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Social Conflicts in the 21ˢᵗ Century – the Shadows of Global Environmental Change[1]

Introduction: changing forms of social conflicts

The theme of this symposium, "Cultural Heritage and the Innovations of the Humanities in the 21ˢᵗ Century" includes difficult aspects as that of "Social Conflicts in the 21ˢᵗ Century – the Shadows of Global Environmental Change" for which it is not obvious what they include in terms of cultural heritage and humanities. The question, how to deal with new social conflicts can be answered in this perspective of cultural heritage and the new humanities as one that requires new ways of dealing with cultural heritage and innovativeinter- and transdisciplinary thinking; such thinking is spreading in the humanities, in the social and natural sciences, and in the everyday sphere of lifeworld.

Social conflicts are no longer specific socio-cultural, ethnic, religious, political or economic conflicts, no longer clear in nature and scope, but become multi-faceted. The radicalization of social, cultural or political groups is not sufficient as their explanation; many people and social groups are involved, not only radicals. Manifold, political and other attitudes and interests are included. The normative implications of the term radicalization make it difficult as a diagnostic term to reveal the reasons of conflicts and explain conflict escalation. These new conflicts show the signs of the presently globalising modern society that has been called by Beck the global or "cosmopolitan risk society" (Beck 2002). Many of the conflicts have to do with environmental problems and, as the diagnosis of the risk society theory says, everyone can be involved in such conflicts, independent from class membership, social and economic status, political orientation and cultural self-perception.

The characteristic feature of such conflicts is, that they have several reasons and causes, social as well as ecological. Not always the main reasons become manifest in the actual conflicts or are articulated by the conflicting parties as the reasons why they are in conflict. Environmental or resource use conflicts can be masked as ethnic or economic conflicts, which seems to be the case with many, also violent conflicts in recent decades, also in Europe, e.g., in the civil war and war following the dissolution of former Yugoslavia.In this case the ethnic divisions and related conflicts, existing since the beginning of the state of Yugoslavia after the 1. World War, and the falling

apart of the Communist regime masked more complex conflicts with further reasons, among that also scarcity and access to natural resources, e.g., in the Kosovo. The characterization of such conflicts as political is no longer adequate to denote their nature; they include political as well as further components and do not always allow for a political logic of conflict resolution.

Conflict research

Conflict research is not a homogenous field of research in the sense of a specialized discipline as found in academic science; it develops in changing forms of specialization and knowledge combinations that are described as inter- or transdisciplinary (Nowotny et al 2002). A well-known form of conflict research is the peace and conflict research that includes also environmental conflicts (Gleditsch 2004) as a specialized field of research, dealing with local, national, transboundary or international conflicts that are perceived as political conflicts and often include violence and military forms of interventions. This is not the only relevant field of research from which knowledge about the new conflicts is available. To understand the conflicts discussed here, conflict research needs to be broadened, becoming an interdisciplinary field of research where many facets of conflicts are to be studied. Complex social conflicts have various reasons and causes, as well in the lifeworld of people, as in the structures of societal systems, in the structures of power and forms of ownership, and in the ways humans deal with nature and use natural resources. Environment-related conflicts make itnecessary to cross the boundaries between the humanities, the social and the natural sciences.

The conflict term needs to be discussed criticallyfor the newcomplex conflicts. In academic conflict research dominate abstract and general definitions. Conflicts are often interpreted as dating back to different values or interests of actors. In the classical work of Rapoport (1960) conflicts are differentiated in fights (to overcome the other), games (to outwit the other) and debates (to change the views of the other). Instead of conflict also further terms associal dilemma, dispute, controversy, are used. A more detailed discussion of multi-causal and multi-scale environmental conflicts is found in the review by Stepanova and Bruckmeier (2013a) where the discussion of the conflict term is summarized as follows.

Definitions of environmental conflicts, such as "incompatible interaction between at least two actors over the use of natural resources or an environmental system, where one of the actors is damaged by the interaction, and the other actor intends or ignores this damage" (Mason et al 2007: 327) are general and vague, need to be specified with conflict typologies developing from empirical research. Such broad conflict terms give rise to controversies about the phenomena to subsume under the conflict term. Non-violent, small-scale and local conflicts often lack conflict indicators asorganized actors, legal and political disputes and decisions, public attention, violence, governmental action. Conflicts are often dealt with informally, without political decisions and as non-security issues, are not seen as public policy issues and thus not

requiringconcerted action. The policy research on conflict, peace and security covers a part of environmental conflicts, but other conflicts that occur in semi-public, local and private spheres and in everyday life, are covered less. Environmental and resource useconflicts are often multi-dimensional. For such conflictsa process perspective is useful to study conflicts in their development and within their social and natural environment. Cultural views of conflicts vary between views of conflicts as taboos and conflicts as necessary components of social life. Even in culturally similar areas in Europe there are significant differences in understanding, assessing and resolving conflicts in politics and everyday life.

General definitions need to be specified through more concrete aspects of conflicts, regarding the actors involved, e.g., as rights, interests, positions and strategies, values and worldviews (cf. Stepanova and Bruckmeier 2013b). The conflicts become always more complex, as the development and networking of social systems and modern societies themselves. Some of the knowledge and practical requirements for the analysis and resolution of the complex conflicts are found in recent conflict research, dispersed in several areas of specialization: in research on environmental and resource use conflicts (Bruckmeier 2005), in political conflict research (Dudouet 2006, Varisco 2010), in social-psychological research on conflicts and mediation (Bar-Tal 2009), and in some fields of economic and management research where the resolution of conflicts is described under the term of transformation, (Mason and Muller 2007), meaning the guided transformation of conflict into cooperation.

For many of the new conflicts discussed here the conventional forms of political conflict management and intervention of police or military, or juridical solutions of the conflicts through courts, are no longer adequate. Many of the conflicts are local, non-violent conflicts at low intensity that can be dealt with in such informal ways of conflict resolution as mediation or through negotiations between the groups involved. The general approach to resolve the conflicts is through their gradual transformation in cooperation of the conflicting parties. But the many forms and facets of such conflicts include also violent ones where violence happens in different forms, from militant protest to civil war and war. Scenarios of conflicts resulting from climate change give a rather dramatic picture of coming conflicts.

Climate change in the 21ˢᵗ century:a new state of nature – „war of all against all"

Violent and nonviolent conflicts resulting from climate change are paradigmatic examples for the new forms of conflicts emerging in the risk society, including wars, civil wars, and manifold peacefully mitigated conflicts. These conflicts result from the environmental catastrophes that humanity has evoked, unwillingly,with the path of development that the societies of the world have sooner or later entered, beginningabout 500 yearsago, called "modernisation". Since about half of that time industrialisationis the dominant modernisation path, which is a direct causefor the climate catastrophehumanityis entering in the 21ˢᵗ century.

The rising average temperature on the planet, two degrees Celsius or more in two, 20th and 21st, centuries,iscaused by a process that can be describedsimple in natural scientific terms as the rise ofgreenhouse gases, especially CO_2-emissions in the atmosphere. From the level of 275 ppm before the begin of industrialization greenhouse gases raided to 400 ppm in recent years. A reduction to 350 ppm is seen as necessary to prevent further dramatic climate change. But the outlook is,that the "heating of the atmosphere" is going on for longer time. In the last yearsabout 35 billion tons of CO_2have been emitted in the airevery year. I do not report in detail here the knowledge that climate research has provided (summarized in the reports of the Intergovernmental Panel on Climate Change, IPCC) about the sources of emissions that include industry, but to a large degree also modern agriculture through methane emissions, the second important climate change gas. The phenomena of climate change that affect humans directly include: extreme weather situations; more strong storms as hurricanes; more dry seasons some parts of the world, especially in the "low latitude countries" in the tropical zone, and more wet seasons in others; rise of the sea level with more inundations in coastal areas and large parts of coastal lowland drowning in the sea. The further discussion is about forms, consequences and solutions of complex social conflicts resulting from climate change.

More than half of the global population lives close to the coast, about 60% in the zone from 0-100 km from the coastline. Two thirds of the so-called mega-cities of the world, citieswith many millions of inhabitants, aredirectly located at the coast. What shall the people living there do, when their land is flooded and their houses are washed into the sea, when big cities are threatened by inundations, and many inhabitants lose their base of existenceorcan no longer be protected through dams and dykes, because these become too expensive (Yasuhara et al 2001)? Whatever will happen to the people, many conflicts are to be expected, already before millions of people are migrating or resettled.No country, no democratic or authoritarian political system, is prepared for climate change, in spite of all rhetorical commitments to climate policy. The first successful years of global climate policy, connected with the Montreal Convention and the Kyoto Protocol, have meanwhile ended in failure of new negotiations and policies, so that the aim to keep climate change within the level of 2 degrees Celsius is given up since years.Politically seen the fight against global warming seems to be lost for some time and the consequences can be anticipated as requiring conflict-prone adaptation to climate change.

In recent years the analysis and discussion of conflicts resulting from global environmental change, especially climate change, intensified in the international research of the IPCC. Anthropogenic climate change is seen in the ecological discourse as one of the main reasons for coming conflicts between and within countries. The books of the German social psychologist Harald Welzer „Climate wars - the reasons of killing in 21st century" (2008) and of the Canadian military scientist Gwynne Dyer „Climate wars"(2008) describe possible scenarios. Both authors see civil wars and wars because of global warming or climate change as more likely than peaceful solutions to climate related conflicts. Also the German Advisory Council on Global Change" has diagnosed, "Climate change strengthens mechanisms leading to

insecurity and violence" (WBGU 2007: 2). This abstract formulationtranslates in the book by Dyer, who uses the Hobbesian formulation for the state of nature as "a war of all against all", in scenarios of possible climate wars. Welzer reflects about changing forms of violence in the past, present and future. Both authors describe potential consequences of global climate change starting from discussions of conflicts and catastrophes since the 1990s, when the world should have become more peaceful after the end of the East-West conformation with the collapse of East European socialism. But it seems that the "peace dividend" does not come, instead the countries of the world glide into new conflicts related to climate change and other environmental problems. Two wars about access to natural resources (1. and 2. Irak war), civil wars like that in former Yugoslavia, catastrophes like the genocide in Rwanda, and the conflict in Darfur seem to indicate that the world is entering in new regional conflicts where natural resources and environmental problems play an always greater role. The Darfur conflict is seen by Welzer and other authors as the first case of a civil war where climate change is one of causes.

Global environmental changein the forms of climate change, biodiversity reduction and land use changetransforms into social conflicts through the involvement of social actors and groups, through manifold social causes and consequences that appear in these conflicts. Whereas in the 20th century environmental problems were dealt with mainly as such of pollution of air, water and soils and how to clean the poisoned environment, the 21st century is to become the one where global environmental change "dictates" development or limits it. The 20th century appeared in environmental historyas the one of exponential growth in many areas - population growth, economic growth, growth of natural resource use, and growth of environmental pollution. The 21st century is to become the one where growth has to come to an end, either through concerted action in all countries, or, if this is not realized, in catastrophic forms, for which conflicts resulting from climate change can give examples. These conflicts appear as multi-causal, violent and non-violent, local, national and international conflicts, where the forms of conflicts we know from the past, do not provide any longer models and knowledge for preventing, de-escalating, managing or resolving conflicts.

Social conflicts in the 21st century

What can be said generally about conflicts in this century is that all spheres of social conflicts are influenced and changed through the ongoing processes of globalisation of modern economies and societies, also small-scale and local or regional conflicts are transformed through these processes into interconnecting multi-scale conflicts. Social conflicts appear in future often as complex conflictswith chains of interconnecting and reinforcing causes and consequences. This makes their diagnosis and the forms of conflict resolution complicated. It becomes controversial what the main reasons and causes are and how they interconnect.

- Multi-causal are such conflicts because no single reason or cause is sufficient as explanation. There is a complex interaction and reinforcement of many social, cultural, political, economic, ecological reasons and causes when, for example, agricultural production collapses in certain regions, with consequences of migration of people and fights for access to and redistribution of natural resources.
- Multi-scale are such conflicts because of the interaction of local, regional, national, international and global processes of social and ecological change. Climate change is a global phenomenon that results in many forms of conflicts that span from local to global levels. Also obviously local conflicts, in coastal fisheries for example the overfishing of local species, have connections to broader conflicts andappear, in the last analysis,as caused by global scarcity and overuse of natural resources.
- Many actors are involved in such conflicts and there is rarely a single and simple cleavage that separates the conflict parties in two groups with contrasting interests as traditionally assumed in politics, e.g., political differences between left wing or right wing parties and groups, or between economic and ecological interests and action. With the blending of multiple reasons and causes also several cleavages overlap and interact.
- Solutions in form of political action by governmental institutions can no longer be expected as the only and sufficient ones. Conflict mitigation requires, following the many forms, scales, causes and actors in the conflicts, a much broader spectrum for forms of intervention and action: much more managerial instruments stretching over different spheres of cultural, political, economic action. Many governmental and non-governmental organisations and civil society actors need to be involved in the resolution process.
- In the discourse of critical theory Honneth (2011) has diagnosed that the social conflict in modern societytakes wild and anomicforms of aspiring recognition. Although not thought for the environmental conflicts, the formulation can, mutatis mutandis, be applied for the new environmental and resource use conflicts, where anomia is not resulting from seeking recognition, but from seeking to survive. It is not only a process of radicalization that results in conflicts; more complex processes and dissolving of boundaries between socially structured spheres of organized action are going on. In the European welfare states, until the end of the 20th century, it was possible to channel and manage social conflicts in the classical form of a class compromise, with the negotiations between labour unions and entrepreneurial organizations as the paradigmatic example. Conflicts that were for long timeregulated nationally, asclass conflicts in modern capitalist societies, become wild, individualized and deregulated.

Following the - controversial - hypothesis of the risk society theory of individualization and dissolution of old forms of class structure and organized collective action, it can be argued: social conflicts are becoming more fragmented, individualized and disorganized, with unclear fronts and cleavage lines, unclear forms of action and resolution strategies, with increasing scarcity of natural and other

resources necessary for life. Escalation to violent and armed conflicts may happen when old social and cultural ties dissolve through modernisation, when social and economic exclusion prevent the satisfaction of basic human needs (e.g., measured in the "Human Development Index" of the United Nations Development Programme), and when the negative factors reinforce each other. As difficult as the answer to the question of reasons and causes of complex conflicts is that how to solve them-through local action and at local levels, where the conflicts do not appear in their full scope, or at several scales, for which hardly political and other institutions of mitigation exist.

How such new conflicts differ from the ones investigated, described and explained in prior conflict research, can be found out from the analysis of their dynamics that differ from older forms of social conflicts in many regards, including the following moments:

- Dissolution of social boundaries:Thesocial structures and social boundaries that create the conventional conflicts in modern, industrialized, capitalist societies dissolve or become unclear. Parties in conflictwith each other and actors involved are often from different social groups or classes, conflicts alsonot simply between rich and poor groups, countries and economies, although much of that global cleavage of the rich and poor appears in the diagnoses of environmental conflicts, e.g., in then hypothesis of the "environmentalism of the poor" (Martinez-Alier 2002).

- New social actors or groups that are in conflict with each other includeoften social movements or mixed, "hybrid" groups of people living in one place that are in conflict with other groups, local enterprises, governmental institutions;but this may not show the full scope of the conflict. Conflicts may also develop between actors and groups in one country that come in conflict with groups in other countries, so that the conflict reveals only though multi-scale analysis of its interconnections in the chains of extraction, trading, processing and consumptionof natural resources that may include global resource flows. Examples for that can be found in the distribution conflicts mentioned in Table 1.

- The conflicts appear as consequences of the globalization of economy, politics, and total society, of global social and environmental change. In the global conflicts more and more actors, organisations and groups in different places and countries come in conflict with each other. This can be seen as a result of the global resource flows from less developed to industrialised countries.

- The dissolution of political boundaries, described as differentiation of the national state into multi-scale states withlocal, regional, national and international components, resulting in action across administrative, legal and territorial boundaries of states,shows the conflicts to be of the kind insufficiently described in phenomena as "sub-politics" (by Beck) and "existential politics" (by Giddens), as civil society action, and as new forms of action of social movements that fight against globalisation and for environmental protection.

- Dissolution of knowledge boundaries: A rarely explicitly discussed assumption in conflict research and management was, that conflicts need to be understood in their nature, which requires knowledge about the specific spheres of cultural, economic, political action, and some kind of professional knowledge for conflict mitigation. The new conflicts remain unclear in their nature, require interdisciplinary knowledge, and still they cannot be solved in many cases, although solutions are urgently needed.

The following Graphic 1 by Howitt attempts to make visible the multiple interacting factors causing resource use conflicts and crises as multi-scale phenomenon, stretching from local to global levels. All factors that influence environmental conflicts and show their social facets are mentioned.

Graphic 1: Multi-scale crisis phenomena in the search for a new world order
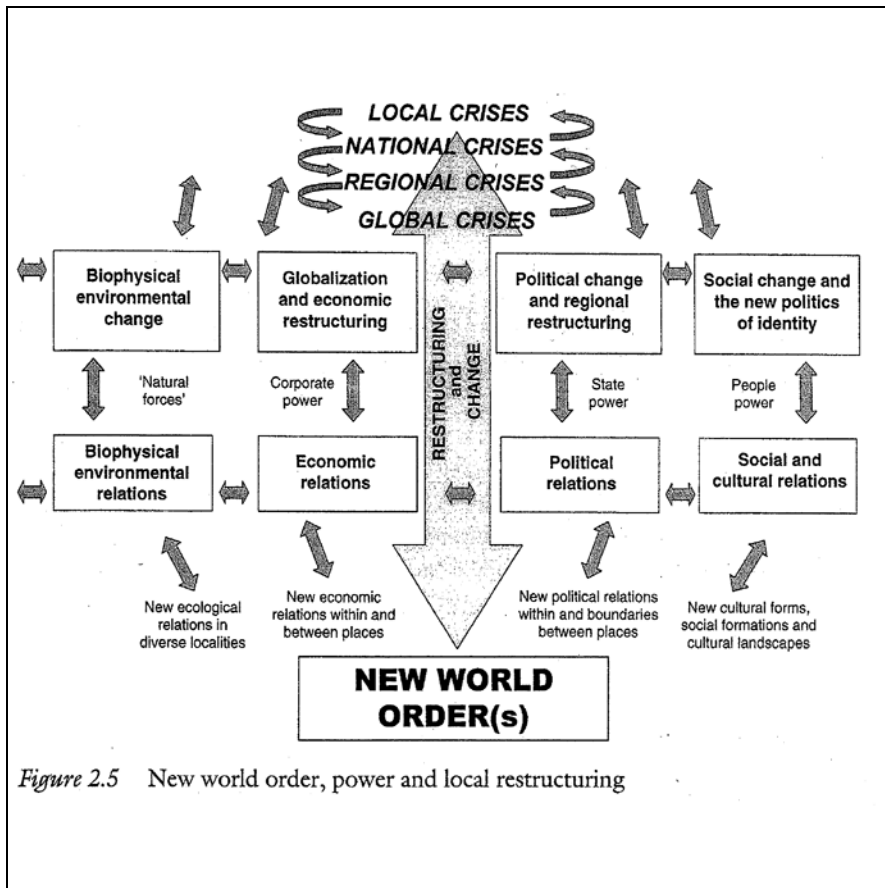

Figure 2.5   New world order, power and local restructuring

Source: Howitt 2001: 87

Climate change and environmental problems more generally generate conflicts of complex nature. Environmental problems cannot be seen separate from social conflicts, both overlap and reinforce each other, show multiple and circular causality. In conflicts with manifold causes and consequencesenvironmental problems and scarcity of resourcestranslate into interconnecting social, political and economic conflicts of access to and distribution of natural resources as water, land, living resources. As Escobar (2006) formulated, various forms of cultural, economic or ecological distribution conflicts emerge. The multi-faceted ecological distribution conflicts have a variety of social and economic causes and consequences, among these scarcity and unequal access to, ownership and distribution of natural resources, appearing in the global resource trade and the patterns of global inequality between rich, industrialized and poor, resource delivering countries. The inequalities give rise to many forms of local, national and international conflicts. Social inequalities are also discussed in normative and ethical terms as environmental (in-)justice (Schlosberg 2007), regarding access to unpolluted air, water and soil or vulnerability through environmental risks. According to the inexact generalization of the inequality hypothesis that appears in the ecological discourse, also in Becks´ risk society theory, are the ones who have to take the large part of environmental "bads" and burdens the inhabitants of the poor countries in the Global South, the women in all countries, and the future generations.

As environmental or ecological distribution conflicts (Martinez-Alier2009) appear such of water and land use, conflicts through pollution of the environment, overuse of limited resources, and global climate change. Although often manifest as local conflicts they include global dimensions through globalisation and global trade of resources or global environmental change, especially climate change. Examples of such conflicts include the ones described in Table 1.

Table 1: Ecological distribution conflicts

Martinez-Alier (1995: 80) describesecological distribution conflicts as "the social, spatial, and temporal asymmetries or inequalities in the use by people of environmental resources and services, i.e. in the depletion of natural resources (including the loss of biodiversity), and in the burdens of pollution" that may evoke local or global conflicts.
Martinez-Alier (2004: 8ff) describes ecological distribution conflicts as they appear in the commodity chains – extraction of materials and energy, manufacture and transport, disposal of the waste:

"Conflicts on the extraction of materials and energy

1.- Mining conflicts. Complaints over the siting of mines and smelters because of water and air pollution, and land occupation by open-cast mining and slag. Also, conflicts on oil and gas extraction. (Networks active in 2004: Mines, Minerals and People / Oilwatch). …

2.- Biopiracy. The appropriation of genetic resources ("wild" or agricultural) without adequate payment or recognition of peasant or indigenous ownership over them (including the extreme case of the Human Genome project).…

3.- Land Degradation. Soil erosion caused by unequal distribution of land, or by pressure of production for exports. Blaikie and Brookfield (1987) introduced the basic distinction between pressure of population and pressure of production on the sustainable use of land.

4.- Plantations are not Forests. The movements against eucalyptus, pine, acacia plantations for wood or paper pulp production (often exported). …

5.- Mangroves vs shrimp. The movement to preserve the mangroves for livelihood, against the shrimp export industry, in Thailand, Honduras, Ecuador, India, Bangaldesh, Philippines, Sri Lanka. ...

6.- Water conflicts. Defence of the rivers: the movements against large dams for hydroelectricity or irrigation (such as the Narmada movement in India, the *atingidos por barragens* in Brazil). … Also, conflicts on the use and pollution of aquifers.

7.- National / local fishing rights. Attempts to stop open access depredation by imposing (since the 1940s in Peru, Ecuador, Chile) exclusive fishing areas (200 miles). The language here is international public law. Another conflicts is that of the defence (or introduction) of local communal fishing rights against industrial fishing (as in coastal India, or the lower Amazonia).

Conflicts on transport

8.- Transport conflicts are on the increase because of the larger and larger use of materials in the economy. Examples are complaints over oil spills from tankers or from pipelines, complaints over new motorways, harbours and airports, also over "hidrovías" (such as Paraguay-Paraná). ...

Conflicts on waste and pollution

9.- Toxic struggles. This is the name given in the U.S. to fights against risks from heavy metals, dioxins, etc. …

10.- Waste dumping. The many conflicts around the world on waste dumps, incinerators. In an international context, "Toxic imperialism" was used by Greenpeace, 1988, to describe the dumping of toxic waste in poorer countries (theoretically forbidden by the Basle Convention of 1989).

11.- Transboundary pollution. Applied in the 1970s and 1980s mainly to sulfur dioxide crossing borders in Europe, and producing acid rain. Also between areas in the U.S. (New England polluted by western winds).

12.- Equal rights to carbon sinks.The proposal for equal per capita use of oceans, new vegetation, soils and atmosphere as sinks or temporary reservoirs for carbon dioxide

… . The disproportionate emissions of carbon dioxide have given rise to a "carbon debt".

13.- Consumers' and citizens' safety. Struggles over the definition and the burden of risks from new technologies (nuclear, GMO, etc.) in rich or in poor countries. (These are the conflicts of Ulrich Beck's "risk society"). They also affect producers (agro-toxics). …."

Most of the distribution conflicts are and will be non-violent, but armed conflicts will increase too. The reasons why social conflicts - for which many forms of non-violent mitigation and resolution exist - can escalate to violent conflicts are also manifold. At this point the books of Dyer and Welzer become simple and conventional in their reasoning that environmental conflicts date back to resource scarcity, including that resulting from climate change. This reductionism can be partially explained with the scientific sources and knowledge they use for their explanations, Dyer that from policy analysis, Welzer social-psychological knowledge. Both authors see violence as a consequence of increasing scarcity of important natural resources. That is not wrong, but inexact and tends to simplification;the picture known from the Neo-Malthusian debate on "Limits to growth" (Meadows et al 1972) seems to re-emerge. Dyermeans, to avoid violence and wars requires internationalnegotiations, a reduction of CO_2-emissions to zero, the use of renewable energy sources (like wind, water, solar energy), genetic engineering and modification of plants and animals for food and other resources for human consumption.None of the ideas is new, and most turned out to be controversial. Consequencesof the production of bioenergy on arable land,such as competition with land use for food production, especially in the Global South, are sources for conflicts.

Much more concrete and less simple suggestions than that of Dyer would be required, but these do also not come from Welzer, who replaces the "logic of political action" by the "social-psychological logic of human behaviour". This perspective supports also his inclination to take as model case small and local societies from history, e.g., island societies as the anthropologist Jared Diamond, who made the history of Easter Island and its depopulation through environmental catastrophes a model case. What can be learned from small, isolated and simply structured societies for the extremely complex and globally networked modern society? The question remains to be discussed more critically. It is not sufficient that Welzer distrusts governmental actionand international policy, replacing recommendations for collective and political action througha series of ideas that sound rather strange - that is: unrealizable - as possibilities of political action: to think beyond the horizon of everyday political action; not to accept the logic of the nature of the case ("Sachzwang"); to become aware of the possibility of changes in moral values and perception in situations of catastrophes; to understand ethnical and other masking of climate- and resource conflicts; to be prepared for that what cannot be planned, foreseen and explained. Theseare examples for an abstract and complicated reasoning, with ideasknown from

the social sciences - e.g., non-anticipated consequences or side-effects of social action and limits of human rationality and knowledge use in decision making called "bounded rationality" - and from risk research and environmental research on vulnerability, resilience and sustainability, in approaches like adaptive management. These forms of reasoning use often heuristics and have in common that they address questions of the limits of knowledge and human insights, the limits of scientific and other knowledge for social action, the incapacity to deal with the unexpected, the unknown, and the future. It is difficult to translate such reasoning in criteria and knowledge for decision-making and resource management. From decision-makers, resource managers and users, or civil society actors it is required to become like scientists in their thinking and action.

Europe seems away from the centres of coming climate change conflicts and environmental catastrophes, but this may be an illusion. Nearly everything what global climate change implies has already been experienced in European countries, it was only not always understood as a consequence of global climate change: unexceptional dry and rainy seasons, extreme storms, floods and inundations that happened not only at the coasts, also in this country where we are at the moment, far away from the coasts, in safe distance from sea level rise. Here the catastrophes come "through the backdoor", e.g., as flooding from the Tisza river. In the Netherlands, the coastal country in Europe most exposed to flooding from the sea, inundations came too from the river Rhinethat enters the Netherlands with floods originating far away, in the Alpine mountains, through the melting of glaciers and seasonal flooding, enlarged through the engineering of the river bed of the Rhine.

Although something is already known from environmental conflict research and from practical, managerial experience with mitigation of such complex conflicts, much more is unknown. Conflict analysis and resolution require forms of navigating in ignorance more than in knowledge, following ideas that come from ecological research about disaster management, resilience and sustainability of coupled social and ecological systems, in strategies of adaptive management and environmental governance (Lindsay et al 2006). Mobilizing knowledge and formulating possible scenarios of climate conflicts, as done by Dyer and Welzer, is a first step and necessary, as also the conjecture of the authors, that in future wars seem much more probable than peaceful political solutions that would require much stronger cooperation in global policies, seem impossible today within the institutions of the United Nations. But it is also necessary to go further and develop more complex strategies of knowledge use, and to avoid the impression of apocalyptic visions for "our common future". This formulation was the title of the popular Brundtland report on sustainable development, with which global environmental policy debates started more than 25 years ago. Sustainable development is today itself in crisis through global climate change. A further necessary step is to analyse and discuss more systematically possibilities of resolving such conflicts. In the thematic perspective of this conference this means: to seek for knowledge from the humanities, the cultural,

philosophical and normative knowledge fields, including ethics and knowledge about the building and maintenance of normative orders that guide collective, governmental and non-governmental action. Global norm systems such as the human rights need to be supplemented by rights regarding the environment and human modification of nature. However, ethics, moral or justice discourses, and normative orders alone will not suffice. New practices of knowledge use that include a variety of knowledge forms will be required.

The resolution of complex conflicts – new practices of knowledge use

It seems important to discuss possibilities of resolving the complex forms of social conflicts described above with an adequate diagnosis of the action situation and the knowledge available for resolving such conflicts. There are no effective institutions for conflict resolution that have mandates, power, experience, and are supported by the actors involved; nor is scientific and practical knowledge available to solve such conflicts peacefully, efficiently and with lasting solutions. How to resolve the conflicts needs to a large degree be learned in the resolution process itself, through joint learning and accumulation of experience, by the actors involved. Under the name of "sustainability science" some principles have been formulated, that can also be applied for research on environmental conflicts and their mitigation:

> "Familiar approaches to developing and testing hypotheses are inadequate because of nonlinearity, complexity, and long time-lags between actions and consequences. … become parallel functions of social learning, which incorporate the elements of action, adaptive management, and policy as experiment. Sustainability science will therefore need to employ new methodologies that generate the semi-quantitative models of qualitative data, build upon lessons of case studies, … Scientists and practitioners will need to work together with the public at large to produce trustworthy knowledge and judgement that is scientifically sound and roots in social understanding." (Kates et al 2001)

Knowledge practices in environmental research and resource management are not only characterized as cooperation of scientists and non-scientists. From the phenomenology of ecological distribution conflicts described by Martinez-Aliersome preliminary ideas about resolving complex conflicts can be identified that date back to the discussion of "wicked problems" for which never sufficient knowledge is available. This is the situation described by Funtowicz and Ravetz (1993) as "post-normal science", where the problems require always urgently solutions and the knowledge is always controversial.

1) The complex social conflicts require transdisciplinary strategies of research and decision-making, where scientific and practical knowledge is applied, where researchers and practitioners cooperate. This is not a requirement to be seen as an effective or optimal approach to conflicts resolution; it implies strategies basedon the limits of knowledge, of human action and rationality,emergency strategies rather than such of advanced science.

2) Forms of conflict resolution require multi-scale strategies and action, simultaneously or subsequently, to connect the different spatial and temporal scales at which action is required. This does not just require coordination of policies and managerial programmes, but more complicated forms of knowledge and action synthesis, beyond conventional assumptions as that: sufficient knowledge can be created through research and needs just to be applied adequately, in a hierarchically structured decision-making process, where responsibilities of action and decision-making are clear. Such multi-scale strategies are often preliminary and have deficits, no optimal forms can be found and hierarchical coordination of global policies in a linear model of command and control is impossible.

3) The possibilities and chances to resolve such conflicts are often unclear. It seems necessary to go away from the logic of specialized conflict research, that conflicts are negative and socially unwanted phenomena that need to be resolved for the purpose of maintaining or regaining peace and "normal" development. The attempts to mitigate such conflicts require experimenting with a variety of formal and informal, social and technical, direct and indirect approaches.

4) Conflict resolution requires, instead of only looking at the conflict and seeking how it can be solved politically, to understand the broader social and ecological contexts of conflicts and to integrate conflict resolution with broader approaches of natural resource management that aim at social, economic and environmental sustainability.

5) The connections of the themes cultural traditions, innovation of the humanities, and new social conflicts of complex kind do not require only or mainly research, but the opening towards inter- and transdisciplinary knowledge forms and processes that imply the integration and synthesis of different forms of knowledge, scientific and practical knowledge, positive and normative knowledge from a variety of disciplines, crossing the boundaries between the humanities, the social and the natural sciences. Discourses that come close to the new requirements of knowledge practices include that of human and social ecology, sustainability science and the broader sustainability discourse.

New forms of knowledge and knowledge use that are relevant for the resolution of complex conflicts are often discussed under the terms of inter- and transdisciplinarity. Both forms have rapidly increasing significance in many fields of applied research. Interdisciplinarity is the more known term which is mainly used for changing forms of scientific research and knowledge use through crossing of boundaries between specialized disciplines. Transdisciplinarity and the forms of knowledge use discussed

as "mode 2" (Nowotny et al 2002) include the combination of scientific and non-scientific, local or practical knowledge in research and knowledge application.

What can inter- and transdisciplinary forms of knowledge generation and application give in terms of new social knowledge practices that can help to mitigate or resolve such conflicts as discussed? First and foremost, it is the possibility and capacity to integrate and synthesize knowledge form different sources, scientific and non-scientific knowledge. Practically seen this implies that more knowledge can be made available and mobilized for conflict resolution than would be available from specialized and disciplinary knowledge. Secondly, with such synthesis of knowledge and action appear new ways of knowledge use and knowledge management in the separate fields of research and action. These new forms of knowledge synthesis include the ones already available or discussed in interdisciplinary environmental and risk research, but much more synthesis and action practices need to be developed through search and experimenting, in the processes of resource management and conflict resolution themselves. This is also a reason why the resolution of complex social conflicts requires to be integrated with long-term strategies and policies of collective action that are so far mainly known from the sustainability discourse, where social, economic and environmental dimensions of knowledge and action are combined. Knowledge strategies include the following:

- combined and integrated analyses of vulnerability, resilience and sustainability and strategies of action based on that (Derissen et al 2001);
- adaptive management and governance (Allen et al 2012);
- strategies of environmental and global governance as framing strategies (Davidson and Frickel 2004);
- social-ecological forms of knowledge synthesis and theories of regulating the interface of society and nature(Bruckmeier 2013).

All these forms of knowledge synthesis and action strategies require to deal with positive scientific knowledge and with normative knowledge where cultural values, worldviews, visions, paradigms of thinking, cognitive and practical interests of many knowledge producers and knowledge bearers need to be negotiated, mediated and integrated. This is where the humanities as knowledge fields and related social practices, the cultural nature of human action in general and of social conflicts as partof it, come into view. New normative orders at globaland local levels (Forst and Günther 2011) need to be discussed, andnew forms of justice and solidarity that are so far locked into traditional debates of justice and ethics in societal processes e.g., the Rawlsian justice-discourse. Such new forms of discussion of environment and resource related problems and conflicts include the examples of environmental justice and environmental citizenship, environmental or ecological ethics, and the discourse ethics of Habermas.

Discussion and conclusions

Conflict mitigation for such complex social and environmental conflicts as discussed above is not necessarily a task for governmental institutions, courts and diplomacy, more for civil society actors, and it becomes part of strategies of sustainable development and global governance. Conflict resolution is not a value or goal in itself, as it was often seen in peace and conflict research, but needs to develop in broader and long-term strategies of social and natural resource management that allow to build lasting solutions, as part of the process of building a new world order that discussed, e.g., in the global scenarios for sustainable development as the Millennium Ecosystem Assessment from 2005. To develop and practice such strategies requires interdisciplinary research, also in the humanities, to deal with ethical problems when conflicts result from unequal distribution of natural resources between countries, national economies and social groups.

From the ongoing transdisciplinary scientific and political discourses as that about environmental and global governance, environmental justice and citizenship, or new normative orders, can the following conclusions be drawn regarding the contributions from the humanities to the debate of complex social conflicts and their resolution:

1) Dealing with complex social conflicts requires multi-scale strategies of knowledge generation and application which need to be learned by scientists and other actors in the processes of analysing and resolving such conflicts; they are not available in forms of well-developed methods and tools. The humanities can provide in this situation ways of dealing with normative knowledge, which was for a long time neglected in scientific discourses.
2) Although the global sustainability discourse as framing discourse of conflict resolution has brought substantial progress in formulating the requirements of societal transitions to sustainability, it is in danger to become temporarily blocked, as the climate change discourse as part of it, through the neoliberal policies and economic strategies that tend to weaken political institutions and civil society sectors. New efforts to revitalize and redirect the discourse as one of global social change and solidarity are required in which the normative debates mentioned above are key components.
3) Beyond scientific research, the results of which are then handed over to decision-makers who are responsible for knowledge use in the practices of policy and resource management, the new forms of knowledge integration and conflict resolution require much stronger cooperation between scientists and practitioners than hitherto practiced.

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