NomosTextbook

Kropp | Sonnberger

Environmental Sociology

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This English edition is based on the book “Umweltsoziologie”, Nomos 2021, ISBN 978-3-8487-5035-1. Parts of the translation into English were created with support of machine translation and/or artificial intelligence.

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available on the Internet at http://dnb.d-nb.de

ISBN 978-3-7560-1248-0 (Print)
978-3-7489-1789-2 (ePDF)

Online Version
Nomos eLibrary

1st Edition 2025
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Foreword

As we completed our work on the English version of this introduction to environmental sociology in October 2024, media reports were filled with news of escalating disasters. In Spain, torrential rains had just caused flash floods, resulting in more than 200 deaths, Australia saw its hottest September in record, with temperatures 3°C above the long-term average, causing health problems for both human and non-human beings. Globally, summer 2024 was the Earth's hottest on record, and in August 2024, the average land temperature in Europe was 1.57°C above the 1991-2020 average, according to the Copernicus Climate Change Service. In 2023, nature's carbon sink failed for the first time, with trees, plants and soil showing almost no net absorption of carbon dioxide emissions due to enormous forest fires and rising sea temperatures. In Canada alone, 6,623 wildland fires had burned more than 15 million hectares of managed forests. "We're seeing cracks in the resilience of the Earth's systems … the oceans showing signs of instability"[1] said Johan Rockström, director of the Potsdam Institute for Climate Impact Research, about these phenomena, which are not yet factored into climate models. Extreme weather events have already become part of our normality, and local governments around the world are urgently developing climate adaptation strategies to keep cities habitable. In each of these regions, institutions struggle to manage climate impacts, highlighting a troubling lack of preparedness and action capacity. At the same time, continuous updates of the planetary boundaries framework in Earth sciences' find that six of the nine boundaries are transgressed, "suggesting that Earth is now well outside of the safe operating space for humanity" (Richardson et al. 2023: 1). Now more than ever, future generations must confront the urgent task of reimagining lifestyles and economic practices, working towards their sustainable transformation. We believe that environmental sociology has a great deal to offer in this endeavor. This textbook is particularly relevant for students in social sciences—sociology, political and communication sciences, human geography, psychology—where an understanding of environmental sociology has become essential for a well-rounded education that meets today's needs.

With this in mind, we hope this English translation of our introduction to environmental sociology reaches a broad audience. Our goal is to provide students and other interested readers with a comprehensive overview of key theories and research in this essential field. The book offers a theoretical and thematic guide to the major issues and approaches in environmental sociology. While our coverage, based in Germany's long tradition in environmental sociology, is necessarily selective, we aim to present foundational theories alongside both classical and current research areas. To assist in learning, each chapter includes a brief introductory summary and a closing overview of the chapter's key points. Each chapter also provides a list of recommended readings with brief annotations. Designed to be suitable for use in both seminars and lectures, as well as for independent study, we hope the book serves as a valuable resource.

1 Source: The Guardian, https://www.theguardian.com/environment/2024/oct/14/nature-carbon-sink-collapse-global-heating-models-emissions-targets-evidence-aoe, accessed on 31.10.2024.

We extend our gratitude to our colleagues at the Department of Technology, Risk and Environment at the University of Stuttgart and the Center for Interdisciplinary Risk and Innovation Research at the University of Stuttgart (ZIRIUS) for their insightful discussions and constructive feedback. We are grateful to work in such an inspiring environment! We thank the student assistants Hanna Sophie Mast, Lukas Günsch, Lena Ebersbach and Amelie Dresel for their invaluable help with proofreading and formatting both the German and English versions of the book. Our thanks also go to Alexander Hutzel, Eva Lang and Fabiola Valeri of Nomos Publishing for their assistance with the publication.

Munich/Stuttgart, October 2024

Cited literature:

Richardson, K., W. Steffen, W. Lucht, J. Bendtsen, S.E. Cornell, J.F. Donges et al., 2023: Earth beyond six of nine planetary boundaries. Science advances, 9 (37): eadh2458.

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Chapter 1: Introduction – The social recognition of environmental problems

Overview

In this chapter, you will learn about the issues and questions that environmental sociology seeks to tackle, as well as the difficulties associated with them. You will become familiar with realism and social constructivism, the two basic epistemological positions from which fundamentally different approaches to environmental sociology are derived and which are therefore hotly debated. Of course, you will also gain an impression of the importance of climate change, global environmental change and their consequences for society in sociology.

Every single day, the social subsystems of politics, the economy, science and civil society are confronted with the issues and consequences of global environmental change and climate change. Environmental science has long shown that the ways in which we manage our economies and live today are not sustainable. The damage, risks, and unintended side effects that our way of life causes, for example, in the form of carbon dioxide emissions, soil degradation, species extinction, and resource depletion, make fundamental change a necessity (Richardson et al. 2023). Despite this, all subsystems are dominated by a no longer carefree yet strangely unwavering adherence to unsustainable goals, routines, and structures (Blühdorn 2022). The Canadian environmental sociologist *Raymond Murphy* (2015) sees the causes of this societal inability to find adequate responses to the global environmental catastrophe in the reaction patterns with which societies ignore transformation necessities. Since their economic and supply concepts are dependent on fossil infrastructures, they construct path-dependent "normalities" either by denying the problems or through technocratic optimism about solutions ("*wishful thinking*"). Thus, the magnitude and complexity of the necessary change seem to be mirrored in the behavioural rigidity that opposes it. This makes it all the more urgent to understand society-nature relations, and the conditions that enable them to function and change. These are precisely the kinds of questions environmental sociology seeks to investigate. This textbook aims to introduce this field of research, familiarise readers with the most important theories, and enable them to understand the social aspects of the geological era known as the Anthropocene, the (white) man-made modern era (Crutzen 2002).

This introductory chapter has three goals: We will define the subject matter of environmental sociology, outline the emergence of the field of research related to it, and look at the major challenges on which environmental sociology must take a position. These three goals cannot be pursued separately, because the determination of the subject matter, the approach, and the tasks are closely interrelated: they are mutually dependent on one another. The need to deal with mutual influences and effects (*interactions and interdependencies*) can be considered constitutive for environmental sociology as well as the sociology of technology. This is demonstrated in the following discussion about the subject matter and development of environmental sociology. We continue paying attention to categorical interactions throughout the rest of the book in order to understand the

interdependencies between "environment" and "society" and to demonstrate their significance in environmental sociology.

1. Environment and nature as objects of scientific observation

The way humans gain knowledge about "the environment" (*epistemology*), and the intensity with which they shape and change the so-called natural environments (*physics, biology*), are interdependent. Epistemologically, contemporary knowledge about the natural environment and the opportunities and risks associated with it comes primarily from systematic observations, experiments and simulations that are mostly scientific and technical. However, these observations, for example weather records or observations about plant growth and possibilities for increasing yields, are not 1:1 representations "of the world out there". Instead, they are influenced by societal interests and beliefs as well as by the instruments of observation (→ chap. 3 on society-nature relations, section 3 on relational theories of environmental sociology). For example, early weather records (which began in Germany in 1881) were mainly focused on locally significant major weather events and their consequences (storms, floods, dry seasons); in contrast, in contemporary meteorology, global contexts and long-term changes occupy a privileged position. Which weather data are generated depends on the interests that the data are intended to serve, such as interests in disaster management or productive agriculture. The type of data generated changes as new interests emerge and new technical instruments for data collection are developed, such as measuring stations and their locations. Therefore, the weather record only provides an imperfect and selective image of the terrestrial weather, according to whichever features are selected as relevant and the options available for observing them.

Epistemologically, two basic positions are used to evaluate environmental observations in environmental sociology (Rosa 1998; Dunlap 2010): realism and social constructivism. These will only be roughly sketched here. *Realists* assume that the basic structures of reality can in principle be reliably represented in (data-based) experience and can at least be described in a scientifically valid way: according to this position, meteorology provides a reliable image of the weather and climate. That is, realists assume that a biophysical world exists that is independent of human interpretation and that this world can (at least partially) be objectively grasped as such by humans. *Social constructivists,* on the other hand, emphasise that nature must always first be recognised linguistically, culturally and scientifically, and that all knowledge is therefore situated in cultural, technical, and social practices. They assume that the described realities (*ontologies*) also always carry within them the (historically and culturally diverse) perspectives from which their description arose. From a social constructivist perspective, the images that people make of nature and the environment to construct their reality are models embedded in socio-cultural presuppositions and rooted not least in the technologies that people have created in order to be able to observe, measure, and interpret their environment. What the world beyond these social descriptions is "really" like remains in principle inaccessible. From a social constructivist point of view, mete-

orology thus provides a description of weather and climate that also expresses the respective social interests, hopes and concerns as well as the instrumental possibilities of weather observation. Consequently, knowledge about nature and society depends on the underlying expectations, perceptual categories, and instruments of investigation. However social constructivists do not assume that knowledge about nature and society is intrinsically arbitrary or fundamentally "wrong", but rather that it is selective and embedded in the social and technical conditions of its production. Radical constructivism (Glasersfeld 1997) represents another perspective. Constructivists make a distinction between external reality and the human construction of reality, because every image of the world ultimately arises in the human sensory apparatus and is a construction of the brain, which processes the sensory impulses according to its own laws (*autopoietically*). Accordingly, radical constructivists assume that no "reality" exists independently of human interpretation; instead, the external counterpart always appears as a biological-mental construct. From the perspective of radical constructivism, truth or objectivity is not a question of conformity between external reality and internal reality, but of "viability", i.e., the usability of the constructed images for further action and decision-making.

Social constructivism or "moderate constructivism" can be seen as a compromise in the realism-constructivism debate, in which the emergence and interpretation of knowledge is conceived as socio-technically mediated and socially constructed. Murphy describes this position as "constructionist realism" as follows: "Humans socially construct their conceptions and practices (including those concerning nature and risk), as well as technologies, according to their culture and power. They are not, however, pure discursive spirits in a material vacuum, but instead embodied beings embedded in a biophysical world" (Murphy 2004: 252). This position provides a fruitful epistemological basis for environmental sociology and interdisciplinary cooperation with the natural and technical sciences, without pushing the critical potential and genuine epistemological interests of sociology too far into the background. Accordingly, "moderate constructivism" is the basic epistemological position on which this book is essentially based (exception: relational approaches in chap. 3 on society-nature relations).

2. Environment and nature as objects of social appropriation

From a sociological perspective, the descriptions of climate and nature—and thus also our understanding of them—change because our methods and interests change. At the same time, climate and nature are themselves dynamic and our understanding of the way they work is used to shape them according to human needs and expectations, or to reshape and "appropriate" them. Talk of the social, or capitalist, "appropriation" of nature comes from economic theory and, since the analysis of capitalist societies in political economy, has been accompanied by a view that the alienation of labour is also an alienation from nature, whereby nature is reduced to a (usually privatised) means for the purposes of human existence (Moore 2015). Thus, nature is not seen as having any intrinsic value; instead, "unprocessed nature" as an extra-societal presence only acquires value

when it contributes to private property formation or to the creation of social value, for example, as fertile soil for the farmer or as a generative principle in biotechnology. Here and in the following, we generally understand the social appropriation of nature to mean the fact that, at the latest since the emergence of industrial societies, nature exists only as "socialised nature", because its manifestation reflects the various social modes of appropriation of earlier societies. These can be economic forms of nature appropriation, but they also include the forms of appropriation seen in global tourism or nature conservation, which likewise serve human purposes.

The social appropriation of nature changes our perception of nature, because nature and the climate then do not exist as pre-human primary nature, but as socially reshaped (appropriated) and globally "warmed" secondary nature. To stay with this example: Weather and plant growth change within the context of climatic fluctuations and through interactions with each other. In addition, humans influence weather and plant growth intentionally, based on their knowledge and interests, and also unintentionally. For example, cloud seeder aeroplanes alter the amount, type and location of precipitation by "seeding" clouds with mixtures of silver iodide and acetone to protect agriculture. Genetically modified crops are introduced to gain higher yields or better resilience to climate change. At the same time, they sometimes result in unintended changes, such as outcrossing in neighbouring plants. Both measures thus change the effects and the perception of climate and nature.

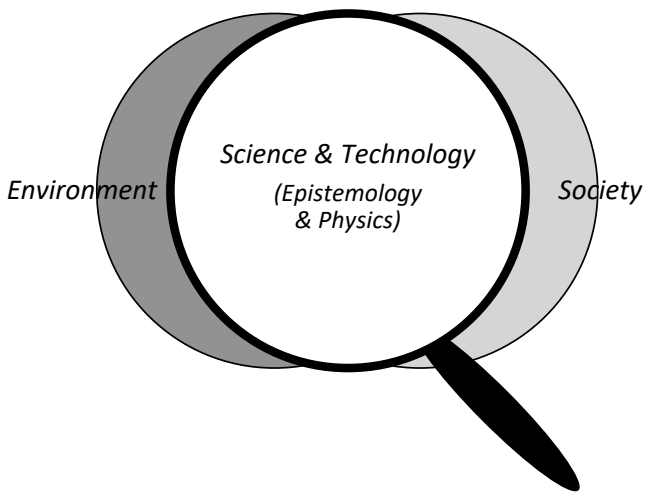

Figure 1: Environment and society understood through a scientific/technical lens; source: own illustration

Environment, or what we call and perceive as "environment", and society, likewise a social construct, can therefore only be studied *sociologically* by taking into account the epistemological contexts in which they are described and the

socio-material contexts in which they change. In addition to specialised global change sciences, biology (the science of living beings) and physics (the science of the fundamental phenomena of nature, its properties and laws) provide analyses of the inner workings and effects of the environment and also take into account interactions between matter and energy in space and time. Textbooks on environmental sociology must always consider the scientific/technical mediation of society-nature relations, which is represented in Figure 1 as a magnifying glass of knowledge and influence. This textbook was therefore designed so that all chapters take into consideration the scientific/technical levels of mediation and their epistemological and bio-physical conditions.

3. Environment and nature as subjects of environmental sociology

This brings us to the heart of the current difficulties: All societies are urgently seeking answers to the manifold threats posed by global warming, ocean acidification, species extinction, and other unintended side effects of technological progress. If, for example, our relationship with nature is to be deliberately redesigned through transformations in the energy, agricultural, and transport industries, then environmental sociology should direct its attention to both a) the societal perception and evaluation of the underlying problems, goals, and approaches for solving problems, as well as b) the organisation of the respective relationships with nature and their spatially and temporally given conditions (→ chap. 3 on society-nature relations). This can be done, for example, in the context of sociological analyses of scientific climate descriptions, individual environmental attitudes, collective consumption patterns, political decision-making processes, or environmental laws. The studies then concentrate on the societal handling of problematised natural conditions ("social nature"); the biophysical interactions between nature and society remain excluded.

However, there is a dispute within the discipline about what the contribution of sociology should be: For some, it should be limited to the sociological study of perceptual processes and the conditions of social action and inaction. Others argue that sociologists should use their knowledge of social change to investigate ongoing and necessary processes of socio-ecological transformation and to intervene regarding the shaping of those processes. In the second perspective, it is not possible to develop this field of investigation—which now encompasses environmental problems, the perception of those problems and approaches for overcoming them—without simultaneously engaging with scientific and technical approaches. Therefore, inter- and transdisciplinary[2] cooperation with the technical and natural sciences and with relevant societal actors outside science is unavoidable (→ chap. 10 on transdisciplinarity). Ultimately, any societal engagement with the internal and external nature of people, i.e., with their bodies and the physical-material environments of their actions, is shaped by technologies and

2 The term transdisciplinarity describes a research approach in which several scientific disciplines work together and incorporate input from non-academic actors (e.g., from public administration, civil society, or business) to develop knowledge about real-world problems and their possible solutions (Brandt et al. 2013; Jahn et al. 2012).

their context-specific use. Since the Stone Age, people living in various forms of cultural organisation have used a wide variety of technologies not only to depict and reflect on natural processes, but also to use and modify them to their advantage. The nature of these technologies shapes the sociological understanding of the respective societies so fundamentally that they are described, for example, as agrarian or industrial societies.

Science and technology and the organised forms in which they are used thus fundamentally mediate society-nature relations. Whenever there is talk of species extinction and climate change or of energy and mobility transitions, sociologists are always dealing with a field of investigation in which other experts (for example from the fields of climate research, engineering sciences, and political offices) have a superordinate claim to knowledge. That is, their expert descriptions of the problems and possible solutions are seen as higher ranking or more valuable. Given this situation, sociology can either focus its research interests on the emergence, meaning, and impact of these descriptions, such as the descriptions of climate change, or take these descriptions as a starting point for their investigations into the consequences within society, such as climate discourses, policies, and risks, or take them up as a point of reference for the exploration of society's possible modes of reaction to individual climate protection measures or the "Great Transformation" (WBGU 2011; Gross & Mautz 2015). Thus, sociologists sometimes investigate the scientific diagnoses of environmental change, which are usually controversial, sometimes they look at the societal consequences of those diagnoses, and sometimes they explore the spaces available in society for reacting to the diagnoses.

Sociology, like the historical sciences, finds it difficult to realistically regard the diagnoses presented by other disciplines (e.g., climate knowledge) as an unquestioned starting point. After all, one of sociology's basic insights is that perceptions, problem discourses, and forms of reaction are shaped by societal influences such as cultural values and political interests—and that this applies equally to the world of science (Mannheim 2013 [1929]; Luhmann 1993). If sociology takes a social constructivist approach to the diagnoses, it can show the extent to which climate knowledge is part of the social construction of reality (Berger & Luckmann 1991 [1966]), but from this perspective it is not possible to formulate legitimate proposals for action, nor does it succeed in grasping the context of the problems "behind" their social thematisation. Instead, society-nature relations and environmental problems get lost in the social communication about them. In the realist approach, environmental sociology thus appears as a "society-blind" auxiliary discipline that is limited to studying the social acceptance for measures taken in response to authoritative diagnoses, without being able to consider the social embeddedness of these diagnoses and measures. Thus, the power relations, disparate interests, and typical perceptual distortions in the scientific and political handling of environmental problems and the development of measures, which sociologists feel responsible for exposing, remain hidden. Conversely, in the constructivist approach, environmental sociology appears as a "reality-blind" single discipline that produces analyses of the various expert and lay assessments of

nature, technology and environmental problems, but which is not able to join other disciplines in the search for solutions to environmental problems. Thus, crises in nature-society relations, including those that potentially threaten societal and human survival, remain hidden from the very science designed to investigate societies.

4. Theoretical perspectives of environmental sociology

How, then, can and should environmental change and possible social modes of reaction be researched in sociology, if either the respective diagnosis must be regarded as a social construct, which differs nationally, historically and disciplinarily from the interpretations under other conditions (sociology of knowledge), or if, conversely, we ignore the social conditions in which the problem is interpreted and possible solutions are formulated (positivist)? From the point of view of "moderate constructivism", for this question it is important to examine the categories, patterns and structures through which society perceives the natural environment and how it interacts with it. For this investigation, environmental sociology provides answers within the framework of two different paradigms: In the first, more social constructivist paradigm, the focus is on society's perception of nature external to society, and also on the reconstruction of its meaning within society (→ chap. 2 on the social construction of nature). The focus is on the role that nature discourses and perceptions play in society, and their effect on ideas about how society can respond to the ecological crisis.

In contrast, the second approach focuses more strongly on the interactions, interdependencies, and intermingling between nature and society (→ section 3 on nature-society relations). This perspective explicitly addresses the problem that not only the analysis of and talk about environmental problems takes place *in* society and is shaped by its structures, but that society, beyond discourse and representation, is also physically and materially involved in the production and reproduction of nature, the environment, and environmental problems to an appreciable extent. There is no longer any primary nature on Earth in the sense that it exists independently of human actions and activity. Even the large nature conservation areas depend on human-made laws, are affected by emissions, and are analysed and mapped by scientists. The American historian of science Donna Haraway views the current state of terrestrial nature (among other things) as a plantation in which anthropogenic processes interacting and intra-acting with other processes and species have produced planetary effects (Haraway 2016; → sections on Donna Haraway in chap. 3 on nature-society relations).

The term Anthropocene thus refers to the fact that humans have become the main influencing factor in the history of nature and the Earth: There are many indications that humans have irrevocably changed the planet and its climate. In the third chapter, we therefore devote ourselves in detail to such theoretical approaches, which are becoming more and more prevalent in the sociological consideration of environmental problems. Their focus goes beyond realism and social constructivism and lies on nature and technology as historical products of specific

interactions and assemblages. Figure 2 shows a diachronic perspective on the left, i.e., the temporal development of the progressive penetration and entanglement of environments and societies, while on the right a synchronic perspective is shown, i.e., a snapshot of the present moment, with the diversity of different natural relationships that exist concurrently.

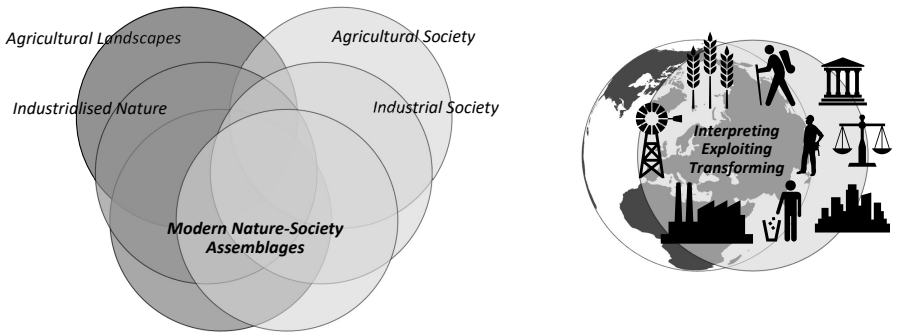

Figure 2: Societies and their environments, diachronic development and synchronic diversity; source: own illustration

Environmental sociology determines how different and unequal social relationships with nature are, how social groups—institutionalised at different levels—interact with natural and technical entities and thereby produce increasingly unstable "assemblages", i.e., hybrid networks of heterogeneous, human and non-human elements, such as cities with their institutions, actors, infrastructures, resource consumption, etc. (Latour 2005, → sections on Bruno Latour in chap. 3 on society-nature relations).

5. The development of environmental sociology

Entirely in the sense of Max Weber and Alfred Schütz, environmental sociology firstly includes any individually and/or collectively meaningful thinking and acting that is directed towards the biological, ecological, energetic, material and technical goals of social action, which are colloquially referred to as body, nature, environment and technology. The focus is thus on all matters of concern that arise less through the immediate research object ("environment"), but through references to social lifeworlds that are always already pre-interpreted by thinking and acting people (Schütz & Luckmann 1980). In addition to meaningful thinking and acting oriented towards the phenomena of body, nature, environment and technology, environmental sociology also examines the structures and problem areas that arise as direct and indirect (often unintended) side-effects of this thinking and acting, or which arise as their unconscious crystallisation at the meta-level, for example, the risks of industrial production processes (→ chap. 5 on risk) or the routines and infrastructures of a highly mobile society (→ chap. 9 on infrastructures) whose future viability is in question. The focus is thus on the interactions of societies or different social groups with their natural and technical

environments, their progressive interpenetration and the resulting sustainability problems. These sustainability challenges in particular and the questioning of the continued validity of leading convictions in science, politics and society have led to the fact that a large part of environmental sociology critically examines social structures and technically and economically formulated necessities. In this respect, environmental sociology is also a critical social science with an interest in transformation processes (→ chap. 8 on innovations and transformation processes).

Compared to other sociological fields of work, environmental sociology has a relatively short history. It began in the United States and Western Europe as a reaction to the early environmental movement and as an approach for examining the undesirable consequences of growth and progress. The first authors, who are exclusively white men, were primarily concerned with applying a sociological perspective to address environmental problems that were only just starting to garner public attention. At the core of the discipline, this request was met with rejection: it seemed to contradict Durkheim's programmatic rule of sociological method (explaining social facts by social facts) and instead open the door to biological and technical reductionisms, thus relegating to the background the forces of social development judged to be more significant, such as differentiation and rationalisation (Kropp 2002: 29– 47). If we look at the emergence of environmental sociology in the turbulent 1970s, we can clearly see the extent to which its subject matter challenges traditional sociological thinking. After 20 tough years of struggle, William Catton and Riley Dunlap, two American pioneers of environmental sociology, laconically summarise the discipline's problematic tradition: "The Durkheimian legacy suggested that the physical environment should be ignored, while the Weberian legacy suggested that it could be ignored, for it was deemed unimportant in social life." (Dunlap & Catton 1994: 14).

Sociology was founded at the time of industrialisation and developed as a theory of modern industrial society, hence it also unwittingly adopted an industrialised worldview. In it, "emancipation from nature"—understood as overcoming natural hazards and natural scarcities—plays a central role, especially in relation to expectations of social progress.

An implicit concept of nature, however, entered into all sociological publications, whereby nature usually forms, at least semantically, the opposite or antithesis to society, culture, and technology, so that conceptual reflection on nature is at the same time a reflection on society (Soper 1995). For Karl Marx, who paid fundamental attention to the metabolism between humanity and nature as a productive force, the social "realm of freedom actually begins only where labour which is determined by necessity and mundane considerations ceases" (Marx 1998 [1894]: 807) – that is, when the constraints imposed by "first nature" (the laws of nature) and bourgeois society as "second nature" are overcome. Emile Durkheim, in contrast, reconstructed the "social facts and things" with reference to their significance in the formation of social order. He was interested in natural and technical phenomena exclusively in relation to their function for social coexistence. Max Horkheimer and Theodor Adorno were among the first to address the unseen repercussions of humans' increasing domination of nature. In 1947,