

## Exploring Uncommon Ground: Sustainability and the Social Sciences

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### *Social Sciences and the Debate on Sustainable Development*

Especially since the United Nations Conference on Environment and Development in Rio, 1992, sustainable development has become an internationally accepted key word for a political discourse committed to quality of life, the conservation of natural resources and a sense of obligation to future generations. Rather than a well-defined concept, sustainable development might best be characterized as a contested discursive field which allows for the articulation of political and economic differences between North and South and introduces to environmental issues a concern with social justice and political participation.

The emergence of the discourse on sustainable development is closely linked to the erosion of 'development' and merely economic modernization as prevailing models for the management of social transformation. On the one hand, 'development' and 'modernization' have attracted growing criticism mainly from 'Third World' activists as a means of domination of non-Western societies and cultures. On the other hand, 'development' viewed as a generalized model of the historical formation of Western societies has proved inappropriate to meet the most urgent needs of present global transformation processes. Not only has the triad of economic growth, technological progress and social development not met the specific conditions and requirements of most 'Third World' countries. The debate on the 'limits of growth' in the early 70s also demonstrated that the resource-intensive path of development pursued by the Western industrial societies could neither carry on into the future at the same pace, nor could it necessarily be applied on a global scale. Considering the biophysical prerequisites and impacts of social processes and ecosystems, it becomes obvious that not only the 'Third World' countries but also - and even more so - the highly industrialized countries of the North have to be regarded as 're-developing' countries.

Moreover, in a broader sense the discourse on sustainable development can be envisaged as a rallying point of public debate, knowledge-building practices and political strategies to cope with a series of unprecedented 'world problems' caused by major transformation processes. These new type of problems result, most importantly, from economic and technical globalization and their social, political and cultural impacts. They are linked to the failure of development strategies in many less industrialized countries, unemployment as a result of 'jobless growth' in OECD-countries, transformation of post-socialist societies, and environmental change, which is influenced by, and itself interferes with, all the other tendencies.

Social scientists have responded to these changes in various ways, intervening in public disputes over the meaning of sustainability.<sup>1</sup> Parts of the scientific community joined decision-makers and NGOs in their attempts to find new instruments for environmental and sustainability policies. In the field of scientific consultancy, particularly scientists from independent research institutions and experts working with international organizations, such as the World Bank or the OECD, have developed innovative indicator systems and tools for measuring and evaluating

environmental impacts of human activity. Others, who are engaged in new forms of cooperation with social movements and NGOs, participate in community-building activities and try to support new alliances between actors within these different sectors.

Especially in the contexts of development studies, political ecology and the feminist debate on women, environment and development, the concern with sustainability has stimulated a rich literature. At the 'cutting edge' of sustainability-related research and scholarship, innovating approaches have emerged and constitute a new trans-disciplinary field with characteristic problems. Related to this field, it is ecological economics that perhaps is figuring most prominently, but there are other - still less visible - approaches in social ecology, environmental history and environmental sociology, too.

Yet, although social scientists have been involved in the public debate on sustainability right from the start, social sciences until now have not developed their full potential within the new field of research. While there is growing acknowledgement that they should contribute to sustainability research, social science approaches have neither been incorporated into the mainstream of environmental research, nor have they resulted in substantial changes within the mainstream of social sciences. Moreover, there is a deep gap, cutting across social sciences themselves. Innovative sites of research have emerged mainly outside academe, while within the established social sciences community a concern with sustainability and the environment has largely remained at the margins of existing disciplines.

There are a variety of reasons, why sustainability has remained for the social sciences uncommon ground: Currently, environmental research, on which environmental policies and recommendations most prominently draw, is still suffering from a strong bias towards the natural sciences. The main focus of analysis is on monitoring the physical environment, while societal interactions with the environment are formulated primarily in non-social terms, like 'energy-use' or 'devastation of land', if they are investigated at all. Oversimplified models have boiled down societal impacts on the environment to a mere outcome of population dynamics. Only recently, societal processes have deserved more attention as 'human dimensions' of global environmental change; a still questionable term, because it refers to a new field of social science research which has been added more or less belatedly to a previously established research agenda defined in natural science terms.<sup>2</sup>

On the other hand, within the social sciences themselves major factors can be identified that have resulted in sustainability being largely disregarded by the disciplines up to now. Especially scholars in feminist and post-colonial studies have underlined the problematic engagement with the paradigms of development and modernization which is deeply embedded in social science theory and methodology: Committed to development theory and practice, social sciences are based on assumptions 'that exclude both women and nature from its understanding of development and, in so doing, have contributed to the current economic and ecological crisis.' (Harcourt, 1994:3)<sup>3</sup>

It becomes increasingly clear that sustainability inhabits a more or less unexplored borderland that cannot be appropriately investigated either by social or natural sciences alone. However, while much has been written on the social implications of sustainability, only few attention has been paid to investigating and delineating the role of the social sciences more comprehensively. Combining both theoretical reflection and practical commitment to sustainability and drawing on the experience of scholars from different disciplines and different regions of the world, the contributions to this book have a twofold concern: They attempt to clarify the meaning and implications of sustainability from a social sciences' perspective in order to establish a starting point from which further social science research might depart. Furthermore, they explore the (potential) contributions of the social sciences to the sustainability debate and outline the latter's implications for the social sciences. In this respect, sustainability is envisaged as a 'generator of problems', introducing a new and innovating type of question for the social sciences, rather than providing a unifying paradigm.

Examining sustainability-related approaches the contributions to this book provide insights into the discussion of instruments and tools within various social science disciplines and fields. They intend to stimulate a discussion between scientists and experts in the field of political consultancy, decision-makers and other representatives about innovative actor-oriented strategies for sustainability. Identifying sites within the social sciences from which further problem- and actor-oriented research into sustainability might depart, the authors also suggest links between the 'cutting edge' of sustainability-related research and the mainstream of the social sciences. In this way, the discussion about the conceptual implications of sustainability intends to promote a reorientation of the social sciences themselves.

### *Analytical, Normative and Political Implications of Sustainability*

It is almost a commonplace in the literature on sustainability to deplore the vague or ill-defined character of this concept. The only consensus on sustainability appears to be that there is no shared understanding. Approaches to and strategies for sustainability differ widely, especially as to the assessment of development, the way ecology is related to justice or the level of participation. The contest over the meaning of sustainability is far from being settled, and has become the subject of social science investigation itself (see Lélé, 1991). Yet, despite such differences the contributions to this book provide a shared understanding on sustainability on which a social science conceptualization can be based.

Although sustainability is most prominently associated with ecological crisis phenomena, like climate change, deforestation, soil degradation or loss of biodiversity, it nevertheless describes a field of investigation that is based on a society-oriented definition of problems. If we talk about sustainability, the main concern is not the conservation of the natural environment. Rather, sustainability addresses the question of how societies can shape their modes of change in such a way so as to ensure the preconditions of development for future generations. From this point of view, sustainability refers to the viability of socially shaped relationships between society and nature over long periods of time. Thus, environmental sustainability turns out to be closely linked to supposedly 'internal' problems of social structure, such as social justice, gender equality and political participation. Putting

the question this way involves not only the issue of economic efficiency, but those of social justice and political regulation as well. In this sense, sustainability describes a topic of research that is basically social, addressing virtually the entire 'process by which societies manage the material conditions of their reproduction, including the social, economic, political and cultural principles that guide the distribution of environmental resources.' (Becker et al., 1997:19)

The set of analytical, normative and political or strategical claims that lie at the core of the discourse on sustainability indicate a deep rupture with the assumptions of the consensus on development during a long period after World War II. Looking closer to these claims, we will outline the specific social character of sustainability more distinctly - and hence sharpen the focus of a social science perspective. This will also highlight the specific challenge for social science conceptualization, resulting from the hybrid character of sustainability, being at the same time a political model and a tool for analysis. In this sense, the following matrix intends to outline the main analytical, normative and political implications of sustainability in order to identify the basic elements of a working definition of sustainability as a concept for the social sciences.

On an *analytical* level sustainability claims that societal development can no longer be viewed without considering its natural prerequisites, but must be inseparably coupled with the reproduction of same. Thus, sustainability breaks with, or at least weakens, the equivalence between development and economic growth, lying at the heart of the consensus on development. It also questions the assumption of a continuous, linear and more or less harmonious development for societies along a given track. And, finally, sustainability puts to rest the idea that there is one single direction for societal development, which all human societies must follow. In contrast, sustainability emphasizes the diversity of paths for societal transformation, depending on the particular cultural or political as well as their ecological starting-points.

At the same time sustainability introduces a set of *normative* commitments to the development problematic. A call for justice is being made on behalf of future generations: Societal development should on no account lead to irreversible constraints on the chances of future generations meeting their needs. Despite competing interpretations concerning the implications of this claim, there is an acknowledgement that it implies a hierarchical interdependence between the economy, society and the natural environment. While societies are possible without a market economy, neither can exist without a natural environment. Thus, sustainability implies that economic processes are subordinated to social and ecological constraints. There is also growing awareness that claims on intragenerational social justice, equity in gender relations and democratic participation in decision-making processes are essential with respect to the access to and distribution of natural resources and services as well as to the management of these resources.

Finally, sustainability imposes a strong commitment to action directed towards reshaping the relations between human beings and their environment, thus defining a *strategical* or *political* context. The main objective in this context is to re-negotiate the goals of future societal development and to establish a system of governance

that has the capacity to appropriately implement policies moving towards sustainability on an international, regional, national and local level. This process of negotiation implies the identification of policy goals with respect to the compatibility of economic and environmental targets, equity and social justice as well as a broad participation of actors and the establishment of ways and means for their implementation. Moreover, this task recommends a critical re-evaluation and assessment of existing institutions and institutional arrangements, as well as the identification of possible actors and conflicts among them. Finally, the consequences of the implementation of sustainability-related strategies should also be taken into account. Intervening in a process of rapid transformation under the condition of uncertainty, these strategies thus have to be very open to self-reflection and re-evaluation of their implications.

Any discussion of sustainability as a concept for the social sciences has to acknowledge the close and complex links between each of these different contexts. At the same time, it should also be aware of the distinctions between them. There is a rich literature on topics, such as justice between and within different generations, equity concerns, top-down vs. bottom up strategies, that are clearly related to the normative and political implications of sustainability. However, with few exceptions, the analytical implications of sustainability have not yet attracted appropriate attention.<sup>4</sup> Given this situation, the above matrix might serve as a useful tool to relate the normative and political claims to an analytical context. In this way, this matrix might be instrumental in determining the implications of sustainability for (social) science conceptualization and provide a map for further investigation.

### *Towards a Working Definition of Sustainability*

The main task of analysis is to define the sustainability and non-sustainability conditions for a combined system of nature and society in real time and space. Sustainability/non-sustainability is a qualification of states and processes within a continuum of possible states and processes. Two important conclusions follow from this statement. It is not possible to consider social or environmental sustainability in isolation. Rather, focusing on the interactions between societies and nature, sustainability has to be conceptualized in strictly relational terms. Sustainability, therefore, is not a specific feature of the environment or of society, but refers to the viability of their relationship over long periods of time. Furthermore, considering the dynamic character of both environmental change and the rapid transformations which societies are undergoing in the present situation, a second implication becomes obvious. In sharp contrast to thinking in terms of preservation, sustainability opens up a perspective that is inherently dynamic. Rather than referring to static structures or qualities, sustainability is concerned with stabilized and preserved patterns within social-ecological transformations in which the natural environment is a central dimension.

Due to the dynamics and complexity of social-ecological transformations, statements about the sustainability conditions of these processes are subject to a high degree of uncertainty. This is one of the reasons, why the term 'sustainability' should be used primarily in a negative definition in order to identify states and processes that are unsustainable. Defining non-sustainable states opens a 'corridor' for different paths to (more) sustainable states, limited by 'crash-barriers'. This view highlights the

importance of working with process categories: Focusing on the issue 'what is prolongable and for how long?' outlines a limited sustainability corridor and conditions for social transformations. This view, again, suggests a conceptual shift from categories of preservation to categories of change and transformation.

Another consideration lends support to avoiding positive definitions of sustainability. If sustainability is to acknowledge the variety of conditions and of possible social trajectories, definitions of sustainability cannot be considered as a general norm. Positive norms of sustainability, suggesting the existence of a single optimum path to sustainability would not only discard attempts that are committed to alternative trajectories. They also are very likely to establish a hierarchy of 'sustainable nations', dominated by countries of the North, eg 'Sustainable Germany', as a model which could then be exported to the unsustainable world.

Drawing on the above matrix, sustainability should be understood as a *valuated quality* of processes, structures and systems. Therefore, definitions of sustainability are bound to strategies and socially negotiated goals which refer to the interactions between societies and their natural environment, including the mutual interference of different societal processes among themselves and with ecological processes. The contributions to this book suggest three basic categories that can be distinguished analytically which account for the sustainability of environmental processes:

- *economic processes*, referring to levels and modes of the production and consumption of goods;
- *social processes, patterns and factors*, in which economic processes are embedded and by which they are maintained and shaped. This category includes issues that are related to social structure, such as social hierarchies, life-styles or gender division of labour, but also comprises cultural aspects such as value systems, affecting the distribution of goods and the access to environmental resources and services.
- *decision-making processes and institutional arrangements*, related to issues like participation in, and responsiveness of decision-making processes, but also to the capability of institutional arrangements to implement policy strategies and to accommodate to changing conditions.

Based on this framework a variety of goals, such as eco-efficiency, social justice, or responsiveness and accountability of institutions might be identified that are related to items within these fields, while at the same time affecting the sustainability of the overall system. However, the framework should be understood as a preliminary sketch, and not as a complete model. It outlines the scope of sustainability-related issues and situates the various approaches that are discussed in this book in greater detail. In particular, it should be underlined that this framework should not be considered as a prerogative for a particular conceptual or methodological approach. For example, a concern with equity and social justice might be analysed within the different conceptual frameworks of social integration, social structure or gender division of labour. To borrow a metaphor from the field of informatics, the above framework is about managing the interface between public discourse and social science investigation. As a generator of questions, the main objective of this framework is to relate the normative and political claims that are raised in the debate on sustainability to specific areas of social science research.

Nevertheless, despite these attempts, social science discussion should not expect to arrive at a definite agreement on the analytical, normative and political status of sustainability. In this respect, the contributions to this book point to the diversity of competing claims and interpretations that create deep fissures cutting across each of these contexts. Therefore, the debate on sustainability within the social sciences is bound to further a commonly shared understanding of basic elements and features of the concept without neglecting, or even levelling out, the differences and disagreements in the analytical, normative and political contexts. Building a shared understanding is an intrinsically political endeavour that cannot be substituted by even the most rigid conceptual purification.

### *A Social Trajectories View for Discourse-Oriented Policies*

There are roughly three routes that can be, and indeed have been taken, by social sciences to make a difference to more conventional environmental research. In this respect, sustainability provides new areas of research for social science investigation. Exploring the potential contributions of the social sciences in this field, we can also delineate the perspectives that problem- and actor-oriented research can open up for sustainability-related policies and strategies.

A first approach to incorporate a social perspective into the study of the complex interplay of intertwined social, economic and political processes with the environment is to calculate the environmental impacts of societal processes. This might be done, for example by measuring societal metabolism in terms of material throughput or energy consumption or by analysing social factors of land-use patterns. In particular, such approaches have the potential to improve the understanding of global environmental processes by introducing a more regional perspective. In this way they stimulate the study of the interrelations of processes on local, regional and global levels. However, these approaches have also attracted criticism for being committed to top-down strategies of environmental management from an 'astronaut perspective' (Sachs, 1997).

Following a second, closely related route, social sciences would investigate how the interactions of social actors with the environment are shaped and mediated by institutional arrangements. Analysing the variety of socio-economic conditions as well as that of political and institutional arrangements that shape the relations of social actors with the biophysical environment at different places, such studies can strengthen a local perspective in sustainability-related research. Furthermore, they can provide insights into how the societal conditions for (non-)sustainability at one place are linked to those at other places and at a global level, paying special attention to the intersections between North and South. An important task that arises within this context is, for example, the identification of political and institutional arrangements and mechanisms that allow for maintaining sustainability at one place by exporting non-sustainability to another place (see Martinez-Alier, this volume).

Finally, social sciences can introduce a hermeneutic or interpretive dimension to sustainability-related research by exploring the cultural and social meanings that are attributed to social practices. Paying attention to the symbolic dimension of social practices is a crucial step towards actor-oriented approaches, because it allows

analysis of those factors that simultaneously affect the perception and valuation of the environment and govern everyday behaviour. As Michael Redclift argues convincingly, the perception of and the behaviour towards the environment rely on social commitments that do not simply reflect individual values or attitudes. Rather, they are deeply incorporated into habits and life-styles as well as being embedded in institutional arrangements and the technical infrastructure of (highly industrialized) societies (see Redclift, this volume).

Finally, the study of the symbolic dimension also includes the analysis of how sustainability problems themselves are represented in the media and public discourse, how they are framed as a matter for policy interventions and how they are defined as subjects for scientific investigation. In this way, social science research can provide important insights into how societal relationships with nature are shaped, maintained and rendered open to transformation by exploring how the agency of social actors is constrained and enabled by natural and social conditions that have to be addressed in both material and symbolic terms.

From these considerations emerge important implications for action-oriented strategies, while they also shed a critical light on the shortcomings of current environmental policies. In particular, they suggest a far-reaching shift in environmental policy-making from a concern with absolute limits to a social-trajectories view aiming at developing more appropriate strategies for sustainable social-ecological transformation processes.

Driven by a concern with absolute limits, conventional environmental policies are mainly concerned with setting up environmental targets that are based on scientifically defined critical loads or the carrying capacity of ecosystems. Strategies to achieve these goals mainly draw on technological improvements, while social issues are primarily taken into account with respect to their smooth and efficient implementation. From a societal perspective this might be called a 'retrospective' approach, because social processes are only considered from the point of view of environmental targets or goals which have been previously defined in non-social terms and to which societal processes are to be adjusted. Accordingly, social science knowledge is mainly incorporated in an instrumental way, for instance, in order to increase public acceptance of technological innovations.

In contrast to such a retrospective approach, a social-trajectories view would start from an analysis of social conditions and causes of non-sustainability. Rather than devising tools and instruments as solutions for pre-defined problems of environmental management, this approach would prefer a more participatory and process-oriented procedure. Its main objective would be to assist in the development of strategies that enhance the agency of key-actors to move to more sustainable practices. Actor-orientation of research could entail, in particular, to choose topics for investigation, according to the needs of the key actors, inviting non-scientific users to reformulate research and involving them in various stages of the research process. Proceeding this way, scientific research could adopt a perspective which is more open to support processes of social negotiation. Science would not claim the authority to define the goals of societal policies, but would rather cooperate with non-scientific actors and assist in a process of negotiation of societal needs and ways of satisfying them.<sup>5</sup>

In this respect, the contributions to this book show, in a variety of ways, how an instrumentalist role of social sciences in decision-making processes might be overcome and an actor-oriented perspective strengthened. Among the topics which might be investigated by social sciences to assist the process of societal negotiation of sustainability-related strategies are: a redefinition of needs and the development of more rigorous and inclusive forms of measuring societal wealth; the examination of the policy context in which targets for environmental policies are formulated; the development of tools and instruments that make the implications of environmental policies visible and that thus throw a light on the tensions and conflicts evolving from these issues, leading in turn to their resolution or amelioration in democratic politics.

### *Reorienting the Social Sciences*

Evidently, sustainability opens up new options and opportunities for the social sciences. At the same time, the new type of problems associated with sustainability entails a need for critical examination of prevailing theories and methodologies for empirical research. For a variety of historical reasons the social sciences are biased towards the study of non-material or symbolic dimensions of social practices. Neo-classical economics, for example, has focused exclusively on the study of market exchanges, using monetary value as the only scale of valuation, while the biophysical dimensions of economic activity have been neglected. Likewise, the Durkheim-Weberian tradition in sociology adhering to the postulate that social facts should be explained by social factors alone has paid main attention to the social construction and understanding of meanings, while the material interrelation of social practices with natural processes has hardly been taken into account. It is exactly this underlying conviction that social facts can be distinguished and strictly separated from natural objects which is starting to crumble in the light of the debate on sustainability. Phenomena such as the greenhouse effect or BSE resist conventional strategies of explanation. Such 'hybrids', to borrow a term from Bruno Latour, can neither be understood as social facts nor as natural objects, but emerge at the intersection of social practices and and natural processes as socially constructed forms of mediation between society and nature (Latour, 1993).

To cope with such phenomena the social sciences have to be opened up for innovative problem-oriented approaches. In particular, new ways have to be developed for studying both the complex interactions between society and nature as well as the connection between the symbolic and material dimensions of social practices more appropriately. These topics provide crucial sites of investigation for problem-oriented approaches to sustainability. At the same time, they are of critical importance for reorienting social sciences themselves (Wallerstein et al., 1996).

Most importantly, problem-oriented approaches require conceptual frameworks that overcome the shortcomings of conceptualizations of society 'without nature'. In this respect, the guiding reference of the social sciences needs to be shifted from an exclusive concern with society towards the relation of society and nature. In this way, knowledge-building strategies that attempt at purifying social objects could be replaced by approaches that focus on the connectedness of social and natural processes. This fresh perspective would allow to pay attention to the forms of

mediation between these processes, while at the same time acknowledging the heterogeneity of elements that are involved in this relationship.

Closely connected, social sciences should be aware that human action and social practices may not be considered as either symbolic or material; instead these two dimensions are intrinsically linked, separable only by analysis. Thus, the study of social practices cannot be restricted to symbolic aspects alone, but should also take the material transformation that result from these practices into account. Taking nutrition as an example, material forms of producing, distributing and also preparing food are evidently connected not only with economic and technological structures but also with diverse symbolic practices ranging from cultural-religious eating taboos, to socially shaped 'nutritional styles' and 'eating cultures' as well as to scientific recommendations and legal norms. Focusing on the links between symbolic practices and material processes, social sciences could deepen the understanding of how the relationship of society and nature are regulated.

Thus, sustainability does not simply add some new 'environment-related' topics to the social science research agenda. Addressing virtually all fields of empirical research, it challenges basic assumptions, prevailing theories and methodologies that are built into the core of the social science disciplines. Historically drawn boundaries between these disciplines have to be re-examined and a rethinking of conceptual and methodological tools is needed, both with respect to reorientations within individual disciplines and related to new forms of cross-disciplinary cooperation that include also the natural sciences. Moreover, investigating conceptual and methodological presuppositions could strengthen the awareness for the limitations of scientific knowledge that are generated by disciplinary boundaries and the fragmentation of knowledge, both on the level of individual disciplines and related to science in general. On the other hand, this awareness can also open up and stimulate innovative ways to cope with the fragmentations of scientific knowledge.

To support this process of reorientation, a concern with sustainability and the environment should not remain isolated within specialized, environmentally oriented sub-disciplines, such as resource economics or rural sociology. Rather it should be moved to the center of the disciplines in order to stimulate the debate about basic assumptions within the social sciences themselves. For similar reasons, conventional forms of cross-disciplinary cooperation, consisting of interactions only at the margins of individual disciplines should give way for new strategies of integration of knowledge. However, this integration of knowledge should not seek to restore a 'unity of science' programme. Rather it should be committed to a multiplicity of new forms of cross-disciplinary cooperation where various disciplines, based on the acknowledgement of their partial perspectives, cooperate in problem-oriented research.

### *Making the Research Process more Inclusive*

Discussions about an actor-oriented restructuring of research have focused mainly on issues of agenda setting and the inclusion of actors in research. Less attention, however, has been paid to the cognitive framework on which sciences draw. As a result of this lack of epistemological discussion, the role of theories, concepts and methods in structuring the research process and the form of cooperation between

scientists themselves has largely remained a black box. Yet, the above considerations suggest that the importance of these issues for problem- and actor-oriented approaches can hardly be underestimated. They guide the selection and translation of problems into topics for scientific investigation, the form of cross-disciplinary cooperation, the re-integration of findings and the development of action-oriented strategies based on the results of this research.

In this context, the debate on transdisciplinarity provides valuable insights for the development of innovative forms, methods and theoretical foundations for problem- and actor-oriented cross-disciplinary research. In order to structure debate, the following typology distinguishes three basic models. All of them are appropriate for cross-disciplinary research into sustainability. They differ, however, with respect to the degree of enrolment of non-scientific actors, the form of cooperation between scientists and the level of cross-disciplinary interaction.<sup>6</sup>

The first model can be referred to as 'goal-oriented multi-disciplinarity'. In this case, the goal of the research process is to find a solution for a previously defined objective, for instance a reduction in car exhaust fumes, with the help of various disciplines. Generally speaking, the objectives are specified and fixed in advance by policy makers; the individual disciplines can adhere almost entirely to their traditional methods, theories and approaches. Within this framework, there is only little impetus towards interaction between the disciplines. A 'synthesis', if undertaken at all, is limited to the level of results and is not integrated into the process of scientific research. It is usually done via the policy makers, as clients, and often involves only a mere adding together of results from the different disciplines.

A second form of cross-disciplinary cooperation can be addressed in terms of 'problem-oriented inter-disciplinarity'. Here, too, socially relevant problems or solutions are at the centre of proceedings; the translation of these problems into issues of research, however, is tied more closely to a process of negotiation between non-scientific actors and the scientists involved. In this way, the different disciplines agree, at least roughly, on a common description of the problems under review; they then examine certain aspects of the whole problem on a relatively independent basis and, for the most part, use their customary disciplinary theories and methods. The results, however, are viewed in the context of results from other disciplines, thus becoming subject to relativization and modification. Thus, a cross-disciplinary exchange takes place, albeit rather on the level of findings than on the level of theories and methods. Moreover, this model provides the opportunity to include non-scientific actors into the review of results, and is, thus, more open to convert these findings into actor-oriented strategies.

Finally, 'self-reflexive trans-disciplinarity' offers a third model of cross-disciplinary cooperation. Similar to problem-oriented cooperation, this model stresses the incorporation of actors into the negotiation of research topics and the evaluation of results. In addition, it is explicitly recognized that the issues of research extend beyond the traditional subject matter of the respective disciplines and, as such, constitute a 'transdisciplinary field' (see Martinez-Alier, this volume). As a consequence, the conceptual and methodological presuppositions and limitations which are tied to each disciplinary perspective can be critically examined in the light of the range of the problems under study. Thus, self-reflexive trans-disciplinarity has

the potential to promote theoretical, conceptual and methodological reorientations with respect to core concepts (eg the discussion about the substitutability of the production factors - capital, labour, land - in economics). These modifications, in turn, can generate new questions and approaches for the investigation of problems that can be fed in into future research processes. In this way, self-reflexive trans-disciplinarity provides a way of structuring the research process that reinforces social scientific reorientation and enhances self-reflexive awareness of environmental and sustainability-related research.

As an example, the concept 'societal relationships with nature' that has been developed at the ISOE as a framework for trans-disciplinary empirical research will be discussed in Egon Becker's contribution at the end of this book. In a broader sense all authors refer to the challenges that arise for the social sciences from the analytical, normative and strategical dimensions of sustainability by discussing the conceptual implications of sustainability, situating sustainability-related approaches within the social sciences, and exploring how social science research can be opened up to new forms of cross-disciplinary cooperation. Thus, they make obvious that the shared commitment to enhancing the capacity of the social sciences for sustainability-related research is closely connected with a more general concern to make societal institutions and decision-making processes more responsive to these new types of problems.

The contributions to the first section explore on a more general level the implications of sustainability which has primarily been developed as a political model for the social sciences. Outlining the scope and the new type of problems that are associated with sustainability, they intend to identify links and critical sites within the social sciences from which further conceptualization of sustainability might depart.

*Ignacy Sachs* reminds us about the context in which sustainability emerged as a political model. In the course of the debate within international organizations on environment and development, the concern with the outer limits of the physical environment has increasingly been linked to an awareness of the internal organization of societies and of the world community as a whole. Accordingly, the scope of sustainability has been pushed beyond the narrow focus of the environment until it finally includes values and policy goals covering virtually all spheres of social life. Drawing on a 'whole development' approach, Sachs suggests supplementing environmental with social sustainability, which is founded on the values of equity and democracy. Insofar as social and environmental sustainability condition each other, both can be addressed as partial sustainabilities, being necessary prerequisites for overall sustainability. Examining the various dimensions of social and environmental sustainability more closely, Sachs outlines the scope of policy goals cutting across the social, economic, political and cultural dimensions and stresses the need to be aware of both the opportunities and the tensions that result from these variety of goals.

*Henri Acselrad* opens up the discussion on the conceptual implications that emerge from the close interrelation between material and symbolic aspects. Based on his experience in the field of urban and regional planning in Brazil, he underlines the crucial importance of including the analysis of representations into sustainability-related research. He argues for a new understanding of 'territory' that gives special

emphasis to the often competing and contested meanings that are applied to space by social actors. 'Territory', then, is considered as a result of the social practices of physical transformation and signification.

From this point of view, the discourse on sustainability itself turns out to be a site of redefining the meaning of territory and the environment that can be subjected to social science scrutiny. If the main thrust of sustainability is a concern with the material prerequisites of societal development, Acselrad maintains, then sustainability is not simply about the durability of this biophysical base, but also related to the social forms under which this base may be sustained. Thus, the different meanings attributed to sustainability indicate tensions between competing socio-political projects with different rationalities and different political implications. This should make social scientists aware that any attempt at defining sustainability intervenes in a political struggle where the legitimacy of practices of different social actors is at stake. This reinforces the importance to include the analysis of representations into the study of sustainability, because this allows to acknowledge the plurality of meaningful projects of different social actors.

In similar fashion, but from a slightly different angle, *Michael Redclift* addresses the analysis of the symbolic and the material dimensions of social practices. Based on a review of prevailing environmental theory and practice within the European Union which is mainly concerned with indicators and a momentum towards ecological modernization, he observes that these strategies fall short of addressing the context in which sustainability policies are formulated. In particular, they fail to grapple with the underlying social commitments, practices and institutions that regulate the way in which nature itself is metabolized.

Taking sociology as an example, Redclift discusses one of the main challenges that is presented by sustainability for the social sciences as a whole. If social scientists remain within the given conceptual and methodological framework they will confine themselves to the study of the understanding and evaluation of the environment. Focusing exclusively on the symbolic dimension of social practices, they risk to detach themselves from their object of study by putting in brackets the very content of this knowledge. This would lead them to take up an indifferent or contemplative stance towards the environment that is clearly not a sufficient base for action-oriented research that is committed to societal transformation. As a result, he stresses the crucial importance of opening up the debate on sustainability within the social sciences to overcome the impasse that is created by the prevailing tradition of 'constructionism'. Thus, the acknowledgement that human beings are 'unavoidably organically embodied and ecologically embedded' (Benton, 1994:41) stresses the need to develop alternative approaches that encompass both the material and the cultural dimension of nature.

*Rosi Braidotti* explores how the discussion of sustainability might benefit from feminist and gender theory as well as from post-structuralist philosophy. From this perspective, the discourse on sustainability is characterized by the re-emergence of the 'hidden other' (women, ethnic others, the environment). Sustainability turns out to be closely linked to a crisis not only of development and modernization, but also of the prevailing and dominating forms of subjectivity. This has epistemological and political implications. On an epistemological level, there is the need for re-examination of science as the dominant model of western representation in order to overcome its ethnocentric and masculinist bias. On a political level, coalition building

among heterogeneous actors, re-negotiation of identity and re-figuration of subjectivity emerge as crucial tasks for social philosophy. Therefore, Braidotti suggests to open the discussion of social sustainability to issues of ethnic identity, multiculturalism and multiple socio-cultural locations, linking cultural and philosophical disciplines to this debate. The main challenge is to elaborate a non-essentialist understanding of the subject which is capable of transformation, at the same time taking also its embodiment and embeddedness into account. Drawing on the French philosopher Gilles Deleuze Braidotti discusses basic elements from which the conceptualization of a sustainable self can depart.

The last two contributions of the first section demonstrate how the limitations of a disciplinary perspective in the study of society and nature can be overcome. *Ramachandra Guha* discusses a transdisciplinary social-ecological approach which has been developed for the study of conflicts over natural resources. Departing from sociology and social anthropology, the basic idea of this approach is to incorporate an environmental dimension into the analysis of lifestyles in terms of 'resource catchment' and to distinguish different groups or classes of actors as to the size of this variable. Thus, modernization is reconstructed as a process in which 'ecological omnivores', who draw on natural resources from the whole country to maintain their lifestyles, have increasingly gained control over 'ecosystem people', who rely only on resources from their own vicinity. As a result of this process large numbers of ecosystem people have been permanently displaced from the base of their livelihood in the countryside, thus forming the new class of 'ecological refugees', living in slums and temporary shelters of towns and cities. Although this conceptual framework has been developed under the specific conditions of the situation of India, it might easily be applied to study sustainability-related issues and conflicts in other places of the world. Moreover, this approach adds a special edge to the debate on modernization theory in sociology. Contrary to the mainstream assumption, modernization is not considered as a linear process enhancing 'societal agency' in general. Rather, it increases the agency of particular actors by foreclosing that of others.

*Juan Martinez-Alier* guides us through the trans-disciplinary field of human ecology which has emerged at the intersections of ecological economics, political ecology and the more conventional approaches in human ecology. Considering the economy as an open physical and social system and stressing its social and biophysical embeddedness, human ecology departs from a 'pre-analytic vision' that gives special emphasis to social conflicts over the distribution and use of environmental resources. In particular, human ecology includes the social perception of material and energy flows as well as the institutional framework of economic processes. From this point of view, 'externalization' of environmental costs is not simply the result of 'market failure', but points to 'ecological distribution conflicts', arising from inequalities in the distribution of property rights, income, power etc. Discussion of the range and limits of various physical indicators links the study of social conflicts to the changing social perception of the natural environment. In contrast to economic accounting instruments based on monetary values, this type of indicators allows for a more appropriate appraisal of the biophysical impacts of human activity. Methodologically, the different types of indicators can be combined in multi-criteria evaluation procedures that rely on 'weak comparability', stressing the

irreducible differences between the different scales of valuation. Finally, Martinez-Alier touches upon the epistemological implications that emerge from cross-disciplinary cooperation within this trans-disciplinary field. He argues for an 'orchestration of the sciences', which would dialectically combine the findings of various disciplines, but also submit its results to an 'extended peer review' including also non-scientific actors.

The contributions to the second section review the state of discussion within individual social science disciplines and examine more closely selected approaches and instruments. Thus, they provide insights into the 'cutting-edge' of sustainability-related research. At the same time, they also point to obstacles that have prevented the concern with sustainability to attract broader attention within social sciences.

Issues of governance and institutional factors have largely been excluded from the debate on sustainability. Strategies to achieve sustainability are predominantly discussed within the framework of eco-efficiency. As a result, main emphasis is given to reducing the environmental impacts of economic activity, but only little attention has been paid to the capacity of a political system to implement sustainability-related decisions. However, as *Nazli Choucri* observes, the political dimension is a crucial prerequisite for the very process of sustainability, because it provides an impasse for every sustainability-related strategy.

Focusing on the macro-level of the nation state, Choucri discusses basic elements of a top-down approach that connects governance and institutional performance with the study of ecological and economic processes. Within this framework, the sustainability of a political system is an outcome of its 'accountability', emerging from the participation in and the responsiveness of governance processes as well as from the capacity of institutions for feedback and adaptation to changing conditions. To understand the political logic of sustainability, the institutional capacity of a nation state can be linked to other factors, such as population, access to resources and level of technology. Applied to comparative research in the field of international relations, this approach provides an alternative to more conventional models. Instead of rating the performance of a given country exclusively in economic terms, the profile of a state is expressed by a set of core variables, including access to resources, technology and population.

*John Gowdy's* concise account of the debate on weak and strong sustainability brings us back to economics. Environmental and resource economics have been critical sites for the operationalization of management rules, the development of new accounting instruments and the formulation of policies. Yet, closer examination shows that - due to the assumption of the substitutability of man-made and natural capital (in the case of 'weak sustainability') or a bias towards resource sustainability (in the case of 'strong sustainability') - both approaches fail to recognize the integrity of the social and environmental processes that sustain the economy in a long-term perspective.

Drawing on hierarchical systems theory, Gowdy suggests an alternative framework, conceptualizing the different dimensions of sustainability as a series of hierarchies, each operating at a different time scale. At the lowest level is the market economy with isolated individuals acting at a particular point of time. The next level contains human institutions, social rules and customs, where decisions are made on a

collective basis. At the highest level is the biophysical world, which encompasses all human existence, and upon which all forms of life depend. Consistent with similar approaches from ecological economics, this framework introduces ecological processes into the study of economic activity. Yet, at the same time, the social sphere is extended to include the institutional dimension of collective decision-making processes. Discussing the example of biodiversity, Gowdy demonstrates how this approach allows for a more appropriate understanding of processes of valuation and decision-making than an economic view that takes only individual consumer preferences into account.

In contrast to economics, sociology has been far less responsive to the debate on sustainability. Even among sociologists who are committed to this topic, it is almost a commonplace that contributions from their discipline to sustainability have been slim. However, as *Margrit Eichler* states, sustainability provides important topics for sociological inquiry. Especially the investigation of the relationship between sustainability and social equity could link sustainability to a more familiar area of sociological research. In this respect, sociology can benefit from the debate on equity and gender that has emerged within ecofeminism and environmental feminism. In particular, this debate provides important insights into the linkages of sustainability and equity, and the analysis of gender as a basis of many inequities. Furthermore, ecofeminism challenges the underlying assumption of 'human exemptionalism' that has been identified as a major obstacle to anchoring a concern with sustainability within sociology. Instead, ecofeminist approaches suggest to acknowledge the biophysical environment as a pre-condition for all forms of life on earth and to recognize the biosphere as the overarching context within which human social systems are located.

Accordingly, attention to the constraints imposed by the 'ecological imperative' of the biospheric system should be incorporated into sociological research in order to make sociology more sustainable. As a consequence all subfields of sociology ought to be reconceptualized to include, in their core, both equity, the social imperative, and the ecological imperative. This also recommends a redirection of science and research policy towards incentives, such as research programmes, and mild disincentives, such as attaching to grants the condition the sustainability implication of the topic under study has to be taken into account. Effecting changes on the level of background assumptions, this reorientation of sociology could enable a proliferation of theoretical and methodological approaches.

Among the social sciences geography might be expected to be especially equipped to bridge the gap between the study of natural and social processes. Unlike other social sciences geography adopted a 'horizontal perspective', which is not restricted to investigating a phenomenon from a particular perspective, but is directed to the study of the relationship between heterogeneous elements. Yet, as *Carlos Reboratti* states, geography has been hesitant to embrace sustainability as a topic of research. One major reason is the vagueness of the term and its analytical, normative and political ambiguities that make it difficult to define sustainability as a scientific concept. However, this reluctance also results from reasons within geography itself. Contrary to the initial programme, a clear distinction has emerged between physical and human geography. Moreover, the study of land-use patterns that could provide an important indicator for the relation between societies and nature has often been carried out descriptively, tending to transform geography into a science of

classifications with only little explanatory or predictive capacity. Furthermore, also the complex nature of these linkages calls for conceptual and methodological innovations. Approaches which assume a close and direct relationship between population growth and resource use in a given territory will hardly be appropriate to come to grips with the effects of economic globalization and social redistribution.

Reviewing studies in environmental psychology from an action-oriented point of view, *Carol Werner* discusses how psychologists can help move humans to accept more responsibility for the environmental consequences of their reproduction and consumption behaviour. Comprehensive actor-oriented strategies that try to bring about changes towards more sustainable practices can be supported by a type of research that measures actual behaviours and shows how to effect positive change. Priority should be given to strategies that lead to long-term, internalized, self-sustaining behaviour change, addressing the social awareness and concern about the problem; knowledge about and motivation to engage in solutions; memory or situational prompts; opportunities as well as skills or perceived competence to act appropriately. Discussing these factors, Werner gives an convincing account of how scientists can adopt an active role in determining and implementing sustainability-related strategies that strengthen grassroots participation and decision-making. She also demonstrates how social sciences can add a fresh perspective to the debate on sustainability policies, which is often dominated by monetary incentives and instruments proposed by technological or policy experts.

*Robert Paehlke* emphasizes that the analytical problems associated with sustainability are not simply a result of definitory vagueness, but arise from the complex structure of the concept itself. Hence, analytical approaches should not tend to reveal a single legitimate meaning of sustainability, but acknowledge, rather, the multiplicity of meanings of sustainability and try to understand and cope with the underlying tensions and conflicts. Accordingly, he suggests to distinguish between 'environmental', 'economic' and 'social sustainability'. While these dimensions should be integrated within the study and conduct of public policy, they nevertheless ought to be kept distinct on an analytical level. Different clusters of values and goals are attached to the various dimensions of sustainability, but might also emerge within the individual dimensions. 'Environmental sustainability', for example, comprises concerns with ecology and biodiversity, pollution abatement, as well as conservation, preservation and management of renewable and non-renewable resources. Within this framework, value analysis as well as the development of appropriate indicators and measurement tools can support effective policy analysis and implementation by identifying and better understanding conflicts, trade-offs and priorities between the different dimensions.

Focusing on 'life cycle analysis' (LCA), as a promising instrument for measuring environmental sustainability, Paehlke discusses the capacity of this tool to assess and measure the sustainability effects of various products, product designs and industrial processes. As he observes, a particular advantage of LCA is that it is able to address the complexity of environmental sustainability, such as hazardous emissions, solid wastes, loss of habitat, energy and material use, and the impacts of associated resource extraction. In this respect, Paehlke's discussion of LCA outlines the specific role social sciences can adopt within societal oriented sustainability strategies. Rather than defining environmental policy goals, social sciences can help achieve sustainability by supporting processes of societal negotiation and providing

instruments that assist the resolution of disputes and conflicts or at least support their amelioration within democratic politics.

The third section widens the focus from conceptual and methodological considerations to the discussion of the role of the social sciences within a broader context. It includes contributions that address issues of science and research policy, the relation between scientists and non-scientific users of research and the changing political context in which sustainability research is situated.

The management and funding of environmental research has largely been dominated by a physical sciences' perspective. Deeply rooted epistemological differences between the more interpretive social sciences and the positivist natural sciences are envisaged as a main obstacle to the social sciences joining in environmental research. Yet, as *Michael Redcliff* states, these differing approaches also bear the potential for a promising partnership between the two scientific cultures. The strength of a more interpretive social sciences' perspective could lie especially in making science policy processes more intelligible by analysing the social processes in which the social authority of science is established in the public domain. Furthermore, social sciences could explore how the outcomes of scientific research are mediated and translated by social actors into useful knowledge and, thus, might enhance user involvement in sustainability-related research.

In addition to the conceptual and methodological aspects of the integration of knowledge and the incorporation of actors, *Nazli Choucri* focuses on some technological aspects of this issue. The newly emerging information technologies open up new opportunities for communication, participation and decision-making. They provide options for broadening access to knowledge, evidence and alternative modes of reasoning and research. The Global System for Sustainable Development (GSSD) is designed as a dynamic networking platform, linking scientists, decision makers, business representatives and actors from the public sector in different parts of the world. Based on the conceptual framework Choucri presented above, GSSD provides knowledge about sustainability problems, technical solutions, strategies for social action and instruments for political implementation.

*Egon Becker* links the discussion of sustainability back to a political context. On the one hand, in the post-Rio process sciences are called upon to develop new methodologies and conceptual frameworks in order to become an 'essential component in the search for feasible pathways towards sustainable development' as stated in AGENDA 21. Discussing the concept of 'societal relations with nature' Becker demonstrates basic features of a trans-disciplinary framework for problem- and actor-oriented empirical research. On the other hand, globalization and international competitiveness have emerged as new topics on the political agenda, threatening to erode the fragile consensus on sustainable development. This also bears implications for science and research policy and funding. Thus, social sciences find themselves in the situation to address problems of unemployment and globalization in the framework of sustainable development, at the same time being called upon to resist attempts of functionalization in the name of economic competitiveness.

## Notes

1 For a bibliography of social science literature on sustainable development and sustainability see Hammer and Stieß (1997).

2 For a critical assessment, see Mesarovic et al., 1996.

3 One might also note an implicit bias towards science and technology in the discourse on sustainability itself. This bias results from an unresolved tension between the 'limits to growth' and 'basic needs' approaches within this discourse and is fuelled by the optimism to bridge this gap by the means of scientific and technological progress. As a result, conventional scientific and technological approaches are seen rather as part of the solution, while their entanglement with the current ecological and social crisis has gained far less attention. This is not to argue that science and technology should be dismissed altogether. Rather it should be acknowledged that they are part of the problem as well as possibly being part of the solution. As a consequence, their role and function need to be re-examined carefully.

4 For a remarkable exception, see Merle Jacob's critical reconstruction of the discourse on sustainable development from a theory of science perspective, exploring especially the links between the analytical and the normative dimensions of sustainability (Jacob, 1997).

5 In this respect the feminist debate on gender, environment and development provides important insights for the development of actor-oriented approaches (see Douma et al., 1994).

6 In some points this distinction corresponds (although in others it does not) to the threefold classification of science categories ('applied science', 'professional consultancy' and 'post-normal science') suggested by Funtowicz and Ravetz (1991). For a more comprehensive discussion, see Stieß and Wehling (1997).

Source: Becker/Jahn (1999): Sustainability and the Social Sciences. A cross-disciplinary approach to integrating environmental considerations into theoretical reorientation. London. ZED Books, ISBN 1856497097 (pb), 336 S.

<http://www.isoe.de/english/public/unsecoe.htm>