

ECONOMIC DEGROWTH AS AN ALTERNATIVE TO THE GLOBAL ECOLOGICAL RISK

DECRESCIMENTO ECONÔMICO COMO ALTERNATIVA AO RISCO ECOLÓGICO GLOBAL

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Abstract

The recent global health crisis caused by the new coronavirus (COVID-19) has proved to be an ecological crisis. This is ultimately due to the side effect of the reflexive global environmental risk. This article seeks to analyze the connection between the pandemic, ecological risk in modernity and the degrowth theory. As an alternative to (un)sustainable development, we seek to propose degrowth as an economically, socially and environmentally sustainable strategy for greater resilience to ecological risks or even suppression of their causes. The research problem involves how it is possible to think about environmental sustainability in a development system harnessed to economic growth. It is concluded that the emergence and dissemination of new

Resumo

A recente crise sanitária global causada pelo novo coronavírus (Covid-19) revela-se como uma crise ecológica. Isso se deve, em última instância, ao efeito colateral do risco ambiental global reflexivo. Busca-se, neste artigo, analisar a conexão entre os fenômenos de pandemia, do risco ecológico na modernidade e da teoria do decrescimento. Alternativamente ao desenvolvimento (in)sustentável, busca-se propor o decrescimento como estratégia econômica, social e ambientalmente sustentável, que permite uma maior resiliência aos riscos ecológicos ou, ainda, a supressão de suas causas. A problemática de pesquisa envolve como é possível pensar em sustentabilidade ambiental num sistema de desenvolvimento atrelado ao crescimento econômico. Conclui-se que será provável o surgimento e disseminação de



zoonotic species will be likely if there is not a reassessment of the current pattern of human economy. This is due to the maintenance of the logic of economic growth which, as part of the concept of sustainable development, means that environmental sustainability is engulfed by the economy. In the preparation of the text, the inductive method was adopted as a research methodology and the bibliographic documentary research as a research technique.

Keywords: public health crisis; degrowth; ecological risk.

novas espécies zoonóticas caso não haja uma reavaliação do atual padrão da economia humana. Isso se deve à manutenção da lógica de crescimento econômico que, inserida na concepção de desenvolvimento sustentável, faz que a sustentabilidade ambiental seja fagocitada pela economia. Para elaboração do texto, adotou-se o método indutivo como metodologia de pesquisa e a pesquisa documental bibliográfica como técnica de pesquisa.

Palavras-chave: crise sanitária; decrescimento; risco ecológico.

Introduction

The current situation of health crisis felt worldwide brought about by Sars-CoV-2, the new coronavirus that causes COVID-19, was able to uncover and point out adversities to which attention was not directed before the spread of the new virus. This article aims to analyze the existing connection between the global pandemic phenomenon and its characterization as a global environmental risk. In addition, it seeks to discuss possible solutions for humanity to reduce the degree of civilizational threats and prolong its existence.

The hypothesis to be investigated is that the theory of degrowth is presented as a theoretical and practical proposal to reduce human exposure to environmental risk. For this, the inductive method is adopted as research methodology, bearing in mind that the combination of chained findings allows reaching generic conclusions that are applicable, even if partially. This is because the inductive method starts from particular data, analyzing individual phenomena to arrive at a general “truth”. Together with the research method, the technique of bibliographic research was used to construct this text, covering sources obtained from public archives, statistical factors and bibliographies that deal directly and indirectly with the subject in question.

The text is structured in three topics. The first is intended to present a summary of the global panorama of the health crisis caused by the Sars-Cov-2 virus. Although there has been a temporary smoothing of environmental degradation as a result of world social isolation, anthropic activities have caused ecological

imbalances at increasingly irreversible levels. The emergence of the COVID-19 variant itself is the result of the intensification of human involvement in nature, since the virus is a zoonosis, a class of diseases whose appearance and spread is also determined by environmental conditions. Thus, the general picture of an emerging global public health crisis has ultimately proved to be a global ecological crisis.

Secondly, it seeks to demonstrate that the new coronavirus is a fraction of the ecological crisis, the result of environmental risk. Based on the German sociologist Ulrich Beck's risk society theory, it is argued that the new class of risks in modernity is characterized by the reflexivity of risk, as well as by its delocalization, tending towards globalization and incalculability. Based on the definition of "development", "sustainability", and "sustainable development", the argument is that the current health crisis can be interpreted as a global environmental risk produced as a result of modernization and industrialization processes aimed at unlimited economic growth.

Finally, the third topic focuses on the appreciation of the presented hypothesis. Based on the previous in-depth analyses of "development", "sustainability", and "sustainable development", the theory of degrowth is proposed as a theoretical and practical alternative to face environmental risks in modernity. It is pointed out that sustainable development, traditionally linked to economic growth, engulfs environmental sustainability in the notion of "sustainable development" and does not question classic economic patterns.

It is concluded that the emergence and dissemination of new zoonotic species will be recurrent if the current pattern of economic growth is not reassessed. In short, modernity requires resources beyond the natural capacity for regeneration, taking into account the acceleration of the low-high entropy flow. Thus, ecological degradation and imbalance reach levels of no return. In this context, environmental risk reflexively emerges as a consequence and product of modernity, in such a way that sustainable development does not satisfactorily meet the compatibility between current production rhythms and the maintenance of natural balance. Given this situation, degrowth reappears as an alternative to the ecological risk of modernity.

1 Pandemic-health crisis in the context of socio-environmental imbalance

The pandemic scenario that was presented in December 2019, and which will continue to have repercussions in the coming years, is a fertile field for exploring

various topics in the most diverse areas. Health, biological, economic and social science professionals are faced with a context in which knowledge construction is interconnected in order to understand the scale of the disturbances brought about by the new coronavirus and the degree of prudence necessary to face them.

One of these dimensions affected by the COVID-19 pandemic is the environmental dimension. As a result of the stoppage of industrial activities, the reduction in the number of vehicles in urban centers and social isolation during a good part of 2020 in various parts of the world, changes in the environment were noticed. The improvement in air quality in large urban centers was the first aspect to be observed. A report prepared by IQAir, a digital platform that provides information on air quality in real time, collected data for three weeks in the ten largest cities in the world in social isolation and compared them to statistics for the same period in the years 2019, 2018, 2017 and 2016. Delhi, London, Los Angeles, Milan, Mumbai, New York, Rome, São Paulo, Seoul and Wuhan were the cities evaluated.

Of the ten large centers, nine showed PM 2.5 reductions (a unit of measurement that analyzes the amount of fine particles in the environment) compared to the same period in 2019. Cities with historically high levels of pollution experienced a substantial improvement in air quality, with pollution reduced to 60% in the case of Delhi and 44% in Wuhan, a location that witnessed its cleanest air recorded during social isolation. In São Paulo, air pollution reduced by 32% compared to the same period in 2019 (IQAIR, 2020).

Another highlight is Earth Overshoot Day, which marks the day of the year when humanity's demand for natural resources and ecological services exceeds the planet's ability to regenerate its ecosystems that same year. The "D" day was reached on August 22, 2020, later than expected, mainly due to the reduction in the pace of industrial activities. In 2019, the critical point was reached on July 29, the furthest date since the beginning of measurements of the ecological deficit in the 1970s (O DIA DA SUPERCARGA..., 2019; WWF BRASIL, 2020).

However, these circumstances should not be evaluated in an optimistic perspective, given that the benefits witnessed resulted from an exceptional context. The current estimated rate of global warming is 0.2°C per decade, and could reach 1.5°C between 2030 and 2052 (IPCC, 2019). Furthermore, the planet's natural regeneration capacity is increasingly affected by anthropic activities, given the soaring increase in consumption and extraction of natural resources.

The new coronavirus, a zoonotic disease (that is, transmitted by non-human animals), has denounced environmental dilemmas involving the link between

humanity and the natural environment which, although already perceived by the international community, are assigned to the secondary level of debate to the detriment of the urgency of economic and health challenges. The *Frontiers 2016 Report: Emerging Issues of Environmental Concern*¹, from the United Nations Environment Program (UNEP), contributes to understanding the relationship between the pandemic and the natural environment. The report devoted an exclusive section to dealing with zoonoses and identified “emerging zoonotic diseases” as those that appeared recently in the population or were pre-existing, but which rapidly increased their contagion and geographic reach (UNEP, 2016).

The emergence of zoonoses is directly associated with ecological disturbances, such as the intensification of agriculture, the approximation of human settlements to areas of native vegetation and, mainly, climate change. This factor is one of the important influencers in the amplification of zoonoses, since climatic conditions are responsible for making the environment conducive or not for the survival, reproduction and distribution of the pathogen (UNEP, 2016), allowing the disease to take on epidemic proportions.

Sousa *et al.* (2018), when analyzing 65 climate-sensitive diseases (CSD), obtained the following result: the most frequent CSD were respiratory, followed by dengue, malaria and cardiovascular diseases. Confirming the claims of UNEP, in an analysis of the study sites of the incidence of climate-sensitive diseases, the impacts on the human species “[...] do not occur with homogeneous geographical distribution, due to the different results predicted by climate change, in addition to different socioeconomic characteristics” (SOUSA, *et al.*, 2018, p. 6).

The 2016 report indicated that around 60% of infectious diseases in humans are zoonotic and that a new infectious variety appears in humans every four months (UNEP, 2016). In recent years, the emerging diseases that most occupied the pages of the main press vehicles were zoonoses: Ebola, Zika virus, avian flu, Middle East respiratory syndrome (MERS) and SARS (severe acute respiratory syndrome that is also caused by other coronavirus species). The most recent UNEP record, released in July 2020 especially due to the current pandemic context, entitled *Preventing the next pandemic: zoonotic diseases and how to break the chain of transmission* presents a technical-scientific assessment of zoonoses and reaffirms some of the alerts already qualified in 2016.

In general, the exchange of microorganisms between humans and animals is natural and important for the healthy balance of life (UNEP, 2020). The problem resides in the imbalance of this interaction, mainly the result of anthropic actions.

¹ “Frontiers Report 2016 on Environmental Emergency Issues”.

According to the new report, although certain physical conditions may increase the risk of infection by zoonoses (such as age, physiology, history of exposure, simultaneous infection with another pathogen), the main contributors to the increased chances of contagion by zoonoses result from the intensification of global trade and industrial activities (UNEP, 2020).

The *Preventing the next pandemic* assessment specifies that the major anthropogenic drivers of emerging zoonotic diseases are: (a) intensification of unsustainable agriculture and livestock (which tend to breed genetically similar animals and hence increase the animal population's susceptibility to infection); (b) unsustainable use of natural resources due to accelerated urbanization; (c) increased demand for consumption of food of animal origin; (d) the aggressive exploitation of wild animals; (e) transportation of animals (legal and illegal); and, finally, (f) climate change (UNEP, 2020).

Specifically regarding COVID-19, the international organization informs that the different species of coronavirus are of similar origin. So far, the thesis supported is that more than two hundred species of the virus have been found in bats, so that the transmission took place between bats and humans, between bats, or between other animals and humans, causing an interspecies transmission. Two other predominant factors in the Sars-Cov-2 case are the intensification of agriculture and the increase in demand for animal protein, as well as the consumption and sale of animals in places known as wet markets, that is, informal markets where pathogen-carrying animals (alive or not) are sold:

These coronavirus disease outbreaks followed rapid intensification of agricultural practices and systems, and dramatic changes in the ways animals were kept or farmed, many of which were made without proper precautionary measures being taken. As mentioned previously, this was a demand driven process, associated with increasing wealth, allowing people to consume more animal source food. [...]. SARS-CoV and SARS-CoV-2 may be associated with wildlife harvest, trade practices and the intensification of wildlife farming in East Asia (UNEP, 2020, p. 25).

From the network of factors that contribute to the transmission of zoonoses, not only is the increase in transmission between animals and humans expected, but also the development of new pathogenic varieties. The UNEP report includes strategies to prevent future outbreaks of zoonoses, considering that the appearance of new diseases is inevitable (UNEP, 2020). Finding alternatives that contemplate the sustainable coexistence between human activities and the environment is one of the recommended policies for the control and prevention of zoonoses (UNEP, 2020).

According to the United Nations Environment Program (UNEP), the Sars-CoV-2 (COVID-19) virus is impacting humanity with greater intensity compared to the effects caused by previously identified zoonoses, as the human species is offering greater conditions for its dissemination (UNEP, 2020). The technical information recovered points to a consensus that there is a direct and proportional relationship between the emergence and dissemination of zoonoses and changes in the natural environment caused by human activities: the greater the environmental imbalance, the greater the risk and threat of diseases for which science does not know the cure.

COVID-19 was able to highlight the environmental risk to which humanity is subject in modernity. The general picture presented is one of an emerging global public health crisis that, ultimately, turns out to be a global ecological crisis. This is due to the lack of control of anthropic activities, especially the pace of industrial production and social behavior that seeks the satisfaction of unrealistic needs in exacerbated consumption. The consequences of risk unfold in countless effects that bring the human species closer to calamitous events for which there are no coping precedents.

2 Environmental risk: theme-problem of modernity

Modernity provided an improvement in the quality of life of humanity in an unthinkable way for pre-modern societies. Extraordinary developments in medicine, health and disease prevention strategies, possibilities for greater comfort at home, the convenience of the automobile, the ease of the world wide web. Countless innovations can be mentioned with the advent and progression of the modern world. However, the current mode of operation has reached unsustainable levels of ecological demand.

Baumann (2001) described the new times as a 'liquid modernity' (compared to the three physical states of matter). Contemporary modernity is marked by its fluidity, that is, it does not stick to any specific form. Time is more precious than space as the latter can be changed conveniently any time. It is also in liquid modernity that time is reduced to instantaneity. Being modern means being on the move and being unable to enjoy the satisfaction of achieving goals. Satisfaction is due to the race to achievement, not the achievement itself. According to Baumann (2001), the *most modern* and, therefore, *the best* that can be done is always in the future.

Therefore, liquid modernity is distinguished from all other historical forms

of transformation and human coexistence due to the “[...] the compulsive and obsessive, continuous, unstoppable, forever incomplete modernization; the overwhelming and ineradicable, unquenchable thirst for creative destruction [...] of ‘clearing the site’ in the name of a ‘new and improved’ design; [...]” (BAUMANN, 2001, p. 36). Thus, humanity has lost the limit of perfecting progress.

On the other side of the assembly line of the constantly needed improvement of industry and consumption is the German sociologist Ulrich Beck (2011), who developed another analysis of contemporaneity that he named Risk Society. In short, contemporary society would be characterized by the accumulation of risk: nuclear, terrorist, financial, military, biochemical, informational and environmental threats agglomerate in a short fraction of time. At the outset, it is worth mentioning that the “risk”² for Beck (2011, p. 362-363) is understood as the “*anticipation of catastrophe*” that presupposes human decisions. “Modernization” is the

[...] surges of technological rationalization and changes in work and organization, but beyond that [...] changes of lifestyle and forms of love, change in the structures of power and influence, in the forms of political repression and participation, in views of reality and in norms of knowledge. [...] a much deeper process, which comprises and reshapes the entire social structure. Ultimately the sources of certainty on which life feeds are changed (BECK, 2011, p. 23).

The risk society is theoretically formulated by concatenating concepts defined throughout his work. The socialization and reflexivity of risk, as well as its globalization and incalculability, are part of the set of aspects that make it possible to understand the framework of risk and threat in modernity.

Modernization, a phenomenon that alters the sources of certainty in science, social structures and conceptions of reality, has modified the circle in which risk and threat are felt. The circle was widened, not being restricted to specific sectors of society (groups framed as agents apart from an alleged normality and regularity), previously considered as *others*³ (BECK, 2011).

However, since Chernobyl and the nuclear threats that marked the second

2 Beck (2011) establishes a differentiation of meaning between “threat” and “risk”. Both are sorts of future uncertainties. However, risk is a modern concept that presupposes human decisions and humanly produced futures. On the other hand, threat concerns the insecurity that accompanies the human species since its primitive formation related to survival. Despite the differentiation into ideal types, threat and risk intersect in reality.

3 Regarding the traditionally marginalized “*others*,” it is noteworthy that Beck brings a twentieth-century European perspective to identify such groups. The “*Others*,” for Beck, are exemplified by Jews, refugees, communists and immigrants. From the Brazilian perspective, this vision of who the “*others*” should be expanded to include groups also affected by the effects of modernity, such as riverside communities, *quilombolas* and traditional communities.

half of the 20th century, it has become evident that the effects of risk (especially environmental risks) can affect everyone to a greater or lesser extent. For this reason, Beck understands that risks in modernity are democratized⁴ (BECK, 2011).

The democratization of risk presupposes its displacement. Thus, the second hallmark of modern risks is their globalization. Given the complexity of the market, the internationalization of industries, the new purchasing possibilities open to consumers and the intensification of damage to the environment, risks can no longer be reduced to short-range hazards or restricted to a small geographic area. On the contrary, there is a tendency to spread across the globe and, sooner or later, cross geographic borders. “In this sense brings into being *supra-national*... global hazards with a new type of social and political dynamism [...]” (BECK, 2011, p. 15-16). In modernity, risk acquires the nature of global uncertainty.

In a similar vein, Anthony Giddens (1991) already addressed, in the early 1990s, that the globalization of risk can be identified in two scales: intensity and expansion. Intensity because it takes into account the degree of severity of the risk and expansion because of the number of secondary occurrences that affect all or, at least, a large part of the world’s population.

Another characteristic of modernity’s risk is its incalculability, a factor linked to scientific knowledge about risk. Beck (2011, p. 262-263) defends the thesis that increasing incalculability is accompanied by increasing estimability. “In this way, the actual consequences ultimately become more and more incalculable, because the possible effects become more and more estimable and their assessment takes place more and more in the research process and [...]”. This relationship between incalculability and estimability stems from the very process of knowledge production that occurs in the sciences and their ability to steer:

The prevailing theoretical self-concept of science implies that the sciences cannot make value judgments with the authority of their rationality. They deliver so-called ‘neutral’ figures, information, or explanations which are to serve as the ‘unbiased’ basis for decisions on the broadest variety of interests. *Which* interests they select, however, on *whom* or *what* they project the causes, how they interpret the problems of society, *what sort* of potential solutions they bring into view – these are anything but neutral decisions. In other words: the sciences have developed their steering

⁴ For Beck (2011), as risks in modernity intensify, the risk society develops a tendency towards unification due to the globalization of threats. Unlike class society, risk society forces humanity to collaborate due to its cross-border evolutionary dynamics. Faced with the risk equalizing factor, risk societies cannot be evaluated by the assumptions of class society. Risk in modernity is threats *despite* class. However, this analysis does not deny the fact that the risk is unevenly distributed due to social class. Risk distribution is historically linked to social class. Therefore, the wealth distribution problem is closely related to the risk distribution problem.

abilities *independently of* and *beyond* explicit value statements. Their possibilities of exerting practical influence lie in *how* they design scientific results (BECK, 2011, p. 265-266).

This critical approach does not mean that scientific knowledge in modernity is directly responsible for the results that culminate in the creation of threats, but rather that the sciences have the power to create or reproduce security or insecurity. In this context in which environmental risk is created by the infusion of human knowledge into nature (GIDDENS, 1991), transforming it into “nature artifice”⁵, the contribution of scientific knowledge to risk and threat reduction concerns the analysis of to what extent the treatment of symptoms can be replaced by the suppression of the causes of risk (BECK, 2011).

For this reason, with regard to risk in modernity, asking *how* is as important as *what*: what is researched, what is industrially produced and often *modernized*, how it is researched, how the answers to these researches are presented, how it is produced or it is intended to produce, how it is possible to reverse the side effects of the industrialization process. That is why, faced with the impasse between suppression of causes or treatment of symptoms, the incalculability of risk persists. It is possible to predict the risk, but it is not possible to predict its size.

Finally, reflectivity consists of the great differentiation of civilizing risks in relation to the threats experienced by humanity in previous historical moments. Risks in modernity can be defined as side effects that cause other side effects. That is, risks are not actors of a chaotic reality, but rather the result of humanly produced futures and past and present political, legal, economic and social decisions which, in turn, produce scenarios of insecurity. According to Beck (2011), current risks are, therefore, a consequence and product of modernity, or even endowed with a reflexive effect converted into a problem-theme of modernity.

The environmental risk in this historic period is made up of relatively novel elements. The current health crisis caused by the Sars-Cov-2 virus, understood as part of the global ecological crisis, meets all the (environmental) risk characteristics of modernity produced as a result of the world’s modernization and industrialization processes. The global pandemic is a threat to human survival, which, however, cannot be treated as an unpredictable fact, inasmuch as the causes of this

⁵ The expression “nature artifice” comes from Ost (1995). In *Nature at the Margins of the Law*, the author discusses the bond and limit of the relationship between man and nature, arguing that with modernity, the sense of bond and limit of this relationship has been lost. With regard to the bond, the type of relationship established between man and nature was based on the replacement of the natural with the plasticized one. In this sense, what happened was a crisis of the bond, because modern technoscience understands nature and then imitates it, improves it, transforms it and, finally, creates the artifice, the autonomous, the supranature. This bond “[...] was anthropomorphized, with nature being reduced to the exclusive interests of the human species [...]” (OST, 1995, p. 30).

specific risk have not been adequately resolved. Therefore, it is necessary to analyze ecological solutions for modernity, with a view to preventing new ecological crises of global magnitude.

3 Economic degrowth: a proposal to fight the global ecological risk

The new class of risks and threats in modernity is characterized by an unprecedented nature. They are globally felt reflexive events of estimable foresight, of incalculable harm and of latent urgency. The vicissitudes of industrialized modernity have outlined a new risk profile, bringing up debates about which solutions can be adopted to reduce risk. Among the proposed solutions disseminated in the second half of the twentieth century is the discourse of sustainable development, in view of its assumption that it would be possible to continue producing and consuming in the current pace and, at the same time, prevent a new health crisis. However, given the increase in the metabolism of the human economy⁶, there is a bet on degrowth as a theoretical foundation and a practical strategy to prevent humanity from being exposed to novel environmental risks.

Degrowth, based on bioeconomy or ecological economics, reappears⁷ as a practical and theoretical alternative in the face of the ecological crisis and as a “[...] awareness of a process that was established at the heart of the civilizing process that threatens life on the living planet and quality of human life” (LEFF, 2010, p. 58). On the other hand, sustainable development responds positively and simultaneously to economic growth and environmental sustainability, sometimes being seen as the only viable alternative, sometimes as a convincing rhetorical discourse from a marketing point of view, but not very efficient when it comes to fulfilling its outlined objectives of respect and preservation of nature. Thus, the development of the case in this section proposes to retrieve some concepts of sustainability, development and, finally, the theory of degrowth as a counterpoint and possible alternative for facing ecological risk.

The term “development” was coupled with “sustainability” with the publication of the Brundtland Report – Our Common Future of 1987⁸, when sustainable

⁶ Alier's expression (2011, p. 47).

⁷ According to Latouche (2009), degrowth emerged in the 1960s and was developed mainly by Ivan Illich and Cornelius Castoriadis from their questions about the consumer society and its imaginary bases: progress, science and technology.

⁸ It should be noted that the term “sustainability” is not new. It was already being used by forestry engineers and, until the 1970s, it meant “maximum sustainable yield,” whose objective was to establish criteria for optimizing forest exploitation. In addition, the term “sustainable” had already

development is conceptualized for the first time (VEIGA, 2015). Consequently, the term “sustainability” is not synonymous with “sustainable development” or “environmental sustainability”, since when used as a noun (sustainability), in addition to not referring exclusively to “development”, it can relate to several other fields (agricultural, cultural, corporate policy, organizational, human sustainability, etc.) (VEIGA, 2015).

Environmental sustainability (specifically) is related to values, especially those of an intergenerational nature and environmental responsibility. The expression announces a sustainable world plan, meaning, ultimately, providing opportunities for future generations to access natural resources. In the same way that modernity is related to the anticipation of risk, environmental sustainability is related to the anticipation of the future. That is, the foundation of sustainability lies more in the future than in the present, since the present generation has an ethical environmental responsibility for the future.

Sustainable development, established by the Brundtland Report as an economic and social project that meets the needs of the present without compromising the needs of future generations, or also as a process of transformation in which the exploitation of natural resources, the orientation of investments and technological development harmonize (CMMAD, 1991), is assimilated as something inherently beneficial and necessary for humanity.

Defined as a goal to be achieved and implemented by all countries in the long term, sustainable development presupposes, on the one hand, the concept of necessity, which is socially and culturally determined. On the other hand, it has as its goal the maintenance of consumption patterns, as long as it conforms to the limits of ecological possibilities to which everyone can reasonably aspire, being, therefore, compatible with economic growth (CMMAD, 1991).

In fact, there is a construction that highlights the necessary conjunction between sustainable development and economic growth. Ignacy Sachs (2008), for example, summarizes this point of view that follows the position of the Brundtland Report. The economist points out that the adjective “sustainable” together with the notion of development is a conceptual advance, so that sustainable development requires more than economic growth. There is a triad of essential elements that must be obeyed: social and environmental sustainability and economic viability make up sustainable development and support the ethical imperative of intergenerational solidarity.

been used in 1972 by the authors of the Limits to Growth Report for the Club of Rome (or the Meadows Report) to characterize the condition of sustainable ecological and economic stability in the long term, an event distinct from the proposals of the Brundtland Report (VEIGA, 2015).

Only solutions that meet all three criteria can be called development solutions. From this perspective, there is no possibility of thinking about development without considering sustainability and economic growth. For Sachs (2008), economic growth is not enough by itself and does not guarantee development, but it is a strategy with an indispensable instrumental function. Thus, sustainable development would be unattainable without considering economic growth.

However, it is believed that, in order to deal with the risks of modernity, another social and economic configuration is needed, focused on the causes of risk, in addition to treating its symptoms. This is because, in the logic of “sustainable development”, the traditional concept of “development” overlaps with that of “environmental sustainability”. In this way, the industrial developmentalist ideals that support the risk society are maintained, considering that changes in the planet’s ecological balance are treated as environmental externalities to the economic process.

In the current mode of production, sustainable development acts as a discursive strategy of power co-opted by economic interest, and not as an alternative to environmental degradation committed to ecological ethics (LEFF, 2010). In this sense, sustainable development becomes unsustainable and amplifies the threat of risk, to the extent that it does not question the logic of growth for the sake of growth and does not transform the reflexive cycle of environmental risk.

Contrary to what it might indicate, degrowth does not argue for an interruption in economic growth¹⁰. In fact, it presupposes a departure from the social model marked by excessive production and consumption and the biophysical limitlessness of economic growth. At the center of the arguments for

9 It is understood that there are other conceptions of “development”. Economist Amartya Sen (2000) argues that development is not entirely linked to the economic issue, but with freedom of choice, of being able to develop according to one’s own volitions. The author points out that wealth is important, however, it is a limited need and does not translate into quality of life. Development is related to the improvement of freedoms, opportunities and processes that allow the exercise of this freedom. Hence, high income and economic growth are not synonymous with development (SEN, 2000). However, the object of study of this article involves the traditional conception of development, often used as a synonym for economic growth, since, as stated by Veiga (2015), before the 1960s it did not seem necessary to separate development from economic growth, since the countries considered developed were those with the greatest economy due to the industrialization process, while the developing countries were those with an incipient industrialization process, resulting in low economic growth. Therefore, theoretical efforts to understand development separately from economic growth are recent. However, this does not mean that the traditional concept of development has been overcome and this concept, associated with the industrialization process, is the critical basis worked on in the modern context of risk society.

10 Among scholars in favor of degrowth, it is understood that simply interrupting the production process would not lead to real sustainability, but would cause an unprecedented crisis (GEORGESCU-ROEGEN, 2012; LATOUCHE, 2009; LEFF, 2010).

the commitment to degrowth is bioeconomy, which assumes thermodynamics as a limit to constant progress.

Nicholas Georgescu-Roegen (2012), a dissident economist¹¹, critical of the distancing of economic theory from the basic foundations of natural sciences, was primarily responsible for bioeconomy. Contrary to most economic theories of the 20th century, whose pattern was represented in the closed and isolated economic system¹², Nicholas argued that steady, progressive economic growth is limited by the laws of nature. Furthermore, he argued that industrial production is not infinitely durable. According to the author, believing that the recurrent exploitation of natural resources will not bring ecological risks “[...] is an illusion of linear thinking, of the mythology of progress and development” (GEORGESCU-ROEGEN, 2012, p. 21-22).

Nature became a requirement for the functioning of the gears in the industrial system, so that the culture of progressive growth ignored the thermodynamics present in the economic process, removing the living natural universe from its cycle of self-balance and self-control. The second law of thermodynamics (or entropy) measures the degree of dissipation of matter and energy involved in the production process. It is a measure of disorder that assesses how unusable matter and energy become: the higher the entropy, the greater the disorder and the greater the dissipated (useless) energy. The lower the entropy, the more useful the matter-energy and the lower the impact on the environment (GEORGESCU-ROEGEN, 2012).

The industrial production process is fed by low entropy (raw material taken from nature) and transforms it into high entropy, a cycle driven by what Georgescu-Roegen (2012, p. 62) called the “joy of living” of modernity, based on

11 Georgescu-Roegen, despite having been honored in academia for his remarkable knowledge in mathematics, statistics and economics, was ignored for composing his economic analyses with the foundations of ecology, an area disqualified by economists in the 1960s, a time when economic growth economy unrelated to the environment was seen as the sole propeller of prosperity (GEORGESCU-ROEGEN, 2012; CECHIN, 2010). By challenging the excessive formalism of economics, as well as the mechanistic epistemology, quite accentuated in the academic world of economic sciences in the second half of the twentieth century, he says that “GR’s interpretation of the Entropy Law is on the side of the movement of holistic thoughts (organicists and anti-mechanists)” (GEORGESCU-ROEGEN, 2012, p. 35).

12 It is said “closed and isolated” because the ideal model of economic system to which it refers does not exchange matter with the environment. Analyzed by the law of entropy, the economic-industrial process is not a linear closed system simply fed with matter and energy that eliminates waste in the preparation of the product, but a phenomenon that interacts with the natural environment and is limited by it. From this, the economic system would be, in fact, an open system, which exchanges matter-energy with the environment, unlike the models presented in economics manuals and criticized by Georgescu-Roegen (2012).

consumption to guarantee well-being. Thus, every production process is limited to absorbing matter and energy and returning them to the environment in a dissipated form (GEORGESCU-ROEGEN, 2012).

The entropic function is a natural phenomenon that indicates the direction of events on the planet, since both matter and energy tend to dissipate in a certain amount of time. It is, therefore, a spontaneous path of natural life. The conclusion reached is that the flow of matter and energy in this cycle is irrevocably and irreversibly transforming from low to high entropy (from a natural resource to unusable energy, mainly in the form of heat).

It so happens that the way established by the human economy accelerated the entropy phenomenon and ecological disorder, entropy being a limit imposed by nature on economic growth. It should be borne in mind that, although Georgescu-Roegen's (2012) approach focuses on the dialectical analysis between the fundamentals of thermodynamics and the functioning of the economic system, this analysis is not restricted to the industrial production process itself, but represents the irreversible impact caused on nature that, ultimately, reflexively becomes an environmental risk:

Based on this observation, we can affirm that global warming – which appears as the clearest symptom of the environmental crisis of economic globalization – is the result of a growing process of *entropic degradation of nature* – of matter and energy – generated by all processes of industrial production and the destruction of natural ecosystems that produce increasing emissions of greenhouse gases, while reducing the ability of the planet's biodiversity to absorb carbon dioxide [...] through the process of photosynthesis, through the processes of deforestation (LEFF, 2010, p. 23-24).

In this way, the economic-industrial process of modernity is the main model of entropy acceleration, given the constant withdrawal of finite natural resources (low entropy) to transform them into high entropy residues. Thus, the struggle of humanity is reduced, in the end, to maintaining the low entropy of the environment, that is, of natural resources:

[...] every time we produce an automobile, it is done at the price of a drop in the number of future human lives. It is possible that economic development based on industrial abundance will be of benefit to us and to those who can enjoy it in the near future, but it is still contrary to the interest of the human species as a whole if, at least, its interest is to last as long as its low entropy endowment allows (GEORGESCU-ROEGEN, 2012, p. 69).

Thus, in view of the second law of thermodynamics, sustainable development inseparable from economic growth, desired for decades, is insufficient to deal with the new standard of environmental risk due to the lack of analysis instruments compatible with the values of environmental sustainability.

In practical terms, degrowth is an interdisciplinary project that addresses the inevitability of environmental externalities through the confluence of ecological, social and economic analyses (ALIER, 2011), based on a realistic analysis of the current modern situation. Its practical design involves eight interdependent changes, comprised of the eight “r’s”. In addition to the already known reduce, reuse and recycle, there is a need to reassess, reconceptualize, restructure, redistribute and relocate the human economy (LATOUCHE, 2009).

Reassessment is about rethinking the values of the modern lifestyle (having over being) and, above all, reconsidering the desire to consume, that is, reassessing whether the consumption of a given product is more related to a temporary satisfaction of status or to a real need. In a second moment, it is necessary to reconceptualize values of a growth society: the dichotomous notions of wealth and poverty, scarcity and abundance, for example, need to be re-signified, since the classical economy transforms natural abundance into scarcity, through the appropriation and commodification of nature. Restructuring is linked to the re-adaptation of the entire productive apparatus, as well as the social relations present in it, aiming at a productive process guided by degrowth due to the reassessment of values. Redistribution goes beyond income distribution; it is also concerned with the equal access of all to the natural heritage (LATOUCHE, 2009). Finally, relocation presupposes essential production to meet the needs of the local population. In addition, it requires food, economic and financial self-sufficiency (in that order) of the locality, preferably with incentives for organic production. The degrowth strategy assumes a more organic and seasonal diet, according to what is produced locally and with the least amount of animal protein possible. This is because degrowth aims to deconstruct the rhetoric of globalized development that, in practice, imposes the logic of the world market on the local sphere, preventing the control of the impacts caused by the economic process and suppressing the subjectivity and capacity of the locality to provide for itself (LATOUCHE, 2009).

In this way, economic degrowth, aligned with environmental sustainability, is a strategy capable of avoiding new global pandemic scenarios, to the extent that these scenarios are essentially caused by anthropic activities that greatly require environmental resources, intensifying the entropic flow.

Economic degrowth requires intense social transformation that prioritizes

biodiversity and the environmentally sustainable coexistence of agriculture and wildlife. It focuses on the significant reduction of waste, avoids the standardization of the globalized market and seeks to value an economy of environmental services – preferably local – that contribute to human well-being as opposed to the well-being of the world economy (ALIER, 2011; LATOUCHE, 2009).

Degrowth is an economic, social and cultural reformulation that starts to consider entropy as a limiting law of nature. Degrowth, therefore, denounces the current patterns of anthropic intervention in natural resources: there is no way to maintain the pace of development and economic growth and, simultaneously, think of intergenerational solidarity strategies. Sustainable development, listed as humanity's only survival strategy against environmental risks, is incompatible with the values of environmental sustainability, since the ecological costs of the industrial production process and the joy of living of modernity remain unquestionable.

Degrowth is understood as an economically, socially and environmentally sustainable strategy that allows greater resilience to ecological risks, or even the suppression of their causes. The health crisis scenario, by revealing itself as part of the global environmental risk, presents the reflexivity of the risk and opens space for economic degrowth to be discussed from a logic that rethinks essential values aimed at coexistence with a truly sustainable environment. It also requires a commitment to decelerate entropy, not only for the sake of preserving environmental goods and services, but also for the sake of human survival.

Conclusion

We tried to demonstrate that the environmental risk composes the threats in modernity, marked by a relative novelty, considering that humanity needs to deal with the consequences of past and present decision-making. Risk comes from a humanly constructed reality with a humanly intended future. Due to its reflexivity and globalizing tendency (risk characteristics aggressively exposed by COVID-19), ecological threats can be estimated, but their consequences are hardly fully calculated.

The new coronavirus serves as a warning for the urgency of bringing together the various areas of knowledge, especially between ecology and economics, given that the specificity of science brings with it an invisibility of scientific, economic and social connections. The emergence and dissemination of a new zoonotic species will not be an unpredictable fact if there is not a reassessment of the current

pattern of the human economy, since, as it has been said, the appearance of new zoonoses is closely related to anthropic activities: unsustainable use of natural resources, exploitation of wild animals, accelerated urbanization, intensification of agriculture and consumption of animal protein foods, global commercialization of animals, and, above all, climate change. All these alterations in the natural balance intensify the environmental risk for the emergence of diseases for which humanity is not prepared.

From the isolated analysis of the terms “sustainability”, “development” and the very concept of “sustainable development”, the bet on degrowth reappears as an alternative to be considered for facing civilizing threats or, at least, reducing ecological risk. This is because, (a) the traditional conception of development linked to the need for economic growth has not yet been overcome; and (b) sustainable development, presented as a desirable project, keeps the pattern of consumption and industrial productivity compatible with economic growth.

The point is that the focus on maintaining economic growth in the paradigm of sustainable development means that environmental sustainability is engulfed by the economy. Thus, sustainable development works only to the extent of the economic interest discourse. For this reason, degrowth, based on the theoretical contribution of bioeconomy and on eight main interconnected practical steps, reappears as a theoretical and practical alternative for reducing human exposure to environmental risk. The act of facing entropy as a limiting law of nature irreversibly imposed on the productive process transforms sustainable development into a nonsense: the irreversible flow of matter and energy from low to high entropy, with the aim of sustaining modernity’s joy of living, is unsustainable.

The separate analysis of the phenomena makes it possible to observe a connection between the global pandemic scenario, ecological risk, (un)sustainable development and the proposal of degrowth, whose center is occupied by the law of entropy and by the reflexive characteristic of risk. In short, the human economy demands resources from nature beyond its reproduction capacity, given the low-high entropy flow rate. Consequently, degradation and ecological imbalance reach increasingly irreversible levels. In this context, environmental risk (translated by the Sars-Cov-2 virus) reflexively appears as a consequence and product of modernity.

Sustainable development, in turn, does not question the effects of the globalized economy. Likewise, it does not respond satisfactorily to how it would be possible to continue producing and, simultaneously, slow down the entropy phenomenon. Degrowth responds to the fact that it is not possible to maintain

the pace of the production process when what is intended is the reduction of environmental degradation and, finally, the reduction of ecological risk. Degrowth and the ethical principles of environmental sustainability are incompatible with unlimited growth and with the consumption behavior of global society.

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