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Epistemological Assumptions of Perception of Sustainable Development through Environmental Sociology

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***Abstract*—** *The aim of this paper is to discuss the epistemological bases of sustainable development from the perspective of environmental sociology. This is a literature review, descriptive, qualitative, interdisciplinary, systemic and holistic study. The subject of interdisciplinarity is still not fully understood today because there is no consensus around the epistemological debate. The interdisciplinary view is accepted by some thinkers as a kind of neopositivism. Environmental sociology also emerged linked to the epistemological discussion of the process of changing the scientific approach in addressing complex problems that strengthen the interdisciplinary movement in the field of knowledge, and although there is no consensus on environmental sociology, it highlights its importance for the discussion of the role of man and his interface with nature, meanwhile sustainable development, finds in the socio-environmental variable one of the central axes of scientific discussion about the pragmatism of its positioning, which for some authors is characterized as utopian. Understanding and explaining the complexity around the theme of environmental sociology is, above all, an exercise of reflection on the ethics of man as an integrated social being and interconnected with the natural environment.*

I. INTRODUCTION

The basis in the conception of the history of science, as a constructive element of the holistic view of the epistemological parameters of scientific knowledge (Phase 1) corresponds to the period marked by the domain of philosophical knowledge in which the first essays of science can be seen from great philosophers as Pythagoras, Plato, Socrates and Aristotle. However, in the ancient and medieval ages, the plurality of sciences and methods made the construction of science live its most static period in its history. This phase extends until approximately the 15th century.

The scientific revolution, the industrial revolution and the French revolution, for some authors like Sell [1], form the main framework that led this movement of political, economic, social and cultural transformation that provoked profound changes in the attitudes of man in relation to nature (Phase II).

Castro and Dias [2] had already pointed out that the economic and social transformations that marked the first half of the 19th century and the development of the scientific method in other sectors of human knowledge, parallel to sociology, created, at that time, the practical and theoretical, historical and philosophical ways of organizing sociology as a discipline and, only in this context, linking intellectual evolution to the social conditions of the settlement of the "ancien régime" and the inauguration of the industrial era, it is possible to understand the historical moment when sociology began to stand out as a specialized knowledge sector, systematizing itself as science.

According to Zayas [3]it is only from the modern age that the autonomy of science begins to take its first steps, going against a long period where it remained uncertain in the scope of philosophy. In this sense, the works of Galileo (1564-1642), Kepler (1571-1630), René Descartes (1596-1650) and Newton (1642-1727) stood out to a large extent and were responsible for this revolution in science. Newton's mechanics, in particular, crystallized the reductionist view in science. René Descartes (1596-1650), in turn, planted modern thought by fragmenting the whole problem into as many simple and separate elements as possible, which caused a great revolution in thought and methodology based on his work "O Discurso do Method", in 1630. This reductionist-mechanistic view reached its peak with David Hume (1711-1776), according to Zayas [3]. But in general terms how to define empiricism?

Empiricism can be understood as a philosophical method based on the idea that the only valid form of knowledge is that obtained through the use of the senses. According to this view, if something cannot be observed, then it is useless to try to explain natural or any other phenomena. An empirical statement therefore describes observations or research based on concrete observations. It is thus distinct from something based only on mental and theoretical processes. Thus, it is clear that there is a clear attempt to move away from purely philosophical precepts to another conception that has observation as the main criterion for scientific validation.

In Phase III, empirical thinking comes to dominate the scientific world, mainly due to the advancement of natural sciences such as Newtonian physics and the whole context of change that occurred due to the great scientific discoveries that, taken as a whole, contributed to the crystallization of the positivist view both in epistemological and sociological fields. According to Videira [4], positivism sought to defend the thesis that only science would be in a position to provide progress for human societies. In Brazil, positivism had a great influence, starting with the Brazilian flag since the phrase "Ordem e Progresso" is a purely positivist thought. As opposed to philosophical thinking, one of the research strategies adopted by the positivists was inductivism. This phase extends from the 19th to the 20th century. According to Giddens [5], both the term "positivism" and the term "sociology" are due to August Comte (1798-1857).

The aim of this work is to discuss the epistemological bases of sustainable development from the perspective of environmental sociology. This is a literature review study, descriptive, qualitative, interdisciplinary, systemic and holistic.

II. SOCIOLOGY AS SCIENCE: A BRIEF CONTEXT

In this process of building sociology as a science, that is, of the new philosophy within an epistemological view, Comte took as an example other sciences that already used positive methods in his researches by revealing that the positivity of the sciences appears in essays that go back to the XVII century. Regarding the superiority of the positive view over the one linked to theological power, Comte makes the following statement:

> For the new philosophy, order is constantly the fundamental condition of progress and, conversely, progress becomes the necessary goal of order, since in the animal mechanism balance and progression are mutually indispensable, as a foundation or destiny.

> Specially considered, then, with regard to order, the positive spirit today presents, in its social extension, powerful direct guarantees, not only scientific but also logical, which may soon be judged to be far superior to the vain pretensions of a backward theology that more and more, for several centuries, it has degenerated into an active element of disagreement, individual or national, unable, from now on, to contain the subversive ramblings of its own adherents [6].

Thus, according to Quintaneiro [7], Positivism appears as a response to the metaphysical spirit of the "negative philosophy" that subtended to take society to a kind of political disorder. Therefore, the "positive philosophy" provided the scientific basis for the proper path of society towards regeneration and social organization. Thus, Positivism had some striking characteristics. Leff [8] showing some of them reveals that the positivist project sought to always be objective, universalist, reinterpreting and reifying. According to Outhwaite and Bottomore [9], Comte intended to strictly eliminate from the domain of rational thought the metaphysical conception and sought to establish a unified science through the logical reduction of science to the terms of immediate experience. And with that, within a more general conception, the standardization of scientific procedures in the sciences can be considered as one of its main objectives. Using Cohen's work [10], it can be seen that Newton's powerful laws, so referenced by positivists, created in the scientific world a kind of heuristic around Newtonian theory that placed the postulates of physics at a level of almost benevolence both in the field of knowledge of the so-called natural sciences and in the field of social sciences that started to use them in the process of construction and scientific validation.

Comte's ideas were, between the years 1923 to 1936, defended by a group of philosophers, mathematicians and scientists like Moritz Shalick, Ernest Mach, Rudolf Carnap, Carl Hemper and Otto Neurath who together formed what was conventionally called the Circle of Vienna [9]. Therefore, the judgment of a knowledge as scientific or non-scientific started to depend on the endorsement of its peers, that is, on a group of people directly linked to the specific knowledge area that seeks validation of which, based on pre-established molds of science, led the entire decision-making process. It can be seen that the structuring of positivism reached basically two dimensions: a philosophical dimension that involves science as the only legitimate knowledge through a "science model" and a sociological dimension that places "sociology" as a "natural" science of society since he considered the natural sciences more mature and developed. Thus, sociology, from an epistemological point of view, arises from the 19th century [11]; [1]. According to Giddens [5], it is due to Augusto Comte (1798-1857), considered the father of "positivism", for the designation of this new field of human knowledge. Understanding the historical process that alludes to the emergence of sociology is, above all, a fundamental exercise for a holistic view of the space-time framework in which this phase took place, thus showing the importance of major revolutions in the design of new habits, new patterns of human relations that together marked the emergence of this science.

From a methodological point of view Sell [1] reveals that Comte understood sociology from two essential fields: static, which studies the constant conditions of society or order; and a dynamic, which studies the laws of historical development of any society, that is, progress. It is clear, therefore, that the positivist foundation arises with the processes of changes that occurred in industrial societies in the 19th century from the consolidation of modern capitalism, which gave rise to what was conventionally called modernity. Modernity is restricted to a certain historical period, to a certain cultural, socioeconomic organization and to certain customs and lifestyles that emerged in Europe around the 17th century and that extends to the middle of the 20th century, whose influences were unfolding and going global. One of the consequences of modernity is the process of globalization that, among other things, generates uneven development both from an economic and a social point of view [12]; [13]. According to Sodré [13], this aspect was the great European model that found reason and progress as its main obsession. And within this rational logic, social life would find the essential mechanisms for the organization of the whole society.

Therefore, it is based on the paradigm of modernity that positivism is structured as a stream of sociological thought that sought in the linear progress of society and in the exclusive and absolute power of reason a rational way to know reality and, with that, proceed from a subjective approach to the elaboration of objective natural laws, whose representative considered most important was Émile Durkheim (1858-1917).

According to Vidal [14], the positivist perspective was based on Durkheim's classic definition of research

strategy, when defining social phenomena as "things" external to the individual in his work "The Rules of the Sociological Method". In this work, Durkheim establishes a methodology to facilitate the work of the social scientist in determining his object of study by associating social facts as “things”, in the sense of constituting a perfectly determined and external unit to the individual. For Durkheim, the understanding of what is a social fact is fundamental to differentiate the object of study of the social scientist from that which identifies with other areas of knowledge [11].

According to Quaresma [15] throughout Durkheim's work, he always tried to establish causal relationships between two phenomena. For this classic, Sociology was intended not only to explain society but also to find remedies for social life. It is within this political-social aspect that many countries begin to adopt positivist principles as management strategies. Brazil with the motto “order and progress” inscribed on the central part of the Brazilian flag was one of those countries that tried to find in the positivist conceptions the remedies for the country's internal problems. This positivist stance can be evidenced during the First World Conference on Environment and Development that took place in Stockholm, Sweden, in 1972, due to the worsening of the environmental conditions that were increasingly expanded at a global level that started to significantly threaten life on earth.

At this Conference, it was necessary to reconcile two currents of interest. On the one hand, the Malthusian current, defended by some developed countries participating in the event, which had the discourse of freezing the growth of the global population and industrial capital due to the strong influence of the report “Limits to Growth” prepared by a team of researchers led by Dennis L. Meadows and that motivated great discussions in this Conference. On the other hand, the current vehemently defended by underdeveloped countries led by Brazil who wanted progress at any cost. The defenders of this trend believed that pollution and other social problems observed among developed countries were indicators of progress and, therefore, considered them "welcome". During the 1970s, Brazil was one of the main recipients of polluting industries in developed nations, due to the advance of environmental awareness in these countries. In the 1970s and 1980s, Brazil experimented with development policies rooted in positivist conceptions of progress and which later proved to be highly disastrous from the social and environmental point of view. As classic examples of policies in this direction are the major colonization projects in the northern region of the country that had the goal of "integrating not to deliver" with a view to promoting progress in a region that, despite having experienced golden periods of economic prosperity, after the decay, were isolated and susceptible to disorder, mainly in the border areas with the other South American countries. In summary and according to Videira [4] positivism sought to defend the thesis that only science would be in a position to provide progress for human societies.

In epistemological terms, the positivist conception began to suffer criticism and, with that, enabled the emergence of theories that sought to break with the rigidity of the Vienna Circle. In this sense, Kuhn [16] clarifies that the scientific community started to be characterized by its highly disciplinary, limited and closed posture, that is, marked by a scientific specialty, by a common theoretical formation, by the abundant circulation of information within the group and by the unanimity of judgment in professional matters. According to this same author, science is not developed through strict obedience to methodological canons, but through the realization of a convergent and unified research practice, made possible by the acquisition of a paradigm. In other words, Kuhn's work caused profound upheavals in the epistemological conception of science, which was characterized by inaugurating a discourse hitherto innovative, privileging the historical and sociological aspects to the detriment of the logical-methodological aspects rooted in the Popperian conception.

Thus, for Thomas Kuhn the existence of a science depends directly on the paradigmatic premises that without it, it would not exist. Lakatos, in his work entitled “The methodology of scientif research programs”, appears, therefore, with the theory of research programs because he considers that both Popper and Kuhn failed to solve certain research problems. In this way, Lakatos reveals that there is a large dump of unresolved problems. For him, there are problems that the current premises cannot answer because they are considered increasingly complex. These unsolved problems would therefore be “thrown into the trash” of knowledge until a time when there would be new discoveries, which would provide answers to the problems of the trash, not in a revolutionary way, but through constant answers about the most complex phenomena. In this sense, by contextualizing the “blanks” left by both Popper and Kuhn, Lakatos formulates the theory of research programs that is based on the creation of a “hard core” and a heuristic.

The following is a representation of the main theories that sought to break with the concepts of verifiability of science in the Vienna Circle.

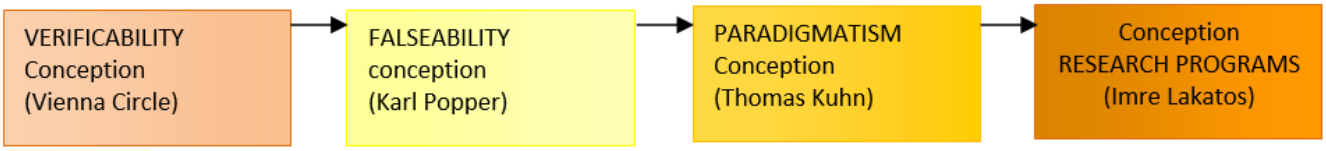

Fig.1: Schematic representation of the main theories against the positivist view.

Source: Own elaboration.

From there, a new way of thinking about the epistemology of science begins, based on the interdisciplinary approach (Phase IV), considered sine-qua-non in studies that address complex themes.

III. INTERDISCIPLINARITY

The fourth phase is related to the debate around the interdisciplinary concept that emerged at the end of the 20th century and which is considered a phenomenon of the 21st century. This new conception comes to be understood by some as a form of neo-positivism, but in reality, there is no consensus about it. For Santos [17] the time in which we live must be considered a time of transition between the paradigm of modern science and a new paradigm that he designates as postmodern science. According to Klein [18], it appears that the history of interdisciplinarity can be confused with the history of science, since for some, philosophers such as Plato, Aristotle, Rabelais, Kant, Hegel and others are considered to be the first. "Interdisciplinary thinkers".

From the work of Maturana [19], it can be observed that even criticizing the reductionist-mechanistic view of science defended by the positivists, logical rationalists such as Popper, Kuhn and Lakatos also ignored the problem of complexity. Furthermore, Von Bertalanffy [20] when mentioning one of the inconsistencies brought about by disciplinary pragmatism revealed that there are often cases in which identical principles were discovered several times because researchers working in one field were unaware that the required structure was already well developed in another field. According to Fazenda [21], the simple integration of contents is not enough to break the boundaries of the disciplines, it will become a precise attitude, that is, an interdisciplinary posture. In other words, interdisciplinarity is not achieved by the simple addition of disciplinary knowledge, that is, through multidisciplinary experience. First of all, there needs to be an interaction between them.

According to Gadotti [22], the concept of interdisciplinarity is not univocal, that is, there is still no consensus about it. This fact seems to strengthen the idea that interdisciplinarity is more linked to criteria of attitude than a new conception of scientific paradigm.

For Leff [23], interdisciplinarity arises with the purpose of reorienting professional training in search of a thought capable of apprehending the unity of reality to solve the complex problems generated by the dominant social, economic and technological rationality. Thus, interdisciplinarity seeks to build a multifaceted, yet homogeneous reality, whose perspectives are the reflections of the lights that project different disciplinary approaches on it [24]. Interdisciplinarity started to take shape in educational institutions, mainly in the United States, from the 1980s onwards due to basically three factors as described by Klein [18]: a) answering complex questions; b) solve problems that are beyond the reach of some disciplines; and c) reach units of knowledge, whether in limited proportions or on a large scale.

In Brazil, according to Gadotti [22], the concept of interdisciplinarity first arrived with the work of Georges Gusdorf and, later, with Piaget who together were largely responsible for the influence of interdisciplinary conception in the country, both in the epistemological and educational fields. Current discussions about environmental crises and the worrying quest to reverse the degradation stage of natural resources and their effects worldwide is not a simple issue that can be resolved in the light of a single discipline, such as the environmental disasters that tend to afflicting the modern world.Disasters can occur as a result of the impact of a natural risk or caused by human activities. Natural hazards include phenomena such as earthquakes, volcanic activity, landslides, tidal waves, tropical cyclones and other intense storms, tornadoes and strong winds, fluvial and coastal floods, forest fires and the mist that forms drought, sand and dust storms and infestations. Therefore, environmental disasters can be understood as a serious interruption of the functioning of a society, causing human, material or environmental losses that exceed the capacity of the affected society to deal with such consequences with its own resources [25].

The social and economic costs of disasters vary widely and are difficult to calculate globally. However, studies show that there is a growing trend in the intensity of these

phenomena as a result of human activities that tend to increase financial costs in the regions and / or countries where they occur. According to Munich Re [26] the number of major catastrophic events in the last decade has reached an impressive level by tripling its occurrence compared to the 1960s, in the same way as the rate of economic losses by showing an increase of almost nine times during the same period.

In summary and according to Cozetti [27], recent data from the United Nations Development Program (UNDP) show that the world is consuming 40% beyond the capacity to replace the biosphere (energy, food, natural resources). As Moon's [28] work shows when quoting other authors, the United States despite having only 5% of the world population consume 40% of the available resources. If the 7 billion people enjoyed the same standard of living as the 270 million Americans, 6 planets would be needed. Thus, for Capra [29] it is necessary to take an ecological perspective, differently from the mechanistic worldview of Descartes and Newton, since according to this same author, we live in a globally interconnected world, in which biological, psychological, social and environmental phenomena are all interdependent.

This thought is also shared by Viola [30] who found that during the last decades, in most branches of science and technology, the analytical-reductionist approach that fails to take into account the interconnection of living phenomena has been intensified. In the scientific community, according to this same author, this approach remains hegemonic, which has been triggering an increasingly fragmented process of knowledge, characteristic of the specialized disciplines of the modern world. In this sense, Santos [31] states that it is well known that modern science in general and social sciences in particular are currently experiencing a deep crisis of epistemological confidence. For Ferreira [32] the difficulties to know the truth is a problem that the social sciences are obliged to face in this century, not because of a calendar issue, but because of the critical awareness of the difficulty of disciplinary knowledge in the face of complex society. It is within this new form of approach that the newest branch of sociology, called environmental sociology, has also been structured. Below we present the origins and contributions to the discussion of sustainable development.

IV. THE ENVIRONMENTAL SOCIOLOGY

Environmental sociology can be understood according to Mora [33] as a discipline applied to the studio of the system of relationships, spatially and temporally established, between society and the environment, emphasizing in social participation and transdisciplinary studies, as goal y context for the development of this specialty. In this sense, we cannot fail to recognize that in postmodernity, which was established in the middle of the 20th century, humanity is going through a new civilization that tends to unveil some of the incredible mysteries of the universe, however, with a tendency to increase the threat to the very existence of life on the planet. Giddens [12]considers that we are reaching a period in which the consequences of modernity are becoming more radicalized and universalized than before, this author prefers to work with the concept of high modernity.

According to Ferreira [32], environmental sociology, as a scientific and academic production, emerged in the wake of the social contestation movements that emerged in the early 1960s and the verification of the emergency situation of degradation of natural resources and the development of industrialism. For Hannigan [34], what we had were isolated works within the subarea of rural sociology, however, to understand the emergence of environmental sociology, it is necessary to observe how the geographic and biological theories of social development lost strength when sociology emerged, in the beginning of the 20th century, as a distinct discipline.

The pioneers of classical environmental sociology, Durkheim, Marx and Weber had approached the issue in a tangential way; moreover, isolated works in rural sociology only rarely appeared, without, however, promoting a considerable accumulation of knowledge that would allow the creation of a theoretical field or subfield [32];[35]. Ferreira [32] raises two explanations for the fact that sociologists marginalize the environmental issue in their theoretical endeavors. The first would be related to the failures of geographic and biological determinism, and his conservative view on understanding social changes and conflicts. The second would be related to the current thinking that, in the middle of the 20th century, emphasized the sociological literature of modernization. Thus, according to the author, what is currently identified as an environmental concern would be seen as a delay and an obstacle to development, to progress. Certainly there were critics of the developmentalist paradigm, like Marxist sociologists; but, they tended to see the environmental issue as a departure from the crucial issues of humanism.

According to Buttel [36], sociologists began to assimilate the importance of environmental sociology studies as a result of the recognition of divergences and conflicts over nature and the causes and extent of environmental problems. It is in the United States that the theme of environmental sociology took shape, dominating studies at a global level between the years of the 1980s and

1990s. However, according to Buttel [37], the American environmental sociological theory originally developed in reaction to the lack of attention of the dominant sociology with biophysical phenomena; thus, he emphasized strong, if not intrinsic, trends in modern societies to the degradation of the environment, and tended to minimize the theorization of environmental improvement processes. As the same author explains, the American environmental sociological culture tended to simplify the processes of environmental mobilization and to exaggerate the coherence of environmentalism.

For Ferreira [32], the institutionalization process of environmental sociology within sociology was not a homogeneous process. According to this same author, the political-institutional trajectory of the sub-discipline in the United States began in the 1970s, however with the influence of the 1960s that there was already a non-systematic, but interesting production, which approached the issue from from a more radical perspective, both in the United States and in Europe. Despite the initial repercussion of the increasingly serious environmental conditions worldwide, in the United States during this phase that marks the 1970s, it did not prosper in terms of objective accumulation of efforts that would motivate the practice of scientific research and investigation, on the subject, on the contrary, according to Dunlap [38] there was a reduction in the number of researchers. However, according to Ferreira [32], based on new undesirable events from the environmental point of view, such as the great contamination verified in accidents such as those at the Chernobyl nuclear plant in 1986, again intensified the clash over the topic that started to enter definitely on the agenda of political and scientific discussions.

From an epistemological point of view, Buttel [39], states that the theoretical-methodological perspective can be explained from three distinct moments: a) moment of formation that involves the combination and contribution of other specific sociologies; b) moment of constitution of a specific theoretical nucleus and with a more consensual profile; and c) a moment of diversification and greater incorporation in the theoretical field of sociology in general. The moment of formation for that author is more related to the contribution of rural sociology, although other specific sociologies have in some degree influenced environmental sociology, such as the sociology of communities, of development, among others.. In this sense, Ferreira [32] states that environmental sociology did not emerge as a new discipline, but within the existing disciplines, it tried to cover theoretical gaps in the classical tradition regarding environmental issues, creating an institutional locus for the development of the new theme. Buttel [37] when referring to the theoretical gap considers that the tendency of classical sociology was to create theories that, implicitly, assume that societies and human groups are independent or isolated from biophysical processes. For him, sociology, in search of liberating social thought from reductionisms, prejudices and the conservative view of the beginning of human ecology, exaggerated in promoting the separation between the social process and the natural world.

According to Ferreira [32], the moment of constitution of a theoretical nucleus was converged by the production of some environmental sociologists such as Catton, Dunlap, Schanaiberg, Buttel, Redclift, Harteley, Chapman, Yearley, Hannigan, among others. Still referring to Ferreira [32], he reveals that the third moment in the intellectual trajectory of environmental sociology, which was clearer at the turn of the 1980s, was characterized by greater theoretical diversity and by a certain incorporation of classical sociological theory. According to the same author, it is possible to register, from that moment, the contributions of prominent sociologists, who emphasize the importance of the issue in the context of high modern societies, such as Beck, Giddens, Touraine, Castells, Habermas, among others. Thus, for Ferreira [32] an environmental problem is socially constructed, that is, environmental problems would be similar to other social problems and the action of the different actors would be the main object of analysis.

When using the work of Buttel [37], practically three currents of thought in environmental sociology are evidenced: a) the current of the risk society; b) the current of ecological modernization; and c) the current of reflexive modernization. The first stream defends a context of risk society, in which environmental and technological risks are placed as central to understanding the society of high modernity. According to Rigotto [40], humanity has always lived with risks, but the specificity of the current ones derives from what Giddens calls “manufactured uncertainty” because the risks are different with regard to sources and scope, that is, uncertainties are created by the development of science and technology, and nothing indicates that more knowledge means more control. The risks appear with an irreducible character, without guarantees, without certainties, with global, invisible and, sometimes, irreversible effects, with long-term consequences, in general, unknown, and which are difficult to be accurately evaluated. It is not the risks that have a source external to modern society, but they are the results of human activity. It covers all people, crossing national or social class borders, which would give pollution a democratic character [41].

The current of ecological modernization, according to Buttel [37], grew out of social research, the

involvement of the environmental movement and ecological research on practical, non-utopian means of achieving environmental improvement. According to Rigotto [40], this current considers that human choices are not structurally determined by the master forces of capitalism, industrialization, etc; and that the solutions to environmental problems lie in progressive modernization, and not in demodernization, as advocated by radical environmentalism, that is, they argue that technology will bring solutions to environmental problems. The current of reflexive modernization believes that modernization has led to a series of misfortunes and risks. These conditions end up threatening the current generations, their quality of life and possibly the very conditions of survival of future generations, characterizing the environmental issue. The growing public recognition of these hazards and risks is one of the main factors that precipitate reflexive modernization and the risk society. Thus, according to Buttel [37], citizen-actors are not just passive recipients of the arc of forces of modernity / modernization. A modernização pode se "voltar sobre si mesma", de forma a encarar os problemas que criou. Modernization can "turn on itself" in order to face the problems it has created.

For Buttel [37] both the theory of risk society and that of ecological modernization and also that of reflexive modernization have been criticized for being applied to very particular contexts, mainly in Europe. The risk society is strongly anchored in the notion of equal risk, that is, no matter the social class, no one escapes bad luck and large-scale risks, in view of the state of well-being, the leveling of living standards and the absence of residential and spatial segregation in northern Europe. Thus, for the author, equal risk simultaneously contributes to the fall of social class and facilitates new policies that cross traditional class lines. However, according to Rigotto [40], this equality does not apply in a context of social inequality such as that of the United States, let alone developing countries, where environmental inequality is more the rule than the exception. Although there is no consensus on environmental sociology, it makes evident its importance for the discussion of the role of man and his interface with nature, placing him as one of the elements that make up the planet's biodiversity and not as an external manipulative individual, using rationality as a selfish measure of the market game product: individual satisfaction and, as a consequence, the growing consumerism that plagues the planet as serious environmental externalities.

Environmental sociology is, therefore, a challenge to understand the complex relationship of man with the environment that allows explaining social relations from a point of view that transcends the limits of man as an individual to a plan of analysis that involves a systemic and interdependent with the environment. To understand this process is to take another significant step to understand the essential role of man as a social being to ensure for future generations the same standards of environmental satisfaction that nature tends to manifest in current generations, although with serious signs of resource drain natural.

V. THE COMPLEXITY OF SUSTAINABLE DEVELOPMENT

Sustainable development has been promoted throughout the planet as a more rational way of promoting an equitable and socially just quality of life. The concept of sustainable development is based on the principle of sustainability. The negative environmental impact generated by economic activities was the main starting point for this mobilization around the discussion on sustainability. The demand for improvements in living conditions occurred when the negative environmental impacts, resulting from economic activities, began to transcend the territorial limits of a given country, taking the consequences of these actions to other peoples, often felt thousands of kilometers away. Your point. The origin. Environmental degradation, therefore, manifests itself as a symptom of a crisis of civilization, marked by the model of modernity governed by the predominance of the development of technological reason over the organization of nature. The environmental issue questions the very bases of production; points to the deconstruction of the economic paradigm of modernity and to the construction of possible futures, based on the limits of the laws of nature, ecological potentials, the production of social meanings and human creativity [24].

The environmental issue, despite being the precursor to this discussion, was not the only point in the process. According to Barbieri [42], it is a new way of perceiving solutions to global problems, which are not only reduced to the degradation of the physical and biological environment, but which incorporates social, political and cultural dimensions, such as poverty and social exclusion, it is what has been called sustainable development.

The concept of sustainable development, therefore, highlights the complexity of the environmental issue, as it highlights the need for an interface between society and the environment, which calls into question the Cartesian heuristic model that fragments and separates parts of the real to enable its understanding. In this sense, thinking about sustainability is not the task of just one scientific branch, much less of a single specific sector of society. It becomes necessary to break with the dominant conception

of development linked to the Western paradigm. Conforme Leff [24] o ambiente não é, pois o meio que circunda as espécies e as populações biológicas. According to Leff [24] the environment is not, as it is the environment that surrounds species and biological populations. It is a sociological category related to social rationality, configured by behaviors, values and knowledge, as well as by new productive potentials. In this sense and according to the same author, the interdisciplinary analysis of society-nature relations arises from the specificity of socioenvironmental processes as complex systems: on the one hand, it is a question of apprehending a multidimensional reality in which non-linear processes, of different levels of spatiality and temporality, with different forms of interdependence, from which new processes emerge that establish varied synergies and feedback, both positive and negative.

On the other hand, the environment questions the sciences to transform their traditional paradigms and incorporate complex knowledge. This emerging environmental knowledge is not univocal, nor is it already prepared to be absorbed by different disciplines.

Thus, according to Leff [24], the environmental issue in the field of development and interdisciplinarity in the field of knowledge arose with two contemporary issues in response to a crisis of the economic and theoretical rationality of modernity. Sustainable development, as an institutional objective of local, regional, national and international development programs and projects, finds in the socio-environmental variable one of the central axes of scientific discussion on the pragmatism of its position, which for many are characterized as utopian. Understanding and explaining the complexity surrounding the theme of environmental sociology is, above all, an exercise in ethical reflection of man as a social being integrated and interconnected with the natural environment. Although the ways to reach a common path in epistemological terms are quite arid, environmental sociology demonstrates that it is a movement that tends to contribute to the theme of sustainable development that, before having the intention of providing a strictly economic gain, seeks to contribute to improve the quality of life with respect to the environment, ethical and moral values and the parameters that strengthen the local identity. In this sense, there seems to be a wide fertile space for discussing the topic, mainly due to the serious environmental disasters that have occurred in different parts of the world and that is raising the level of concern in several governmental and non-governmental bodies on a global scale. Finally, we try to end this work with the work of Morin [43] by stating that knowledge needs to be aware of its biodegradability, since the belief in an absolute truth causes blindness in knowledge and rationalization. Therefore, in this new postmodern paradigm, there is an increasing saturation of this rational model.

VI. CONSIDERATIONS

The theme of interdisciplinarity, although it emerged at the end of the 20th century, is not fully understood today because there is no consensus around the epistemological debate of this movement that tends to be considered as the new paradigm of the 21st century.

The interdisciplinary view, although it may be understood by some as a new attempt to standardize science and, therefore, as a kind of neopositivism, is here understood as a movement that does not seek to reject any disciplinary practice in the sciences, on the contrary, applied it is precisely those problems that are considered complex, which, from the disciplinary point of view, are insufficient; but, on the other hand, for those linear problems, with a high degree of knowledge specialization, the disciplinary view reaches a high level of competence.

Environmental sociology has also emerged linked to the epistemological discussion of the process of changing the scientific focus in addressing complex problems that strengthen the interdisciplinary movement in the field of knowledge.

Although there is no consensus on environmental sociology, it makes evident its importance for the discussion of the role of man and his interface with nature, placing him as one of the elements that make up the planet's biodiversity and not as an external manipulative individual, using rationality as a selfish measure of the market game product: individual satisfaction and, as a consequence, growing consumerism with serious environmental externalities, worldwide.

Sustainable development, as an institutional objective of development programs and projects, finds in the socioenvironmental variable one of the central axes of scientific discussion on the pragmatism of its position, which for some authors are characterized as utopian.

Understanding and explaining the complexity surrounding the theme of environmental sociology is, above all, an exercise in reflection on the ethics of man as an integrated social being and interconnected with the natural environment.

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