world have started to create and develop technologies aimed at increasing the production and productivity of agroecosystems, the genetic improvement of plant and animal species, and other factors linked to the land. It is possible and absolutely necessary to combine development and sustainability. However, we must discuss the essence of the development we want.

If the development is directed solely and exclusively at the expanded reproduction of capital, the environmental and civilization crisis will intensify, becoming totally unsustainable in the short, medium, and long term. If development begins with sustainability as a paradigm, we will have other, much more beneficial, 'vias' for environmental conservation to preserve life on Earth. The 'via' to the future and the maintenance of humanity is singular, the others lead to destruction.

We need to stop seeing villains and start ringing the bell of solidarity and cooperation between the different actors/subjects/institutions. Companies need to conserve the supply of raw materials for the production of goods. Society needs to feed, breathe, and live, and this is only possible within an environmental system. Nation States need to defend their interests and their sovereignty, but they will have to negotiate alternatives with other Nation States. As Morin and Kern (1995) state, planet Earth is our homeland. It is necessary to rethink the stateless logic of a wild and destructive capitalism to think about new possible horizons and worlds.

Final considerations

Environmental complexity is part of reality, it exists regardless of whether social subjects perceive it or not. Morin, in his works, highlights indispensability of regaining the understanding of the necessity to create another 'via' for the future of humanity, based on ethics, cooperation, communion, and solidarity between people. His texts present much more than a scientific narrative, they emphasize another conception of the world and humanity. His dialectical dance of words shows his concern to point out the contradiction inherent in the real and constructed realities.

Morin is not just an intellectual, he is a futuristic and realistic scientist. He has fought epistemological battles and legitimized the importance of an alternative paradigm: the dialectic of systemic complexity. This article shines light on the relevance of recognizing systemic complexity in Brazilian environmental policies and in the lives of men and women who work and reproduce deep within the Amazon. Amid so much diffusion of the hegemonic discourse, we strive to shed light on the counter-hegemonic face, so strong, but so deprived of repercussions.

Countless peoples and communities have dedicated their lives to maintaining the foundation for reproducing life: environmental sustainability. People have created technologies, techniques, knowledge, and forms of social organization that brought them to national and international scenarios. The fruitful existence 'of epistemologies of the south' has been carefully designed by the hands of farmers, fishermen, and extractivists, who, although suffering from the negligible reach of the State, manage to substantiate alternatives in the face of the obstacles faced, building their own governance: isomorphic governance.

Although we recognize that there is much to be done, horizons that are being drawn, worlds that are being built, forms of development that bring change, there is hope, there is a way out, and there must be a way out. The 'via' to the future of humanity, worked on by Morin, already exists, as we saw in the examples cited throughout this article. However, it is necessary to multiply these tentacles so that we can practice the most urgent civilizing act: seeing and acting with sustainability as a paradigm.

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