I. Overview

Within the interaction between humans and their natural environment four stages are prominent.

The first stage is characterised by the presence of subsistence economies. These largely exist in a circular relationship with nature by extracting or depositing no more than that which grows anew in or can be absorbed by the local environment.

The second stage is marked by an overburdening of natural resources through their exploitation for extraction or waste disposal purposes. However, the burdensome events and their effects remain local, even though this may have disastrous consequences for the local population. As a result, social and governmental measures to mitigate the damage remain local or national and often rather weak.

The third stage is characterised by an increase in the severity of burdens. One such burden is that the causation chain of environmental issues transgresses local borders and spreads over a wider area; another is that single incidents of local damage accumulate and contribute to the endangering of overarching entities, such as whole species or the ozone layer. Both of these burdening effects have triggered regional and international institutions of environmental protection.

It seems that a fourth stage has been reached. The domestic and the cross-border causation chains have multiplied to the extent that the complex biophysical-chemical mechanics of the biosphere as a whole are put under strain. Not only do environmental ‘problems’ of a planetary magnitude appear, but the earth is afflicted as a system. The causation is less visible but, at the same time, more and more severe, a fact which has caused some to say that the present Holocene Age may mutate into an Anthropocene Age. Whilst the human impact on the environment led to an immediate and often mono-causal response from nature during the earlier stages, the new stage is marked by more complex and concealed causation trails. Consequently, the phenomenological description of ‘global environmental change’ is moving towards a more structural analysis of
the earth system, extending both to long-term natural causes as well as to the contribution of mankind.

If the fundamental mechanics of the earth as a whole are affected, a new kind of institution and, with them, institutional analysis is needed. Just as earth system analysis, the analysis of institutions must be holistic. This is not to mean that international law must now develop towards a supranational organisation endowed with managing the fundamental laws of the globe. On the contrary, a holistic view requires us to look at the full scale of institutions because all levels contribute to the systemic whole.

This means, first of all, that given the preoccupation of institutional research with international regimes, the structures beneath the international layer must be rediscovered, i.e. regional integration, the state, and the self-regulatory potential of societies and transnational societal actors and networks. It is one of this book’s central assertions that many institutions other than those on an international level must be considered in order to reach a truly global approach. Before considering the integration of state-based and societal governance into international regimes or even a worldwide superstructure, one should try first of all to make them reflective of their proper role on a global scale. The most progressive view on global institutions is the vision of a community (rather than society) of states, based on both the states and civil society. The ideal of this vision is an overall well-ordered unity, the global federal union. By contrast, what is advocated in this book is the concept of a polyarchy of institutions located at several organisational levels, divided into many issue-related sections and dispersed over various geographical zones. This polyarchy would be self-organisational in order to reflect the common concern of preserving an inhabitable earth system.

Secondly, it should systematically be considered that institutions have played a dualistic and often contradictory role in bringing about the kind of man-nature constellation we are facing today. There are institutions which foster human technological and economical inventiveness. By organising economic growth they have contributed to human welfare but also to an ever-increasing exploitation of nature as a resource for extraction and waste disposal. In contrast, there are institutions struggling to protect nature against overexploitation. This tension between promotion and limitation of nature exploitation crosscuts all levels of institutions. It is innate in societies themselves, represented in state bodies, and reappears on the international level as a split between international economic and ecological organisations. The challenging question is how the opposing structures can be interrelated in order to sustain the earth system.

A third aspect of institutional analysis concerns the overall orientation of research. Is it still the idea of preserving a livable earth, or is the focus shifting towards resilience and adaptation to change? The overburdening of the earth’s bearing capacity is, by some observers, seen as unavoidable. They
INTRODUCTION

promote instead the potential of institutions that are capable of adapting societies to the consequences of global change as, for example, the new patterns of societal stratification, migration, incidence of disaster effects, etc. Whilst the importance of this task is not refuted, this book focuses instead on institutions that abate environmental decline. The decline of soil, water, biodiversity, and the atmosphere cannot be repaired by new technologies. Admittedly, there is a fundamental incongruence between the speed of the Promethean exploitation of the biosphere and the slow institutionalisation of mitigation measures. But this does not in itself render global change ungovernable because global change is a product of institutional settings too. The challenge for institutional development is to determine how to bring these settings in line with the long-term preservation of nature. Ideally, measures of long-term mitigation would at the same time be able to contribute to short-term adaptation.

Fourthly, clarity is necessary about the relationship between institutions, society, and nature. Of course, there is no direct link between institutions and the earth system: a law cannot command the climate not to change, neither can climate change make laws. The link is represented by society, i.e. human mind and the patterns of human behaviour. Based on its perception of the state of
the earth system and depending on the existing social structures, human mind will respond (or not) to institutions of global change, and it will accept (or not) the institutions as legitimate.

The present book – and this introduction to it – is based on this model. We begin with a summary account of earth system analysis focussing on human impact and an analytical tool of its identification. We proceed by looking at society in its double role of responding to and legitimising institutions of global change. The remaining and most extensive part is concerned with the variety of institutions and their interlinkages.

II. The earth system

The mechanics of the earth system are demonstrated in the example of the climate, as offered in the contributions of Peter Lemke, Chapter 2 and Stefan Rahmstorf, Chapter 3. An adequate climate is a fundamental precondition to human life. The major components of the climate system include the atmosphere (acting through gas, clouds, and aerosols), the ocean (acting through its temperature, salinity, pressure, and velocity), the cryosphere (consisting of ice covers on land and ice shields on water), the lithosphere (acting e.g. through volcanoes), and the biosphere (acting through the production of gases including carbon dioxide and oxygen). The components work on a fundamental external impact, i.e. solar radiation. The laws determining how they interact are complex and far from fully understood. Some of these interactions are represented in Figure 6 in Lemke’s Chapter 2. A particularly important mechanism for maintaining living conditions in moderate climates are the oceans. They serve as a huge energy pump, storing heat in the south and transporting it to the north (see Figure 10 in Chapter 2). Another major climate-determining factor is the albedo (i.e. rate of reflection of solar radiation) of different land covers. The cryosphere has a high albedo, thus keeping the temperature low which leads to snowfall, enabling the cryosphere to reproduce itself. By contrast, water and forested land have a low albedo, thus producing evaporation and, consequently, rain. A third factor is the composition of gases in the atmosphere, and in particular the percentage of carbon dioxide which accounts for the storing of heat at higher or lower levels.

In the past, this complex system has undergone fundamental changes triggered by variations in solar radiation, continental drift, ocean salinity, and natural factors within the system.

These changes were not induced by human activities. However, as Rahmstorf demonstrates in Chapter 3, human activities did induce new changes in the twentieth century. Carbon dioxide levels in the atmosphere increased by 30 per cent, resulting in a temperature rise of 0.7 °C. Indicators point to a further increase in the twenty-first century, all the more so in the light of changes in land use as, for example, deforestation and its implications for the function
of the land cover as a sink for carbon dioxide. Models of the climate system enable us to predict the consequences of these human-made changes. The study of causation chains can go so far as envisaging the halting or diversion of the great oceanic currents, thus affecting the system responsible for the moderate climate of vast regions of the earth. Other changes may result in an increase of extreme weather conditions (already verified by statistics), an acceleration of desertification, a loss of habitats for plants and animals, etc.

The German Scientific Advisory Board on Global Environmental Change has proposed syndrome analysis as an intellectual tool to understand the complex interaction between deviant states of the climate and other parts of the earth system. Syndromes are defined as ‘undesired, characteristic, negative trajectories (or environmental degradation patterns) of natural and civilizational trends and their interplay, which can be identified in many regions of our world’. The particular merit of syndrome analysis is that it takes systematic account of the effect of the human factor of global environmental change. Figure 1.2 shows an example of a syndrome, namely that of the overexploitation of the biosphere. The human factor is presented in the boxes entitled social organisation, economy, and science/technology.

The WBGU has identified sixteen such syndromes, but more could be proposed. Three groups can be distinguished:

- ‘utilisation’ syndromes: syndromes which are the consequence of the inappropriate utilisation of natural resources;
- ‘development’ syndromes: human/environmental problems resulting from non-sustainable development processes;
- ‘sink’ syndromes: environmental degradation due to inappropriate disposal of human effluent.

The full list as identified by the WBGU includes the following:

- Sahel Syndrome: overcultivation of marginal land;
- Overexploitation Syndrome: overexploitation of natural ecosystems;
- Rural Exodus Syndrome: environmental degradation caused by abandonment of traditional forms of land use;
- Dust Bowl Syndrome: non-sustainable industrial management of soil and water resources;
- Katanga Syndrome: environmental degradation caused by extraction of non-renewable resources;

2 WBGU, op. cit. p. 22.
HYDROSPHERE

- Changes in water quality (pathogens, nutrients, toxins)
- Loss of biospheric sinks
- Reinforcement of biospheric sources
- Fragmentation of natural ecosystems
- Changes in local water balance
- Changes in loads of particulate and dissolved matter

POPULATION

- Rural exodus
- Growing environmental awareness

PSYCHOSOCIAL SPHERE

- Spreading of Western lifestyle and consumption patterns
- Sensitisation to global problems

ATMOSPHERE

- Enhanced greenhouse effect
- Increase of trace gases
- Overexploitation of biological resources
- Damage to ecosystem structure and function
- Genetic and species loss
- Social and economic marginalisation
- Decline of traditional social structures
- Policy failure
- Increasing international agreements and institutions
- Increasing environmental production at national level
- Increasing significance of NGOs

SOCIAL ORGANISATION

PEDOSPHERE

- Loss of fertility (organic matter, nutrients)
- Erosion, morphological changes

ECONOMY

- Increased consumption of energy and resources
- International indebtedness
- Globalisation of markets
- Expansion of traffic routes
- Automation, mechanisation
- Development of new materials, material substitution

SCIENCE / TECHNOLOGY

- Conversion of natural ecosystems

BIOSPHERE

- Global and regional climate change


Figure 1.2 Network of interrelations characterising the overexploitation syndrome.

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Edited by Gerd Winter
Excerpt

More information
**Introduction**

- **Mass Tourism Syndrome**: development of and damage to near-natural areas for recreational purposes;
- **Scorched Earth Syndrome**: environmental degradation through military activities.

**Development syndromes:**

- **Aral Sea Syndrome**: environmental damage caused by large-scale projects aimed at restructuring natural landscapes;
- **Green Revolution Syndrome**: environmental degradation caused by the introduction of site-inappropriate farming methods;
- **Asian Tigers Syndrome**: neglect of environmental standards in the course of highly dynamic economic growth;
- **Favela Syndrome**: environmental degradation caused by uncontrolled urbanisation;
- **Urban Sprawl Syndrome**: landscape degradation caused by planned urban and infrastructure expansion;
- **Major Accident Syndrome**: singular anthropogenic environmental disasters with long-term impacts.

**Sink syndromes:**

- **Smokestack Syndrome**: environmental degradation caused by long-range, diffuse dispersal of mostly persistent substances;
- **Waste Dumping Syndrome**: appropriation of environmental space through the controlled and uncontrolled dumping of wastes;
- **Contaminated Land Syndrome**: local contamination of environmental assets, mainly at industrial production sites.

These and other syndromes – one could, for example, imagine a syndrome focusing on Western lifestyles – can be employed to explain climate change as well as other global environmental problems such as the chemical contamination of air, soil, and water, the overexploitation of the oceans, the degradation of the soil, the loss of biodiversity, and the scarcity of fresh water. Whilst descriptive information on the state and development trends of these problems is more and more available, syndrome analysis can help to trace the much demanded causal chains behind the phenomena. Table 1.1 shows how in the view of the WBGU⁴ the syndromes are related to the six large global problems.

Syndrome analysis achieves two objectives in the study of institutions: first, if developed further, by the insertion of a special box on institutions and allowing for genuine syndrome trajectories within institutions (see Figure 1.2), it can help to identify how much of an impact institutions have as a part of the human

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³ See in particular the comprehensive global and regional Environment Outlooks published by UNEP (www.geo.org/GEO/index.htm).
⁴ WBGU, op. cit. p. 53.
Table 1.1  Causation of global environmental problems by syndromes

<table>
<thead>
<tr>
<th>Syndrome</th>
<th>Climate change</th>
<th>Stratospheric ozone depletion</th>
<th>Oceans at risk</th>
<th>Biodiversity loss and deforestation</th>
<th>Soil degradation</th>
<th>Fresh water scarcity and pollution</th>
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<td>Overexploitation</td>
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<td>Dust Bowl</td>
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<td>Kalanga</td>
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<td>Mass Tourism</td>
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<td>Scorched Earth</td>
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<td>Aral Sea</td>
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<td>Green Revolution</td>
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<td>Asian Tigers</td>
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<td>Waste Dumping</td>
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<td>Contaminated Land</td>
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• means that the syndrome plays a leading role in the causation of the environmental problem • indicates a less marked influence.
III. The global mind

The scientific community is preoccupied with understanding the individual syndromes, their configuration as a whole, their contribution to the major global environmental problems, and in all of these respects – the role of human impact. However, if the emerging knowledge is to become actively relevant, it must be known by the global population. Therefore, the analysis of human knowledge of and perspective on global environmental change must start with a genuine sociological enquiry into the inner logic of societies, their beliefs, rules, and structures. Devising measures of influencing this perspective can only occur after this has been accomplished. However, the vision of a global subject as proposed by John Schellnhuber\(^5\) must be considered with caution and not be understood as the rule of a new philosopher king. The global subject may well turn out to be a mere metaphor for a common concern based on the prevailing fundamental differences of perception.

There are two dimensions of the human mind of interest in the institutional context: in one sense, the human mind is a factor determining human behaviour towards nature, and as such institutions must take it into consideration in order to find the appropriate means of action. For instance, if the Western lifestyle is tabooed by institutions propagating modesty, these institutions are doomed to fail. In another sense, the human mind is the political basis required for institutions to come into existence and be legitimate. The human mind is therefore a condition of both the effectiveness and legitimacy of institutions.

In their contributions to the present volume, Karl-Werner Brand and Fritz Reusswig in Chapter 4 focus on the first condition and Asher Alcoby in Chapter 5 focuses on the second.

Brand and Reusswig explore the societal preconditions of a successful institutionalisation of global environmental governance. They describe how institutions are embedded in societies. In order to become effective their problem solution must take the interest and power structure of society into account, their core idea must be related to basic cultural values, and the basic hypotheses they assume must correspond to ‘storylines’ widely shared by society. They also have to meet the criteria of procedural and distributional ‘fairness’ which prevail in society. These conditions of anchoring institutions in society apply also to those institutions – national as well as international – which contribute to global environmental change. If they are to be reoriented towards more

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sustainable utilisation of natural resources the human mind and its construction of risk must become aware of the globality of environmental problems in order to ‘green’ interest and power structures, societal values, and perceptions.

The authors argue that such awareness is indeed emerging, but that its perseverance will depend on some broader developments of modern societies. These can be reconstructed in terms of structure and agency. As to the first aspect, Brand and Reusswig show that macrostructural trends such as detraditionalisation, individualisation, globalisation, or the emergence of the ‘knowledge society’ have ambivalent effects on the social acceptance of environmental regulations. On the one hand, they erode traditional ways of life and pave the way for the spread of Western lifestyles; moreover, they increase the probability of cultural conflicts and the salience of social problems. On the other hand, they favour participation, the spread of information and a worldwide networking of concerned citizens and non-governmental organisations (NGOs).

Structural opportunities for the required change towards sustainability are no guarantee for a real change. This demands powerful agents. The authors therefore go on to analyse the societal key actors who will – or could – be the hosts of the required ‘greening’ of human society. Leaving business and the media aside, they focus on transnational civil society as represented by NGOs, science as a social phenomenon, and the consumer. Acknowledging certain flaws of NGOs, the authors nevertheless insist that NGOs do pave the way towards a world society. As for science, they show its precarious role between uncertainty and the practical need for definite answers. Concerning consumers, whilst revealing the burdensome impact on global change of consumerism, they nevertheless are positive about the prospects of environmentally concerned consumption, provided the consumer’s mind is supported by adequate institutions.

Asher Alkoby embarks upon answering the question whether and if so in what way civil society within the nation state can develop into a global civil society and as such become the source of legitimacy for international institutions. Whilst there is substantial empirical information about the kinds of transnational actor (TNA) appearing on the international stage, such as NGOs, social movements, advocacy networks, and transnational corporations, and about the way in which TNAs act, e.g. by participating in agenda-setting, norm creation and norm implementation, the theoretical explanation of why TNAs emerge and may constitute a global civil society is still underdeveloped.

The author believes some approaches are counter-empirical, such as the ‘power theory’ which does not accept any influence of NGOs etc. on institutions, and the ‘institutionalist theory’ which regards NGOs etc. as pure instruments of states. Whilst the author considers ‘constructivist theories’ to be generally of more substance, nevertheless some variants are flawed, such as the ‘old social movements’ concept which explains such movements by experiences of deprivation, and ‘rational choice’ concepts which overlook the moral and cultural