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Climate Change Security Nexus: Achievements and Shortcomings

Contextualizing and Assessing the Climate Change and Security Discourses and Policy Debates (2000-2012): Stages, Schools and Qualitative Approaches[1]

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Abstract

The linkage between climate change and security has been addressed since 1988 by policymakers and scientists. The scientific debate gradually emerged in the 1990s and since 2002 the policy debate started in Europe (UK, Germany) in the context of international security, since 2004 in the US as a national security issue, and since 2007 in the UN in the frame of international and human security. In the scientific debate four schools coexist: 1) determinists or dramatizers who claimed that climate change will lead to wars; 2) empiricists analysed with qualitative and quantitative methods whether environmental stress and climate change contributed to forced migration and violence; 3) sceptics pointed to a lack of evidence in the peer-reviewed, quantitative literature; and 4) deniers challenged the links between climate change and conflicts. Further, at least five different scientific approaches have emerged: a) policy analyses, b) scenario analyses, c) discourse analysis, d) conceptual and model analyses and e) theoretical and empirical analyses that use a wide range of scientific approaches, theoretical orientations, and methods to analyse the 'observed' and 'projected' interrelations among physical and societal effects of climate change on the state, society, the economic sector, and on individuals, community groups, states, and humankind.

Keywords: Climate change, security, scientific discourses, policy debates, stages, schools, approaches, methodologies

[1] This article builds on the author's previous publications since his consultancy report of November 2002: Hans Günter Brauch "Climate Change, Environmental Stress and Conflict - AFES-PRESS Report for the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety", in: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Ed.): *Climate Change and Conflict. Can climate change impacts increase conflict potentials? What is the relevance of this issue for the international process on climate change?* (Berlin: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, 2002): 9-112; at: <http://www.afes-press.de/pdf/Brauch_ClimateChange_BMU. pdf>. See also Brauch (2009, 2011, 2011a, 2012); Oswald Spring and Brauch (2011); Brauch and Scheffran (2012), Scheffran and Brauch (2013) and Oswald Spring, Brauch, Edwards and Roberts 3013. Lectures on this theme since 2002 may be found at: <http://www.afes-press.de/html/download_hgb.html>.

Contextualizing and Assessing the Climate Change and Security Discourses and Policy Debates (2000-2012): Stages, Schools and Qualitative Approaches

1. Introduction

The "Climate Change Security Nexus: Achievements and Shortcomings" has gradually emerged first as a policy challenge and later as a scientific issue. Global environmental change (GEC) and anthropogenic global climate change (GCC) have gradually been 'scientized' since the 1970s, 'politicized' since 1988 and 'securitized' since 2002. Issues of global change have been addressed by three global research programmes in the natural sciences since the 1980s (WCRP [Church/Asrar/Busalacchi/Arndt 2011], IGBP [Noon/Nobre/Seitzinger 2011], Diversitas [Walther/Larigauderie/Loreau 2011]) and by the social sciences (IHDP [von Falkenhayn/Rechkemmer/Young 2011]) since the mid-1990s and the linkage been *global environmental change and human security* (GECHS) was the theme of an IHDP research project (1999-2009) [GECHS 2005; Barnett/O'Brien/Matthew 2008; O'Brien/Lera St. Clair/Kristoffersen 2010; Matthew/Barnett/Macdonald/O'Brien 2010; Sygna/O'Brien/Wolf 2013]. The Millennium Ecosystem Assessment (Leemans 2009) and the Earth System Science partnership (ESSP [Leemans/Rice/Henderson-Sellers/Noone 2011]) and its related projects have offered a forum for the global scientific discourse (e.g. on health related issues).[2]

This nexus between climate change and security has been addressed since 1989 by a few scientists in the USA (Gleick 1989) and in the UK (Brown 1989) at a time when the cold war was reaching its end and the security community was looking for new scientific themes and policy challenges and when the first stage of the environmental security debate emerged (Myers 1989, Mathews 1989). However, during the second empirical phase both major research projects in Toronto (Homer-Dixon 1991, 1994, 1999; Homer-Dixon/Deligiannis 2009) and in Switzerland (Bächler 1998, 1998a, 1999, 1999a; Bächler/Spillmann 1996a, 1996b; Bächler/Böge/Klötzli/Libiszewski/Spillmann 1996; Bächler/Spillmann/Suliman 2002) focused primarily on the linkage between environmental scarcity, degradation and stress and the possible societal outcomes as conflicts or cooperation without addressing specifically issues of GEC and GCC (Brauch 2003, 2005, 2008, 2009).

The emerging scientific discourse and the policy debate on the climate change-security nexus was initially policy driven and emerged since 2004 in Europe with the political goal to *prevent* new conflict constellations (WBGU 2008) from emerging (*securitization*) and since 2007 in the USA – partly motivated by a specific military interest to *adapt* its infrastructure, force structure and military missions to a new environment where the impacts of global climate change may constrain the operation of military forces (*militarization*).

While the initial European policy debate since 2004 was primarily framed within an 'international' security context, the US debate since 2007 was conducted nearly exclusively in a 'national security' context (Campbell 2008; Moran 2011; National Research Council 2013). Many of the initial contributions were research reports by policy consultants for governments (German, UK, US governments, for supra-and international organizations (e.g. for the EU Commission) and humanitarian organizations (International Alert). Their policy task was primarily agenda-setting by putting this perceived new security challenge on the international, national or humanitarian policy agenda. Their contracts did not permit intensive empirical

[2] See O'Brien, (2013)

research but rather tried to conceptualize the assumed linkages and to summarize the available scientific empirical evidence.

The third contextualization as a 'human security' issue was promoted by GECHS, taken up by the Human Security Network (2008) and by the Friends of Human Security at the United Nations. While the UN Secretary General in his 2009 report on *Climate Change and its Possible Security Implications* did not even refer to the human security concept, in his two reports on *Human Security* (UNSG 2010, 2012) he referred to climate change as a major human security threat. The IPCC is tasked to assess in its fifth Assessment Report the linkages between climate change and human security (IPCC 2007, 2014/2015).

In the social science research two parallel research approaches have emerged focusing either primarily on quantitative methods looking at correlations among selected global or regional factors (Gleditsch 2012) or on qualitative methods (Scheffran/Brzoska/Brauch/Link/Schilling 2012) that focus on the empirical evidence based on multiple case studies on the ground.

For the second decade of research on the climate change and security nexus there is a need for:

- a *dialogue between the natural scientists* working on climate change issues and *social scientists* addressing observed or projected possible societal impacts that may affect international, national and human security perspectives and assessments;
- an intensive *discourse between different scientific schools* to overcome the tendency of communicating solely within one epistemic community and ignoring the results of the other school;
- a closer *debate between scientists* (of all disciplines and schools) and *policymakers* to address areas for preventive policy initiatives to reduce the probability that climate change may trigger series security consequences, conflicts and in the worst case even wars.

2. Emergence of the Climate Change and Security Nexus

The link between climate change and security has been addressed since 1988 by policymakers and scientists. The scientific debate gradually emerged in the 1990s and since 2004 the policy debate started in Europe (UK, Germany) in the context of international security, since 2004 in the US as a national security issue, and since 2007 in the UN in the frame of international and human security. Since 2008, the most recent scientific debate and research on the climate change and security nexus is a response to the agenda setting by policymakers, national governments and supranational (EU) and international organizations (UN, NATO).

In the policy debate the following stages may be distinguished:

- The initial stage of *agenda-setting* started in 1988 (Brundtland 1988) and since 2002 with a series of consultancy reports for government agencies and ministries[3] and workshops organized by governments (e.g. of the German Foreign Ministry) and international organizations (e.g. of the World Bank in 2007)[4];
- The *policy-takeoff* in Europe started in spring 2004 when the then science adviser of the British Prime Minister Tony Blair, Sir David King, warned that global warning posed "a

[3] See e.g. the AFES-PRESS report for the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety that was released in November 2002 on "climate change and conflict" and that addressed the questions "Can climate change impacts increase conflict potentials?" and "What is the relevance of this issue for the international process on climate change?"

[4] See the paper by Halvard Buhaug, Nils Petter Gleditsch and Ole Magnus Theisen on "Implications of Climate Change for Armed Conflict" that has been commissioned by the World Bank Group for the "Social Dimensions of Climate Change" workshop in March 2007, at: <http://www.engagingconflict.it/ec/wp-content/uploads/2012/05/Feron-Buhaug-Implications-of-Climate-Change-for-Armed-Conflict.pdf>.

bigger threat than terrorism" and with the tabling of the climate change-security linkage on the UN Security Council by the UK Government in April 2007 (Brauch 2009).

- The *agenda-setting* in the USA started in spring 2004 with a leak of a report for the US Department of Defense by Randall and Schwartz and the policy-takeoff occurred during 2007 with the publication of several policy reports (see review by Brauch 2009).
- The *European policy debate* was triggered by a WBGU Report (2008) on *Security Risk Climate Change* that was released in June 2007 during the German dual presidency of the G-8 and of the EU that placed it on the agenda of the European Council and Commission that took it up in March 2008 (EU 2008, 2008a).
- Following the UK agenda-setting of 2007, the UN Policy debate was initiated by the Pacific Small Developing Island (PSDI) counties that succeeded with the support of the EU countries to adopt a resolution in the UNGA (June 2009) that requested the UN Secretary General to prepare a report addressing analysing this linkage (September 2010). During the German UNSC Presidency the climate change and security nexus was added to the reporting obligations of the UNSG in his annual reports (see review of the UNSC debate in July 2011 in Brauch/Scheffran 2012).
- In the US, the Obama Administration took up this issue as a National Security challenge and addressed it in its QDR of February 2010 and in its National Security Strategy of May 2010 (Brauch 2011): The CIA's National Intelligence Council (NIC) had commissioned several regional reports that were released in 2009 and resulted in several conference reports in 2010. The NIC's major report on the world by 2025 (December 2008) and by 2030 (December 2012) addressed the increasing threat climate change impacts may pose for US national security interests and strategy. At the request of the US intelligence community a report by the US National Research Council was prepared and released in 2013 that "summarizes what is currently known about the security effects of climate perturbations" (NRC 2013: ix-x).

Building on the contributions of meteorologists and historians (Neville Brown 1989, 2001), in the social sciences the debate on the climate change and security nexus has emerged both within peace research and security studies, especially by political scientists (James Lee 2009, Nils-Petter Gleditsch 2007, 2012; Brauch 2002, 2009, 2012), geographers (Karen O'Brien; Hans-Georg Bohle; Neill Adger; Jürgen Scheffran), economists (Stern 2006), sociologists (Giddens [2]2011) and psychologists (Welzer 2008).

3. The Threefold Security Context: International. National and Human Security

Since the early 21st century climate change has gradually been 'securitized' in government reports and in statements of government officials.[5] Since 2007 policy studies have securitized climate change as: a) an *international security* issue (3.1); b) a *national security* threat for the United States (3.2), and c) as a *human security* challenge affecting socially vulnerable and poor population groups (3.3). Until spring 2013, the policy debate on the 'national security' approach to climate change has taken off in the USA and empirical and theoretical contribu-

[5] The first conceptual and empirical studies addressed "climate change, worst-case scenarios of climate change in the Southwest Pacific" (Edwards 1996, 1999), "climate change and world food security" (Parry/Rosenzweig/Iglesias/Fischer/Livermore 1999), "climate change and violent conflicts" (Rahman 1999), "linking climate change research with food security and poverty reduction in the tropics" (Sanchez 2000), "from climate risk to climate security (Wiman/Stripple/Chong 2000), "security and climate change" (Barnett 2001), "climate change as a security issue" (Stripple 2002), and "climate change, environmental stress and conflict" (Brauch 2002).

tions from the social sciences have increased and major peer reviewed compendia have been published (Gleditsch 2012; Scheffran/Brzoska/ Brauch/Link/Schilling 2012).

3.1 Climate Change as an International Security Danger

At the "World Conference on the Changing Atmosphere – Implications for Global Security" in June 1988 in Toronto, the Norwegian Prime Minister Brundtland stated that "the impact of world climate change may be greater than any challenge mankind has faced, with the exception of preventing nuclear war".[6] She thus launched the process of *politicization* and *securitization* of climate change that reached a political criticality during the year 2007.

3.1.1 Scientific Agenda-Setting

In autumn of 1988, during its 30th anniversary meeting in Brighton, the *International Institute for Strategic Studies* (IISS) addressed non-military aspects of strategy and invited Neville Brown to explore potential avenues for future research on "climate, ecology and international security". Brown (1989, 2001)[7], a trained meteorologist and historian and a professor of international security affairs, reviewed the growing ecological awareness, climate history and its impact on politics, and the possible impacts of the greenhouse effect. He argued that "the challenge begins to look like 'the moral equivalent of war', not least because a failure to meet it would have catastrophic consequences for international security". Brown (1989: 531) called for a paradigmatic shift in strategy and the "adoption of a new corpus of knowledge and ideas", and that strategists will find themselves confronted "with a large, diverse and unfamiliar agenda. But it will be one informed by the precept that if doom can be foreseen, it may be thwarted. Such a self-defeating prophecy is what good strategy has always been about".

In the United States, Peter Gleick (1989, 1989a) addressed the links between climate and international security arguing that "global climate change will potentially alter agricultural productivity, freshwater availability and quality, access to vital minerals, coastal and island flooding, and more". These impacts "will be challenges to political relationships, realignment of energy markets and regional economies, and threats to security". When the national security discussion on the environment started in the United States (Mathews 1989, 1991, 1992, 1993; Myers 1989), Gleick pointed to a "debate about the extent to which resource constraints or environmental problems alone can lead to conflict".[8]

3.1.2 Political Agenda-Setting

Thirteen years later, a report for the German environment ministry (BMU) focused on the causes of climate change and their complex interactions with other drivers of GEC, on those environmental factors that contribute to environmental stress as a driver that may cause or trigger potential conflictual or cooperative outcomes (Brauch 2002). From an international security perspective, the *German Advisory Council on Global Change* (WBGU 2007/2008) reviewed *Climate Change as a Security Risk* arguing that "without resolute counteraction, climate change will overstretch many societies' adaptive capacities within the coming

[6] Philip Shabecoff, "Norway and Canada Call for Pact to Protect Atmosphere", in: *New York Time*s, 28 June 1988; at: <http://query.nytimes.com/gst/fullpage.html?res=940DE0DA163BF93BA15755C0A96E948260&sec=&spon=&pagewanted=print>.

[7] In his book on *History and Climate Change*. *A Eurocentric perspective*, Brown (2001) analysed major turning points of European history on the background of climate history.

[8] See the testimony of Peter H. Gleick to the United States Congress, Committee on Government Reform Subcommittee on National Security, Emerging Threats, and International Relations, Hearing on Energy as a Weapon: Implications for U.S. Security: "The Implications of Global Climatic Changes for International Security", 16 May 2006.

decades. This could result in destabilization and violence, jeopardizing national and international security to a new degree".[9]

The WBGU identified four conflict constellations "as typical causal linkages at the interface of environment and society, whose dynamic can lead to social destabilization and, in the end, to violence": a) Climate-induced degradation of freshwater resources: b) Climate-induced decline in food production; c) Climate-induced increase in storm and flood disasters; and d) Environmentally-induced migration. The WBGU referred to "six key threats to international security and stability which will arise if climate change mitigation fails": 1) possible increase in the number of weak and fragile states as a result of climate change; 2) risks for global economic development; 3) risks of growing international distributional conflicts between the main drivers of climate change and those most affected; 4) the risk to human rights and the industrialized countries' legitimacy as global governance actors; 5) triggering and intensification of migration; and 6) overstretching of classic security policy. In the WBGU's view, "climate policy … becomes preventive security policy, for if climate policy is successful in limiting the rise in globally averaged surface temperatures to no more than 2°C relative to the pre-industrial value, the climate-induced threat to international security would likely be averted". A week after the G-8 summit in Heiligendamm (Germany), the WBGU report was discussed in the German Foreign Office with representatives of civil society.[10]

Key arguments of this study are reflected in a paper of the European Commission and of the Secretary-General of the European Council that was approved by the European Council on 14 March 2008. Thus this scientific agenda setting has resulted within nine months in a policy document of the 27 countries of the European Union. These national and international efforts to securitize climate change and its projected societal impacts have been complemented by many reports for NGOs and national governments that share the goal of making climate change an issue of utmost political importance that requires extraordinary policy responses and coping measures.

3.1.3 Societal Agenda-Setting: Consultancy Reports

The links between climate change, peace and war were analysed in a report by International Alert (Smith/Vivekananda 2007) that highlighted four key elements of risk – political instability, economic weakness, food insecurity, and large-scale migration, and it made twelve recommendations for addressing climate change in fragile states. It discussed the climate change impacts for Algeria, Darfur, Peru, Bangladesh, and for Karachi, governance matters for Mali and Chad, as well as linking for Liberia peace building and climate adaptation efforts and developing social resilience for Nepal. The report supplied two lists of states at risk: a) facing a high risk of armed conflict as a consequence of climate change (46 states); and b) states facing a high risk of political instability as a consequence of climate change (56 states). An extended version of *A Climate of Conflict* was published by SIDA (Smith/Vivekananda 2008) that offers case studies on Kenya, Bangladesh, Mali and Chad, as well as on Sudan and Darfur, Liberia, Nepal, Colombia and Rwanda.[11] The task of these reports was primarily to conceptualize the linkage, to summarize the available evidence and to interpret it to their customers or financial sponsors (environmental and development agencies and humanitarian organizations).

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[9] See for details the WBGU website at: <http://www.wbgu.de/wbgu_jg2007_engl.html>, where several expert studies are also available for download at: < http://www.wbgu.de/wbgu_jg2007_kurz_engl.html> and the full report is at: < http://www.wbgu.de/wbgu_jg2007_engl.pdf>.

[10] This meeting on "Sicherheitsrisiko Klimawandel" is fully documented in German in: Auswärtiges Amt (2007).

[11] The study of International Alert is for download at: http://www.international-alert.org/publications/322.php; the version for SIDA is at: <http://www.envirosecurity.org/activities/diplomacy/gfsp/documents/A_Climate_of_Conflict>.

3.1.4 International Agenda-Setting: International Organizations

The security aspects and implications of climate change have been considered by government representatives within the environment directorate of the OECD, and informally discussed between the British Foreign Office (FCO) and the German Environment Ministry (BMU) since 2001. The public policy debate on the *securitization* of climate change has been most intensive in the UK since 2004. On 9 January 2004, David King, the UK Government's chief scientific adviser, was quoted as saying that climate change is a far greater threat to the world than international terrorism.[12] In February 2004, John Reid MP, British Secretary of State for Defence, argued that climate change may spark conflict between nations.[13] In October 2006, the *Stern Review* on the *Economics of Climate Change* by the Prime Minister's Special Adviser, Sir Nicolas Stern (2006), reviewed the scientific basis, impacts of climate change on growth and development, the economics of stabilization, the policy responses for mitigation and adaptation and international collective action to cope with the consequences of GCC.

In October 2006, Foreign Secretary Margaret Beckett considered climate change as a "serious threat to international security".[14] John Ashton, Special Representative for Climate Change, argued: "Climate change is a security issue because if we don't deal with it, people will die and states will fail." And he added that "there is no hard power solution to climate change – you cannot force your neighbour to change its carbon emissions at the barrel of a gun".[15] This '*securitization move*' culminated on 17 April 2007 in a UN Security Council debate that addressed for the first time climate change as a security issue.[16]

Among the countries that supported this '*securitizing move*' Sindico (2007) distinguished three groups, a) those wanting to raise global awareness for climate change (UK), b) those focusing on conflict prevention (Germany, France), and c) the most vulnerable small island states. The opponents argued that climate change as a sustainable development issue should not be considered by the UNSC (China, Russia, India, South Africa, Brazil, Indonesia, and Qatar) but by the UNGA, ECOSOC, and UNCSD, while Mexico and Singapore acknowledged that climate change could lead to future security concerns but that the UNSC should not interfere into state energy policies. For UN Secretary General, Ban Ki-moon "projected changes in the earth's climate are thus not only an environmental concern. … Issues of energy and climate change can have implications for peace and security". [17] This

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[12] See: Goklany and King: "Climate Change and Malaria", in: *Science*, 1 October 2004: 55-57; BBC (2007) "Global Warming 'Biggest Threat'"; at: <http://news.bbc.co.uk/1/hi/sci/tech/3381425.stm >; see also BBC: "Scientist urges US climate help" on 10 March 2004; at: < http://news.bbc.co.uk/1/hi/sci/tech/ 3498830.stm> and on 31 March 2004; at: < http://news.bbc.co.uk/1/hi/uk_politics/3584679.stm >.

[13] See: Ben Russell and Nigel Morris: "Armed forces are put on standby to tackle threat of wars over water", in; *Independent*, 28 February 2006; at: <http://news.independent.co.uk/environment/article348196.ece >.

[14] See: British Embassy Berlin: "Speech given by Foreign Secretary, Margaret Beckett, at the British Embassy, Berlin, 24 October 2006"; at: <http://www.britischebotschaft.de/en/news/items/061024.htm>; the quotes are from "Climate change 'serious threat to global security'"; at: <http://www.politics.co.uk/news/foreign-policy/international-development/debt-and-debt-relief-in-developing-world/climate-change-serious-threat-global-security-$455615.htm >.

[15] Quoted in: Ben Vogel (2007) "Climate change creates security challenge 'more complex than Cold War'", in: *Janes.com*; at: <http://www.janes.com/security/international_security/news/misc/janes070130_1_n.shtml>; quoted by Chris Littlecott (2007) "Climate Change: The Global Security Impact" 5 February; at: < http://www.e3g.org/index.php/programmes/climate-articles/climate-change-the-global-security-impact />.

[16] "Press Conference by Security Council President, 4 April 2007"; at: <http://www.un.org/News/briefings/ docs//2007/070404_Parry.doc.htm>;

[17] UN Security Council, SC/9000, 5663rd meeting, 17 April 2007: "Security Council holds first-ever debate on impact of climate change on peace, security, hearing 50 speakers"; at: <http://un.org/news/press/ docs/2007/sc9000.doc.htm>; Reuters: "UN Council Hits Impasse over Debate on Warming", in: *New York Times*, 18

debate on climate change pointed to two different approaches to security. A broad concept of international security promoted by developed countries that embraces climate change, and a narrow concept favoured by developing countries, which tends to exclude climate change from the global security agenda (Sindico 2007: 34).

Since January 2004, high British government officials launched a 'securitizing move' addressing GCC as a new danger for global, international, and collective security that succeeded to stir a public debate in the UK that rapidly proliferated abroad, and to put climate change on the agenda of the UNSC. The climate change issue was discussed at G-8 meetings in August 2005 in Gleneagles (UK) and in June 2007 in Heiligendamm (Germany).[18]

In November 2007 the *Human Development Report 2007/2008: Fighting climate change: Human solidarity in a divided world* (UNDP 2007/2008) suggested that the world should focus on the development impact of climate change. This report *argues* that climate change poses challenges for political leaders and people in rich nations to acknowledge their historic responsibility and to initiate significant cuts in greenhouse gas emissions, and for the entire human community to undertake prompt and strong collective action. Climate change also poses major obstacles to progress in meeting the MDGs and in raising the HDI.[19]

On 14 March 2008, the Council of the European Union released a paper on "Climate change and international security" (S113/08)[20] that recommended: a) *to enhance capacities at the EU level* (build up knowledge, assess the EU's own capacities, improvement in the prevention of, and preparedness for early responses to, disasters and conflicts). At the international level the EU should "become a positive driver for improving and reforming global governance". The EU has taken up the conceptual and political debate on the *securitization* of climate change and thus the European Council has become a major s*ecuritizing actor* translating the scientific messages into concrete policy proposals that will lead to action in the years to come.[21]

While many policy studies for government agencies and NGOs discuss a variety of potential security dangers posed by climate change impacts, many high-level policy-makers and advisers also claimed links between climate change and conflict. These policy documents and statements ('speech acts') illustrate the manifold policy efforts, especially since 2007, to securitize climate change by addressing it as a key security concern for the survival of humankind and for the affected states that require proactive extraordinary measures to reduce the probability that the impacts of political baseline scenarios become a conflictual reality.

The year 2007 was the turning point in the *securitization* of problems of global environmental and climate change. During 2007, the IPCC has indirectly become a *securitizing actor* although its mandate has excluded security issues. Its scientific messages have reached a global audience that has increasingly become receptive to the sense of urgency.

April 2007; Edith M. Lederer: "Security Council Tackles Climate Change", in: *Washington Post*, 18 April 2007.

[18] For the documents of the G-8 Meeting in Heiligendamm, Germany on 8 June 2007; at: < http://www.g-8.de/Webs/G8/ EN/G8Summit/SummitDocuments/summit-documents.html > and the chair's conclusions; at: < http://www.g-8.de/nsc_true/Content/EN/Artikel/__g8-summit/anlagen/chairs-summary,templateId=raw,property=publicationFile.pdf/chairs-summary>.

[19] UNDP (2007/2008); at: <http://hdr.undp.org/>; see also: UNDP/UNEP/World Bank/ADB/AfDB/GTZ/DFID/OECD/EC (2003).

[20] Joint paper by the Commission and the Secretary-General/High Representative concerning "Climate change and international security" to the European Council, Brussels, 3 March 2008; **Source:** http://euractiv.com/29/images/SolanaCCsecurity%20reportpdf_tcm 29-170886.pdf.

[21] Andrew Bounds: "Climate change poses 'security risk'", in: *FT.Com*. 3 March 2008; Ian Traynor: "EU told to prepare for flood of climate change migrants", in: *The Guardian*, 10 March 2008.

Britain and Germany took the lead in putting the security implications of climate change impacts on the agenda of the UNSC, of the G-8 and on the agenda of the European Union. The *securitization* of climate change has also reached the traditional s*ecuritizing actors*, the national defence ministries, the military establishments, and the intelligence community that have started to address climate change as a new national security threat.

Since the emergency of the global economic and financial crisis in the autumn of 2008, the primary policy focus shifted to global economic crisis management. The failure of the international community to adopt a post Kyoto climate change regime at COP 15 (Copenhagen 2009), COP 16 (Cancun 2010), COP 17 (Durban 2011) and COP 18 (Doha 2012) indicated on the one hand the lack of urgency and political will to adopt 'extraordinary measures' – according to the theory of securitization – as legally binding political commitments. Both this policy failure and the increase in global GHG emissions have increased the probability of extreme weather events that may trigger security consequences.

3.2 Climate Change as a National Security Danger

The *securitization* of climate change as a national security issue has started in the USA in February 2004 when a contract study by Schwartz and Randall (2004) for the US Department of Defense on the impact of *Abrupt Climate Change on US National Security* was leaked to the press. Three years later, a report on *National Security and the Threat of Climate Change* by the US *Center of Naval Analysis* (CNA 2007) addressed three questions: a) on the conditions climate change is likely to produce globally that represent security risks for the USA; b) how they may affect the US national security interests; and c) what actions should the USA launch to address its national security consequences.[22]

3.2.1 Takeoff of the Policy Debate in the USA

The study suggested that the climate change impacts "should be fully integrated into national security and national defense strategies" that the USA should help "stabilize climate changes at levels that will avoid significant disruption to global security and stability", and "help less developed nations build the capacity and resiliency to better manage climate impacts". It proposed that the US Department of Defense should "enhance its operational capability by accelerating the adoption of improved business processes and innovative technologies that result in improved US combat power through energy efficiency", and "conduct an assessment of the impact on US military installations worldwide of rising sea levels, extreme weather events and other projected climate change impacts over the next 30 to 40 years".

In November 2007, the *Center for Strategic and International Studies* (CSIS) and the *Center for a New American Security* (CNAS) released a report on: *The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change* (Campbell/Lennon/Smith 2007) by a group of high-level US security experts and climate specialists that discussed three future worlds with climate change impacts during the next 30 and 100 years that

> are based on *expected*, *severe*, and *catastrophic* climate cases. The first scenario projects the effects in the next 30 years with the *expected* level of climate change. The *severe* scenario, which posits that the climate responds much more strongly to continued carbon loading over the next few decades than predicted by current scientific models, foresees profound and potentially destabilizing global effects over the course of the next generation or more. Finally, the *catastrophic* scenario is characterized by a devastating 'tipping point' in the climate system, perhaps 50 or 100 years hence. In this future world, global climate conditions have changed radically, including the rapid loss of the land-based polar ice sheets, an associated dramatic rise in global sea levels, and the destruction beyond repair of the existing natural order.

[22] This report was discussed at a meeting on "National Security and the Threat of Climate Change", by the Environmental Change and Security Program (ECSP) of the Wilson Center on 14 May 2007.

The authors drew several policy conclusions from the discussion of these three scenarios:

- Historical comparisons from previous civilizations and national experiences of such natural phenomena as floods, earthquakes, and disease may be of help in understanding how societies will deal with unchecked climate change.
- Poor and underdeveloped areas are likely to have fewer resources and less stamina to deal with climate change – in even its very modest – and early manifestations.
- Perhaps the most worrisome problems associated with rising temperatures and sea levels are from large-scale migrations of people – both inside nations and across existing national borders.
- The term 'global climate change' is misleading in that many of the effects will vary dramatically from region to region. A few countries may benefit from climate change in the short term, but there will be no 'winners'.
- Climate change effects will aggravate existing international crises and problems.
- We lack rigorously tested data or reliable modelling to determine with any sense of certainty the ultimate path and pace of temperature increase or sea level rise associated with climate change in the decades ahead.
- Any future international agreement to limit carbon emissions will have considerable geopolitical as well as economic consequences.
- The scale of the potential consequences associated with climate change – particularly in more dire and distant scenarios – made it difficult to grasp the extent and magnitude of the possible changes ahead.
- At a definitional level, a narrow interpretation of the term 'national security' may be woefully inadequate to convey the ways in which state authorities might break down in a worst case climate change scenario.

Also in November 2007, the *Council on Foreign Relations* (CFR) released a report on: *Climate Change and National Security* that proposed several policy options to reduce the vulnerability of the United States and other countries to the predictable effects of climate change. These studies were picked up by members of the US Congress. In March 2007, Senators Richard J. Durbin (D-IL) and Chuck Hagel (R-NE) introduced the "Global Climate Change Security Oversight Act" (S.1018) requesting a national intelligence estimate to assess whether and how climate change might pose a national security threat (Scheffran 2008: 22). A similar "Global Climate Change Security Oversight Act" (H.R.1961) was submitted in the House by Congressman Edward Markey (D-MA).[23]

3.2.2 The Conceptual Policy Response of the Obama Administration

While the CIA had ignored climate change in its projection of the world by 2020 (CIA 2004), it would now have to pinpoint "the regions at highest risk of humanitarian suffering" and assess the "likelihood of wars erupting over diminishing water and other resources". Furthermore, the Pentagon would have to determine how global climate change could affect US security, including "direct physical threats to the United States posed by extreme weather events such as hurricanes". Retired Air Force General Charles Wald voiced support for bringing the national security bureaucracy into the debate over global warming and John J. Hamre, a deputy secretary of defence in the Clinton administration, said "global warming couched in security terms would make if far more difficult for politicians to ignore". [24]

[23] See: Congressional Record: March 28, 2007 (Senate), p. S4059-S4061; at: <http://www.fas.org/irp/congress/2007_cr/s1018.html >; see also at: < GovTrack.us. H.R. 1961--110th Congress (2007): Global Climate Change Security Oversight Act, *GovTrack.us (database of federal legislation)*; at: <http://www.govtrack.us/ congress/bill.xpd?bill=h110-1961> (16 May 2008). For an overview of other bills on this issue submitted to the US Congress; see at: < http://www.pewclimate.org/federal/congressional-proposals/110/National%20Security%20and%20Climate%20Change >.

[24] Bryan Bender: "Bill ties climate to national security seeks assessments by CIA, Pentagon", in: *The Boston Globe*, 9 April 2007.

In the aftermath of Hurricane Katrina (2005), US public opinion and the sentiment in the US Congress on climate change were changing since 2007 when the Democrats regained the majority in both houses. For the USA the year 2007 has also become a turning point when climate change was increasingly perceived as an urgent security concern for US national security and for and by its military establishment.

The British Ministry of Defence (MoD) and its Development, Concepts and Doctrine Centre identified climate change as a key strategic trend.[25] Its Chief of Defence Staff suggested on 25 June 2007 that climate change is a threat to global security that military planners must include into their calculations.[26] In Germany, the link between 'climate change and security' was discussed at a workshop by the German Command and Staff College (FüAk) in cooperation with the Centre for Transformation of the German Armed Forces (*Bundeswehr*) and the German Development Institute (GDI) in Hamburg in 2006 (Jopp/Kaestner 2008).

Obama Administration has addressed the climate change and security nexus in its Quadrennial Defense Review (QDR 2010), in its National Security Strategy (2010). In 2010, the US intelligence community requested the NAS/NRC "to evaluate the evidence on possible connections on possible connections between climate change and US national security concerns and to identify ways to increase the ability of the intelligence community to take climate change into account in assessing the political and social stresses with implications for US national security" (NRC 2013: 1). The CIA's National Intelligence Council (2012) on "The World by 2030". In February 2010, the QDR stressed that the "DoD will need to adjust to the impacts of climate change on our facilities and military capabilities", noting that according to an estimate of the National Intelligence Council

> more than *30 US military installations* were already facing *elevated levels of risk* from rising sea levels. DoD's operational readiness hinges on continued access to land, air, and sea training and test space. Consequently, the Department must complete a comprehensive assessment of all installations to assess the potential impacts of climate change on its missions and adapt as required.

The QDR 2010 referred 19 times to climate change noting that the "rising demand for resources, rapid urbanization of littoral regions, the *effects of climate change*, the emergence of new strains of disease, and profound cultural and demographic tensions in several regions are just some of the trends whose complex interplay may spark or exacerbate future conflicts". The QDR 2010 announced that the DoD would craft "a strategic approach to climate and energy" where "climate change and energy will play significant roles in the future security environment" by "developing policies and plans to manage the effects of climate change on its operating environment, missions, and facilities". The new global challenges of the "rising demand for resources, rapid urbanization of littoral regions, the effects of climate change, the emergence of new strains of disease, and profound cultural and demographic tensions in several regions are just some of the trends whose complex interplay may spark or exacerbate future conflicts". DoD acknowledged that "climate change will shape the operating environment, roles, and missions that we undertake". According to "assessments conducted by the intelligence community indicate that climate change could have significant geopolitical impacts around the world, contributing to poverty, environmental degradation, and the further weakening of fragile governments. Climate change will contribute to food and water scarcity, will increase the spread of disease, and may spur or exacerbate mass migration". Objecting to any mono-causality, the QDR 2010 stated that

[25] See Abbot (2008: 10); Development, Concepts and Doctrine Centre: *The DCDC Strategic Global Trends Programme, 2007-2036* (Ministry of Defence, December 2006); at: <www.dcdc-strategictrends.org.uk>.

[26] See at: <http://www.mod.uk/DefenceInternet/AboutDefence/People/Speeches/ChiefStaff/ClimateChange PoliticsVsEconomics.htm>.

> while climate change alone does not cause conflict, it may act as an accelerant of instability or conflict, placing a burden to respond on civilian institutions and militaries around the world. In addition, extreme weather events may lead to increased demands for defense support to civil authorities for humanitarian assistance or disaster response both within the United States and overseas. In some nations, the military is the only institution with the capacity to respond to a large-scale natural disaster. Proactive engagement with these countries can help build their capability to respond to such events.

Furthermore, "DoD will need to adjust to the impacts of climate change on our facilities and military capabilities". Adaptation to climate change would "pose challenges for civil society and DoD alike, particularly in light of the nation's extensive coastal infrastructure". As 30 US military installations may face "elevated levels of risk from rising sea levels. DoD's operational readiness hinges on continued access to land, air, and sea training and test space. Consequently, the Department must complete a comprehensive assessment of all installations to assess the potential impacts of climate change on its missions and adapt as required". This necessitates that the DoD "must complete a comprehensive assessment of all installations to assess the potential impacts of climate change on its missions and adapt as required". Further, "as climate science advances, the Department will regularly re-evaluate climate change risks and opportunities in order to develop policies and plans to manage its effects on the Department's operating environment, missions, and facilities. Managing the national security effects of climate change will require DoD to work collaboratively, through a whole-of-government approach, with both traditional allies and new partners". And finally, DoD "is increasing its use of renewable energy supplies and reducing energy demand to improve operational effectiveness, reduce greenhouse gas emissions in support of US climate change initiatives, and protect the Department from energy price fluctuations".

In his first National Security Strategy of May 2010 (NSS 2010) President Barak H. Obama stressed a shift towards a value oriented strategy that includes "forging cooperative solutions to the threat of climate" on which NSS 2010 stated:

> The danger from climate change is real, urgent, and severe. The change wrought by a warming planet will lead to new conflicts over refugees and resources; new suffering from drought and famine; catastrophic natural disasters; and the degradation of land across the globe. The United States will therefore confront climate change based upon clear guidance from the science, and in cooperation with all nations—for there is no effective solution to climate change that does not depend upon all nations taking responsibility for their own actions and for the planet we will leave behind.
>
> *Home*: Our effort begins with the steps that we are taking at home. We will stimulate our energy economy at home, reinvigorate the U.S. domestic nuclear industry, increase our efficiency standards, invest in renewable energy, and provide the incentives that make clean energy the profitable kind of energy. This will allow us to make deep cuts in emissions—in the range of 17 per cent by 2020 and more than 80 per cent by 2050. This will depend in part upon comprehensive legislation and its effective implementation.
>
> *Abroad*: Regionally, we will build on efforts in Asia, the Americas, and Africa to forge new clean energy partnerships. Globally, we will seek to implement and build on the Copenhagen Accord, and ensure a response to climate change that draws upon decisive action by all nations. Our goal is an effective, international effort in which all major economies commit to ambitious national action to reduce their emissions, nations meet their commitments in a transparent manner, and the necessary financing is mobilized so that developing countries can adapt to climate change, mitigate its impacts, conserve forests, and invest in clean energy technologies. We will pursue this global cooperation through multiple avenues, with a focus on advancing cooperation that works. We accept the principle of common but differentiated responses and respective capabilities, but will insist that any approach draws upon each nation taking responsibility for its own actions.

The *National Intelligence Council* (NIC) in its projection of the global trends for the "World by 2030" of December 2012 noted as Megatrend 4 on the growing food, water and energy

nexus that "climate change will worsen the availability of these critical resources" (NIC 2012: iv). It also listed among the potential black swains that would cause the most disruptive impact a more rapid climate change. It noted that in Africa climate change may create "new social and economic tensions that could flare into civil conflict" (NIC 2012: 3). It further stated that climate-change-driven-migration "is likely to affect Africa and Asia far more than other continents" (NIC 2012:23). As the worst case outcome for climate change until 2030 the report referred to a total collapse of the climate change negotiations and as the best case cheaper and more plentiful natural gas resources (NIC 2012: 56). It claims that the Middle East, South Asia and the Sahel zone would be most vulnerable to climate change impacts. From a Cornucopian perspective the report claimed that "GM Crop deployments will enable higher yields and address climate change driven food scarcities" (NIC 2012: 91).

However, after massive attack from Republicans in the US Congress in November 2012

> the CIA has quietly shut down its Center on Climate Change and National Security -- a project that was launched with the support of Leon Panetta when he led the agency, but that drew sharp criticism from some Republicans in Congress. … The CIA launched the climate change center in September 2009 after a spate of reports linking climate change and national security that drew interest from some members of Congress seeking political action on climate change. … The analysts probed questions such as, under what scenarios might a massive drought cause large-scale migration, and when might a government's failure to respond to a devastating flood open the door for terrorist groups to win over the local populace? Analysts at the center worked to develop warning software that combined regional climate projections with political and demographic information, and held climate war games looking at what might happen in extreme scenarios, such as if rapid glacial melt caused the ocean's major currents to shut down. … But congressional Republicans skeptical of the science behind climate change sought to block the center's funding shortly after it was launched. … Much of the information and expertise that the center needed in order to do its analyses is based in the academic world and involves non-U.S. nationals, whom the intelligence community tends to eye with suspicion. … The inclusion of climate change in top-level national security documents in recent years has signaled that the Defense Department takes the issue seriously, said Francesco Femia, founding director of the Center for Climate & Security.[27]

Whether this organizational decision may have impacts on the political priority of the climate change and security nexus during the second Obama Administration is uncertain.

3.2.3 From Intelligence Community to National Academy of Science

Responding to the request of the US intelligence community the NRC's report on: *Climate and Social Stress – Implications for Security Analysis* (2013: 3) concluded that "anthropogenic climate change can reasonably be expected to increase the frequency and intensity of a variety of potentially disruptive environmental events". Its major conclusions are:

- **Conclusion 3.1:** Given the available scientific knowledge of the climate system, it is prudent for security analysts to expect climate surprises in the coming decade …
- **Conclusion 4.1:** The overall risk of a disruption to a society from a climate event is determined by the interplay among several factors. …
- **Conclusion 4.2:** To understand how climate change may create social and political stresses with implications for US national security, it is essential for the intelligence community to understand adaptation and changes in vulnerability to climate events and their consequences in places and systems of concern, including susceptibility to

[27] See Annie Snider: "CLIMATE: Amid budget scrutiny, CIA shutters climate center", in: *Greenwire*, 19 November 2012; at: <http://eenews.net/public/Greenwire/2012/11/19/1> .

harm and the potential for effective coping, response, and recovery. This understanding must be integrated with understanding of changes in the likelihood of occurrence of climate events.

- **Conclusion 5.1:** It is prudent to expect that over the course of a decade some climate events … will produce consequences that exceed the capability of the affected societies or global systems to manage and that have global security implications serious enough to compel international response.
- **Conclusion 5.2:** The links between climate events and security outcomes are complex, contingent, and not understood well enough to allow for prediction.

To improve the monitoring, analysis and anticipation of climate change impacts, the US Global Change Research Program (USGCRP) listed in its strategic plan for 2012-2021 to "advance understanding of the vulnerability and resilience of integrated human-natural systems and enhance the usability of scientific knowledge in supporting responses to global change". The NRC report suggests a "whole-of-government approach to understanding adaptation and vulnerability to climate change" to better anticipate "the social and political consequences of climate events and in building the basis for a widely useful system for monitoring and analysis".

The NRC Report (2013: 9-13) suggested that specific measures for improving monitoring and analysis to better anticipate "national security risks related to climate events should focus on five types of phenomena":

1. *Climate events and related biophysical environment phenomena;*
2. *The exposures of human populations and the systems that provide food, water, health, and other essentials to life and well-being;*
3. *The susceptibilities of people, assets, and resources to harm from climate events;*
4. *The ability to cope with, respond to, and recover from shocks; and*
5. *The potential for outcomes of inadequate coping, response, and recovery to rise to the level of concern for U.S. national security.*

Such a system would require

> "maintaining critical existing observational systems, programs, and databases; the collection of new data; the analysis of new and existing data; and the improvement of analytic systems, leading to better understanding of the linkages over time and to improved indicators if key variables where quantitative indicators are appropriate and feasible to produce. It will typically require finer-grained data than are currently available. It will also require improved techniques for integrating quantitative and qualitative information."

The NRC report proposed that the intelligence community "should establish a system of periodic 'stress testing' for countries, regions, and critical global systems regarding their ability to manage potentially disruptive climate events of concern" and "countries, regions, and systems of particular security interest should be primary targets for periodic stress testing". This analytical report points to multiple research needs and restrains itself from a classical analysis of US national security threats.

Whether President Obama's strong emphasis on climate change in his second inaugural address on 20 January 2013, will result in stronger climate change policies will depend on decisions of the US Congress and especially of the Republican controlled House of Representatives. Besides policy efforts to reduce the carbon bootprint of the military by replacing hydrocarbon with renewable energy sources, it remains which role the climate change and security nexus will play and whether it will be successfully used by his administration to legitimize and implement 'extraordinary measures' remains to be seen.

3.3 Climate Change as a Human Security Danger

Climate change also poses severe security impacts for human security and its referent objects: human beings and humankind. From a human security perspective, climate change has been addressed by the GECHS programme of IHDP in June 2005[28] and was the focus of the Greek Presidency of the Human Security Network (2007-2008)[29] that aimed "to raise the international community's awareness of the impact of climate change and global warming on human security, with regard to vulnerable groups, particularly women, children and persons fleeing their homes due to climate change".[30] A policy memorandum on '*Climate Change and Human Security*'[31] (Wisner/Fordham/Kelman/Johnston/Simon/Lavell/Brauch/Oswald Spring/ Wilches-Chaux/Moench/Weiner 2007) pointed to manifold impacts for international, national, and human security for selected direct, indirect, and slow-onset linkages. Some effects are already evident and will become very clear in the short run (2007-2020).

Besides the *Human Security Network* (HSN), the *Friends of Human Security* (FHS) that are coordinated by Japan and Mexico also discussed issues of climate change and human security based on a symposium on 31 July 2007 that reviewed the impact of climate change in developing countries, the challenges of disaster risk reduction, and the linkages between development and security.[32] For the Mexican co-chair human security should be understood as a multidimensional concept, which would overcome the existing polarization among the three pillars of the UN: peace and security, development, and human rights.

In 2008, the conceptual debate on climate change and human security was just starting. Barnett and Adger (2005: 1; 2007, 2010) discussed how climate change may undermine human security, and how human insecurity may increase the risk of violent conflict as well as the role of states in human security and peace building. Schnabel (2007) addressed the linkages between climate change, human (in-)security and stability because anthropogenic "climate change … poses a risk to economic development and social and political stability" but will also act as a "powerful amplifier of existing threats". Five years later, the scientific conceptualization of climate change impacts from a human security perspective has progressed. A *Climate Change and Human Security Handbook* (Redclift/Grasso 2013) to which several members of this panel have contributed (Dalby, Scheffran, Oswald Spring, Brauch) is forthcoming and a chapter on "climate change and human security" in the IPCC's AR5 (2014/2015) is in preparation.

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[28] On 21-23 June 2005, *The Global Environmental Change and Human Security* (GECHS) project of IHDP organized a workshop in Oslo on 'climate change and human security'; at: < http://www.cicero.uio.no/humsec/>; papers are at: <http://www.cicero.uio.no/humsec/list_participants.html>. Six papers have been published in a special issue on "Climate Change and Human Security", of: *Erde*, 137, 3: 155-270; other peer reviewed papers were published in a special issue of *Political Geography*, 26,6.

[29] See the Greek concept paper on: "Human Security and the Climate Change Impact on Vulnerable Groups" of 8 May 2007; at: <http://www.humansecuritynetwork.org/docs/2007-ministerial-meeting-04-greek%20paper.doc>.

[30] See Greece, Foreign Ministry at: <http://www.mfa.gr/www.mfa.gr/Articles/en-US/ts18052007_KL2115.htm>. On this official website all activities during the Greek presidency of the HSN and during the Ministerial in Athens on 29-30 May 2008 are documented.

[31] See the memorandum written by: Wisner, Fordham, Kelman. Rose Johnston, Simon, Lavell, Brauch, Oswald Spring, Wilches-Chaux, Moench and Weiner (2007).

[32] See: Workshop on "Climate Change from the Perspective of Human Security"; at: <http://ochaonline.un.org/WhatsNew/ClimateChangeandHumanSecurity/tabid/2106/Default.aspx>; see the presentation by Under-Secretary-General John Holmes' on: "Human security and disaster reduction". In the view of John Holmes, Under-Secretary-General for Humanitarian Affairs and Emergency Relief Coordinator, "It has become obvious that climate change is the biggest threat the planet faces, especially to the poorest and the most vulnerable among us. Climate change, and the natural hazards and extreme weather events that are associated with it, are not some distant, future threat. The threat to human security is here, it's real, and it's today." <

Thus, by the end of 2007, climate change was not only addressed by scientists, governments, and international organizations as an urgent security danger, it was also perceived by a majority of the people in many countries as a major new international, national, and human security concern. Since 2008, the impact of climate change on security in developing countries is also increasingly being addressed by the security community both for national security (e.g. by IDSA[33] in India) and from a human security perspective (by ISS in Pretoria).[34]

By 2013, the human security perspective on the climate change-security nexus has a growing impact on the scientific discourse, while the policy impact has remained negligible.

4 Four Scientific Schools

While future climatic scenarios can be simulated and socio-economic trends can be projected, specific events (Gaddis 1992-1993), such as climate conflicts and wars as the outcome of the decisions of future policymakers, cannot be predicted, but rather a number of 'conflict constellations' can be foreseen (WBGU 2007, 2008; Bauer 2011) that may possibly escalate into violence. In the scientific debate on the climate change security nexus the causal linkages and possible extreme and sometimes fatal societal outcomes have been discussed from four different scientific perspectives:

1. *Determinists* have claimed that climate change will lead to wars during the 21st century. This argument has been made by scientists (e.g. Welzer 2008; Lee 2009), humanitarian organizations, and NGOs and a few governments.
2. *Empiricists* have stressed (Scheffran/Brzoska/Brauch/Link/Schilling 2012) that environmental stress and climate change have contributed to forced migration and small-scale violence (Kahl 2003, 2006). They have analysed the securitization of climate change impacts (Detraz/Betsill 2009: Brauch 2009; Scheffran 2011) and reviewed conflict constellations triggered by climate change (WBGU 2008; Bauer 2011).
3. *Sceptics* have pointed to a lack of evidence in the peer-reviewed, quantitative literature on the link between climate change and wars (Nordas/Gleditsch 2007; Gleditsch/Nordas 2009; Gleditsch 2012).
4. *Deniers* have challenged the links between climate change and conflicts that may present security threats (Lomborg 2009, 2004; Tetrais 2011). Within the context of the UN, Russia, China, and many G-77 countries have considered climate change primarily as an issue of sustainable development, to be addressed by the UNGA, ECOSOC, and the *United Nations Framework Convention on Climate Change* (UNFCCC), but not as an issue of international peace and security for consideration by the UNSC.

The NRC Report (2013) distinguished among four general approaches "for implementing a risk-based climate-security analysis: a) a *forecasting* approach; b) an emphasis on *early warning*; c) analysis of *system vulnerabilities* and d) a *policy vulnerability analysis*. All for approaches require the monitoring of a wide range of different variables of "climatic and other environmental factors as well as socioeconomic variables" that can support the specific requirements. The NRC report suggested to analyse the impact of climate events on global food systems, global energy markets, on strategic product supply chains and other global system effects, the specific exposure to such events and the "susceptibility to harm from climate events" and the specific efforts for coping, response and recovery. It proposed to examine the national security outcomes of climate events for "water, food and health

[33] See: Institute for Defence Studies and Analyses (IDSA): "Workshop on Security Implications of Climate Change for India: A Report" (New Delhi, 6 April 2008).

[34] See the workshop by ISS (Pretoria) with IDRC (Canada) on: "Climate change and human security in Africa" (Pretoria, South Africa, 27-28 February 2008);

security" and their impact on humanitarian crises, disruptive migration, resulting in severe political instability and state failure as well as interstate and intrastate conflict and violence. The NRC Report calls for an empirical approach for assessing national security threats where the monitoring task should focus on biophysical environmental date, on the exposure and "susceptibilities of people, assets and resources", the "ability to cope" and "the potential for outcomes of inadequate coping, response, and recovery to rise to the level of concern for US national security".

5 Five Different Scientific Approaches

Further, at least five different scientific approaches have emerged: a) policy analyses, b) scenario analyses, c) discourse analysis, d) conceptual and model analyses and e) theoretical and empirical analyses that use a wide range of scientific approaches, theoretical orientations, and methods to analyze the 'observed' and 'projected' interrelations among physical and societal effects of climate change on the state, society, the economic sector, and on individuals, community groups, states, and humankind. Thus, five different genres of publication may be distinguished:

a) *Policy analyses* by consultants aiming to put the linkage on the policy agenda of national governments and international organizations. This goal has been successfully achieved by putting it on the agenda of the UNGA, the UN Secretary-General, and the UNSC.
b) *Scenario analyses* with the goal of preparing policymakers for potential future security threats posed by the projected societal impacts of climate change. Such studies have been funded by defence ministries, intelligence agencies (US NIC), and supranational (EU 2008) and international organizations.
c) *Discourse analyses* have analysed the policy statements of national and international policymakers and press reports in terms of international, national, and human security (Brauch 2009; Detraz/Betsill 2009; chap. 12 by Rothe; chap. 33 by Kurtz)
d) *Conceptual and model analyses* of the linkage between climate change and society as part of the interactions between natural and human systems (Scheffran 2008, 2008a, 2009, 2010).[35]
e) *Theoretical and empirical analyses* that use a wide range of scientific approaches, theoretical orientations, and methods to analyse the 'observed' and 'projected' interrelations between four physical effects of climate change (increasing temperature, sea level rise, number and intensity of climate-related natural hazards, and changes in precipitation) on the state, society, and the economic sector and business community, and on individuals, community groups, and humankind.

Work in the first two genres has been carried out primarily by political consultants and in the third by sociologists, political scientists, and media specialists. The fourth and the fifth require inter-, multi- and transdisciplinary cooperation among scientists from the natural and the social sciences.

To respond to the challenges of the climate-change security nexus that have been characterized by the German WBGU (2008), the British Foresight Report (2011), the US NRC (2013) and in the report of the UNSG (2009), theory-guided empirical research with both qualitative and quantitative methods as well as conceptual and model analyses are needed.

6 Different Uses: Securitization vs. Militarization

With regard to the interest that is guiding the research ('erkenntnisleitendes Interesse') on the climate change and security nexus and the potential recipient of this knowledge two different

[35] See related publications: Scheffran 1999, 2002, 2008a, 2011; Scheffran and Jathe (1996); Scheffran and Hannon (2007); Eisenack, Lüdeke, Petschel-Held et al. (2007); Scheffran, Link and Schilling (2011).

communities may be distinguished: a) the *scientific community* that focuses on knowledge creation and assessment; and b) the policy community that is concerned with anticipating and responding to perceived security threats, challenges, vulnerability and risks.

A part of the conceptual literature that reviewed the emerging climate change and security discourse was inspired by Ole Wæver's theory of *securitization*, whereby policymakers declare an issue as being of utmost importance that requires an extraordinary policy response. In Wæver's view this process of securitization has been successful if the audience has been convinced of its policy relevance. In 2007 and 2008, the securitization of climate change issues appeared to be successful. But with the emergence of the global economic and financial crisis in 2008, the major change in public opinion in the US on the importance of climate change issues and since 2009 the policy blockade in the U.S. Congress on any climate change law and finally since the failure of COP 15 in December 2009 in Copenhagen the 'extraordinary measures' were not taken neither by the G-8 nor by the G-20.

Since then the international community has been facing a "climate paradox" (Brauch 2012), an increasing gap between legal commitments and policy declarations and the lack of implementation due to major domestic policy constraints. In addition, the climate sceptics, many of them being funded by the oil and coal industry in the US and elsewhere, special interest groups and ideologically-motivated campaigns have attacked the IPCC and the dominant climate consensus.

A different debate has emerged from the military and intelligence community that was concerned with the potential impact of climate change events on its military infrastructure, its future military missions, force postures and structures to be able to operate under the conditions of climate change. Thus, not surprisingly the US Armed forces, the US Navy and the US Army have become major sponsors of social science research on the climate change-security nexus as well as of major conferences between scientists and the military. This second debate is being interpreted as a 'militarization' of the climate change-security nexus where a military agenda is often driving the search for new knowledge.

While the "securitization discourse" on the climate change-security nexus was primarily driven by a scientific and theory-guided agenda, the emerging "militarization debate" is clearly policy driven both by interests to anticipate the possible societal impacts trying to prevent the emergence of new political and military conflict constellations and by pragmatic interests to be able to respond to these newly emerging security dangers and concerns.

7 Policy Challenges and Research Needs

Responding to the interests of the US intelligence community, the NRC's (2013: 33) report on climate and social stress restrained from offering "recommendations on where or when the U.S. government should act on risks related to climate change" noting "that this is a policy choice", rather is aim was to offer "ways to better assess such risks and to anticipate changes in them".

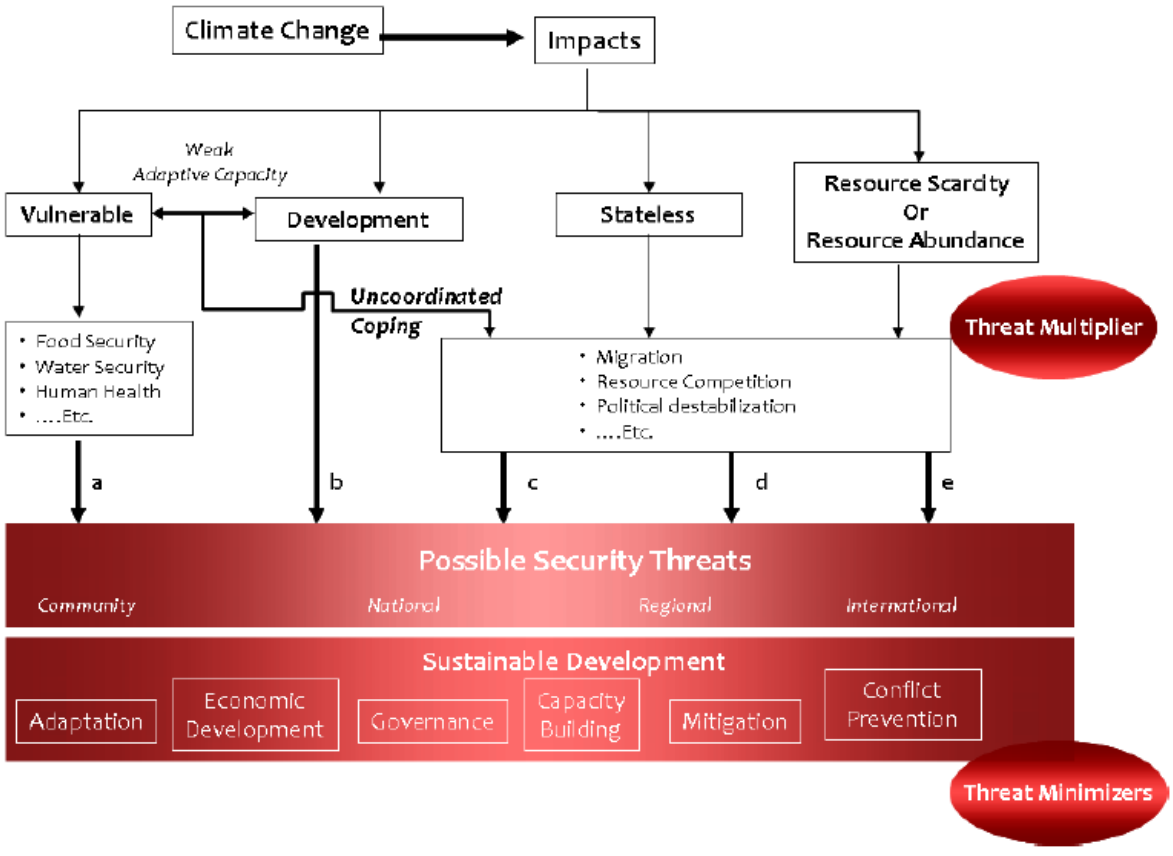
During the second decade of research the well-developed policy debate and the still emerging social science research on the climate change-security nexus face various challenges: a) between scientific and policy community, but also within the b) academic social science community between deductive and inductive approaches, quantifiers and qualifiers, between correlation analyses and case studies.

The NRC's goal to "better assess such risks and to anticipate changes in them" requires overcoming the segregation of the different research communities that have nearly exclusively reflected the research results within their own community and too often ignored the research of the other based on "qualitative" or "quantitative" methods.

A major goal that has motivated the policy-debate on the climate change and security nexus in Europe since 2004 was to avoid that violent security consequences could emerge from the physical effects and the societal outcomes of anthropogenic global environmental and climate change. Thus, a major policy goal of the 'securitization move' was a kind of a "self-destroying prophecy". The climate-change security nexus points to the first of two interrelated policy debates, the UN Secretary-General (UNSG 2009) referred to in his report on "possible security implications of climate change", where he framed climate change both as a 'threat multiplier' that prevails in the national security approach and as a 'threat minimizer' that points to proactive policies towards sustainability (figure 1).

Climate change as 'threat minimizers' point to "climate mitigation and adaptation, economic development, democratic governance and strong local and national institutions, international cooperation, preventive diplomacy and mediation, timely availability of information and increased support for research and analysis to improve the understanding of linkages between climate change and security". The report "identifies a set of emerging climate change related threats … that appear highly likely, are large in magnitude, may unfold relatively swiftly, and are unprecedented in nature, including: loss of territory, statelessness and increased numbers of displaced persons; stress on shared international water resources, e.g. with the melting of glaciers; and disputes surrounding the opening of the Arctic region to resource exploitation and trade".

Figure 1: Channels of threat multipliers and threat minimizers. **Source:** UNSG (2009: 7).



To respond to and prevent climate change-induced security threats the report suggested an international capacity "to anticipate and prepare itself to address a number of largely unprecedented challenges posed by climate change for which existing mechanisms may be inadequate", focusing on climate-induced displaced persons and migrants, to the "statelessness of citizens of submerged island nations", water-scarcity and the increased competition "over newly accessible Arctic natural resources and trade routes".

This UN report offers a framework for two policy debates and scientific discourses: a) since 2002 on the 'securitization' of climate change. The second debate on *sustainability transition* is just emerging where the impact on international peace and international, national and human security has been totally ignored. To address this linkage is the goal of the *sustainability transition and sustainable peace* (STSP) project that addresses consequences of non-action and postponement of action in dealing with probable impacts of global environmental change and a possible 'peace dividend' of a long-term transformation of the global and national economic and energy systems towards sustainable development goals.

From an *environmental or ecological* perspective the interactions between the human and natural systems in the Anthropocene (Crutzen 2002, 2006, 2011; Clark/Crutzen/Schellnhuber 2004) must be examined and better understood. From a *security studies* perspective the societal outcomes of global environmental and climate change must be better anticipated that may result in societal and political instability, state failure and violent conflicts. From a *development research* perspective analyses of the multiple strategies, policies and measures for a transition towards a sustainable development path are needed. Finally, from a *peace research* perspective, the analysis of the securitization of climate change is no goal by itself, rather its avoidance requires major political efforts at addressing the anthropogenic causes through major GHG emission reduction that can only be achieved by moving towards a gradual decarbonization of the global economy in particular of its energy sector by moving towards a sustainability transition (WBGU 2011).

The *Sustainability Transition and Sustainable Peace Project* (STSP) was launched after the completion of a comprehensive project on the *Reconceptualization of Security* (Brauch et al. 2008, 2009, 2011) to addresses key scientific and political challenges of the 21st century:

- The relative failure of international efforts to address, face and cope effectively with the impacts of global environmental change and global climate change that have resulted in a 'climate paradox' that major industrialized and democratic countries were unable or unwilling to comply with their global legally binding and declaratory commitments they adopted during the first Earth Summit in Rio de Janeiro in June 1992 in the aftermath of the end of the Cold War. This failure is reflected in
  - the inability of the international community represented by the world of states to agree on a legally binding follow-up regime to the Kyoto Protocol by the end of 2012;
  - in the relative failure of the Conference of Parties (COP 15-18) to the UNFCCC;
  - in the failure of most G8 countries to initiate measures to implement their announced goal (2007-2011) to reduce their GHG emissions by 80% by 2050;
  - in the failure of the G20 meeting in June 2012 to adopt a legally binding agreement on financing climate change activities in developing countries in their G20 Leaders Declaration;
  - in the failure of the United Nations Conference on Sustainable Development (Rio+20) in Rio de Janeiro on 20-22 June 2012 to adopt any new and legally binding decisions besides the declaratory statement: "Outcome of the Conference: The future we want".

This sceptical diagnosis refers to two different approaches on international security and environmental policy:

- a *business-as usual policy* that the market, economic initiatives and military power will be able to cope with its consequences;
- a willingness to move towards a *fourth sustainability revolution* that requires multiple efforts to move towards a long-term transition towards sustainability.

This new project tries to link this emerging debate with the experience of international relations and *environment, security, development and peace* (ESDP) studies by addressing possible impacts of both alternative policy trends for international peace and security.

References

Bächler, Günther, 1998: "Why Environmental Transformation Causes Violence: A Synthesis", in: *Environmental Change and Security Project Report*, Issue 4, Spring (Washington: Woodrow Wilson Center): 24-44.

Bächler, Günther, 1998a: *Why Environmental Degradation Causes Violence: A Synthesis*. (Zürich, Switzerland: Environmental Change and Security Project Report, Swiss Peace Foundation).

Bächler, Günther, 1999: *Violence Through Environmental Discrimination. Causes, Rwanda Arena, and Conflict Model* (Dordrecht – Boston - London: Kluwer Academic Publishers).

Bächler, Günther, 1999a: "Environmental Degradation and Violent Conflict: Hypotheses, Research Agendas and Theory-Building", in: Suliman, Mohamed (Ed.): *Ecology, Politics and Violent Conflict* (London – New York: Zed Books): 76-112.

Bächler, Günther; Böge, Volker; Klötzli, Stefan; Libiszewski, Stephan; Spillmann, Kurt R. (Eds.), 1996: *Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung*, Vol. I (Chur-Zuerich: Rüegger).

Bächler, Günther; Spillmann, Kurt R. (Eds.), 1996a: *Environmental Degradation as a Cause of War. Regional and Country Studies of Research Fellows* (Chur-Zürich: Rüegger).

Bächler, Günther; Spillmann, Kurt R. (Eds.), 1996b: *Environmental Degradation as a Cause of War. Country Studies of External Experts. Country Studies of External Experts*, vol. II (Chur-Zürich: Rüegger).

Bächler, Günther; Spillmann, Kurt R.; Suliman, Mohamed (Eds.), 2002: *Transformation of Resource Conflicts: Approach and Instruments* (Bern: Peter Lang).

Barnett, Jon; Adger, Neil, 2005: "Security and Climate Change: Towards an Improved Understanding". Paper for the joint workshop of GECHS, CICERO and PRIO on "Human Security and Climate Change", Oslo, 20-21 June 2005; at: <http://www.cicero.uio.no/humsec/papers/ Barnett&Adger.pdf>.

Barnett, Jon; Adger, W. Neil, 2007: "Climate Change, Human Security and Violent Conflict", in: *Political Geog*raphy, 26,6: 639-655.

Barnett, Jon; Adger, W. Neil, 2010: "Environmental Change, Human Security, and violent Conflict", in: Matthew, Richard A.; Barnett, Jon; Mc Donald, Bryan; O'Brien, Karen (Eds.)*: Global Environmental Change and Human Security* (Cambridge, MA: MIT Press): 119-136.

Barnett, Jon; Matthew, Richard A.; O'Brien, Karen, 2008: "Global Environmental Change and Human Security", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Mesjasz, Czeslaw; Grin, John; Dunay, Pal; Behera, Navnita Chadha; Chourou, Béchir; Kameri-Mbote, Patricia; Liotta, P.H. (Eds.): *Globalization and Environmental Challenges: Reconceptualizing Security in the 21st Century.* Hexagon Series on Human and Environmental Security and Peace, vol. 3 (Berlin – Heidelberg – New York: Springer-Verlag): 355-361.

Bauer, Steffen, 2011: "Stormy Weather: International Security in the Shadow Climate Change", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Mesjasz, Czeslaw; Grin, John; Kameri-Mbote, Patricia; Chourou, Béchir; Dunay, Pal; Birkmann, Jörn (Eds.), 2011: *Coping with Global Environmental Change, Disasters and Security – Threats, Challenges, Vulnerabilities and Risks* (Berlin et al,: Springer-Verlag): 719-734.

Brauch, Hans Günter, 2002: "Climate Change, Environmental Stress and Conflict - AFES-PRESS Report for the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety", in: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Ed.): *Climate Change and Conflict. Can climate change impacts increase conflict potentials? What is the relevance of this issue for the international process on climate change?* (Berlin: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, 2002): 9-112; at: <http://www.afes-press.de/pdf/Brauch_ClimateChange_BMU. pdf>.

Brauch, Hans Günter, 2003: "Worldviews and Mindsets: American vs. European Perspectives on Mediterranean (Environmental) Security Policy", in: Brauch, Hans Günter; Liotta, P.H.; Marquina, Antonio; Rogers, Paul; Selim, Mohammed El-Sayed (Eds.): *Security and Environment in the Mediterranean. Conceptualising Security and Environmental Conflicts* (Berlin – Heidelberg: Springer): 237-266.

Brauch, Hans Günter, 2005: *Environment and Human Security. Freedom from Hazard Impact*, InterSecTions, 2/2005 (Bonn: UNU-EHS); at: <http://www.ehs.unu.edu/ file.php? id=64>.

Brauch, Hans Günter, 2006: *Destabilisierungs- und Konfliktpotential Prognostizierter Umweltveränderungen in der Region Südeuropa und Nordafrika bis 2020/2050*. AFES-PRESS Studie für den Wissenschaftlichen Beirat der Bundesregierung Globale Umweltveränderungen (WBGU). Background Contract Study for WBGU (Mosbach, 14 June).

Brauch, Hans Günter, 2008: "Introduction: Globalization and Environmental Challenges: Reconceptualizing Security in the 21st Century", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Mesjasz, Czeslaw; Grin, John; Dunay, Pal; Behera, Navnita Chadha; Chourou, Béchir; Kameri-Mbote, Patricia; Liotta, P.H. (Eds.): *Globalization and Environmental Challenges: Reconceptualizing Security in the 21st Century* (Berlin – Heidelberg – New York: Springer-Verlag): 27-43.

Brauch, Hans Günter, 2009: "Securitzing Global Environmental Change", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Grin, John; Mesjasz, Czeslaw; Kameri-Mbote, Patricia; Behera, Navnita Chadha; Chourou, Béchir; Krummenacher, Heinz (Eds.), 2009: *Facing Global Environmental Change: Environmental, Human, Energy, Food, Health and Water Security Concepts* (Berlin et al.: Springer-Verlag): 65-102

Brauch, Hans Günter, 2009a: "Human Security Concepts in Policy and Science", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Grin, John; Mesjasz, Czeslaw; Kameri-Mbote, Patricia**;** Behera, Navnita Chadha; Chourou, Béchir; Krummenacher, Heinz (Eds.): *Facing Global Environmental Change: Environmental, Human, Energy, Food, Health and Water Security Concepts* (Berlin – Heidelberg – New York: Springer-Verlag): 965-990.

Brauch, Hans Günter, 2011: "Security Threats, Challenges, Vulnerabilities and Risks in US National Security Documents (1990–2010)", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Mesjasz, Czeslaw; Grin, John; Kameri-Mbote, Patricia; Chourou, Béchir; Dunay, Pal; Birkmann, Jörn (Eds.), 2011: *Coping with Global Environmental Change, Disasters and Security – Threats, Challenges, Vulnerabilities and Risks* (Berlin – Heidelberg – New York: Springer-Verlag): 249-274.

Brauch, Hans Günter, 2011a: "Concepts of Security Threats, Challenges, Vulnerabilities and Risks", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Mesjasz, Czeslaw; Grin, John; Kameri-Mbote, Patricia; Chourou, Béchir; Dunay, Pal; Birkmann, Jörn (Eds.), 2011: *Coping with Global Environmental Change, Disasters and Security – Threats, Challenges, Vulnerabilities and Risks* (Berlin et al.: Springer-Verlag): 61-106.

Brauch, Hans Günter; Dalby, Simon; Oswald Spring, Úrsula, 2011: "Political Geoecology for the Anthropocene", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Mesjasz, Czeslaw; Grin, John; Kameri-Mbote, Patricia; Chourou, Béchir; Dunay, Pal; Birkmann, Jörn (Eds.), 2011: *Coping with Global Environmental Change, Disasters and Security – Threats, Challenges, Vulnerabilities and Risks* . Hexagon Series on Human and Environmental Security and Peace, vol. 5 (Berlin – Heidelberg – New York: Springer-Verlag): 1453-1486.

Brauch, Hans Günter; Oswald Spring, Úrsula; Grin, John; Mesjasz, Czeslaw; Kameri-Mbote, Patricia**;** Behera, Navnita Chadha; Chourou, Béchir; Krummenacher, Heinz (Eds.), 2009: *Facing Global Environmental Change: Environmental, Human, Energy, Food, Health and Water Security Concepts* (Berlin – Heidelberg – New York: Springer-Verlag).

Brauch, Hans Günter; Oswald Spring, Úrsula; Mesjasz, Czeslaw; Grin, John; Dunay, Pal; Behera, Navnita Chadha; Chourou, Béchir; Kameri-Mbote, Patricia; Liotta, P.H. (Eds.), 2008: *Globalization and Environmental Challenges: Reconceptualizing Security in the 21st Century* (Berlin – Heidelberg – New York: Springer-Verlag).

Brauch, Hans Günter; Oswald Spring, Úrsula; Mesjasz, Czeslaw; Grin, John; Kameri-Mbote, Patricia; Chourou, Béchir; Dunay, Pal; Birkmann, Jörn (Eds.), 2011: *Coping with Global Environmental Change, Disasters and Security – Threats, Challenges, Vulnerabilities and Risks* . Hexagon Series on Human and Environmental Security and Peace, vol. 5 (Berlin – Heidelberg – New York: Springer-Verlag):

Brauch Hans Günter; Scheffran, Jürgen, 2012: "Introduction: Climate Change, Human Security, and Violent Conflict in the Anthropocene", in: Scheffran, Jürgen; Brzoska, Michael; Brauch, Hans Günter; Link, Peter Michael; Schilling, Janpeter (Eds.): *Climate Change, Human Security and Violent Conflict: Challenges for Societal Stability* (Berlin et al.: Springer): 3-40.

Brown, Neville, 1989: "Climate, Ecology and International Security", in: *Survival*, 31,6: 519-532.

Brown, Neville, 2001: *History and Climate Change. A Eurocentric Perspective* (London – New York: Routledge).

Brundtland Commission (World Commission on Environment and Development), 1987: *Our Common Future. The World Commission on Environment and Development* (Oxford – New York: Oxford University Press).

Bulhaug, Halvard; Gleditsch, Nils Petter; Theisen, Ole Magnus, 2008: "Implications of Climate Change for Armed Conflict". Paper commissioned by the World Bank Group for the 'Social Dimensions of Climate Change' workshop, Washington, D.C., 5-6 March 2008, working paper; at: <http://siteresources.worldbank.org/INTRANETSOCIALDEVELOPMENT/Resources/SDCCWorkingPaper_Conflict.pdf>.

Campbell, Kurt M., 2008: *Climatic Cataclism. The Foreign Policy and National Security Implications of Climate Change* (Washington, D.C.: Brookings).

Campbell, Kurt M.; Lennon, Alexander T.J.; Smith, Juliane (co-directors), 2007: *The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change* (Washington, D.C.: Center for Strategic and International Studies, November).

Church, John A.; Asrar, Ghassem R.; Busalacchi; Antonio j.; Arndt, Carolin E., 2011: "Climate Information for Coping with Environmental Change: Contributions of the World Climate Research Programme", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Mesjasz, Czeslaw; Grin, John; Kameri-Mbote, Patricia; Chourou, Béchir; Dunay, Pal; Birkmann, Jörn (Eds.), 2011: *Coping with Global Environmental Change, Disasters and Security – Threats, Challenges, Vulnerabilities and Risks* . Hexagon Series on Human and Environmental Security and Peace, vol. 5 (Berlin – Heidelberg – New York: Springer-Verlag): 1257-1272.

Clark, William C.; Crutzen, Paul J.; Schellnhuber, Hans Joachim, 2004: "Science and Global Sustainability: Toward a New Paradigm", in: Schellnhuber, Hans Joachim; Crutzen, Paul J.; Clark, William C.; Claussen, Martin; Held, Hermann (Eds.): *Earth System Analysis for Sustainability* (Cambridge, MA; London: MIT Press): 1-28.

CNA, 2007: *National Security and the Threat of Climate Change* (Alexandria: VA: Center for Naval Analysis); at: <http://securityandclimate.cna.org/>.

Crutzen, Paul J., 2002: "Geology of Mankind", in: *Nature*, 415,3 (January): 23.

Crutzen, Paul J., 2006: "The Anthropocene", in: Ehlers, Eckart; Krafft, Thomas (Eds.): *Earth System Science in the Anthropocene* (Berlin – Heidelberg – New York: Springer): 13-18.

Crutzen, Paul J., 2011: "The Anthropocene: Geology by Mankind", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Mesjasz, Czeslaw; Grin, John; Kameri-Mbote, Patricia; Chourou, Béchir; Dunay, Pal; Birkmann, Jörn (Eds.), 2011: *Coping with Global Environmental Change, Disasters and Security – Threats, Challenges, Vulnerabilities and Risks* (Berlin – Heidelberg – New York: Springer-Verlag):

Detraz, Nicole; Betsill, Michelle, 2009: "Climate change and environmental security: For whom the discourse shifts", in: *International Studies Perspectives*, 10,3: 303-320.

Eisenack, Klaus; Lüdeke, Matthias K.B.; Petschel-Held, Gerhard; Scheffran, Jürgen; Kropp, Jürgen P., 2007: "Qualitative Modelling Techniques to Assess Patterns of Global Change", in: Jürgen Kropp, Jürgen Scheffran (Eds.), *Advanced Methods for Decision Making and Risk Management in Sustainability Science* (New York: Nova Science): 99-146.

EU [European Commission; Council], 2008: *Climate Change and International Security*. Doc 7249/08 (Brussels: European Commission, 14 March).

EU, 2008a: *Report on the Implementation of the European Security Strategy - Providing Security in a Changing World*, S407/08 (Brussels: European Council, 11 December).

UK Government Office for Science, 2011 *Foresight Report - Migration and Global Environmental Change: Future Challenges and Opportunities* (London: Government Office for Science).

Gaddis, John Lewis, 1992/1993: "International Relations Theory and the End of the Cold War", in: *International Security*, 17,3 (Winter): 5-58.

GECHS, 2005: *Annual Report 2004/2005* (Oslo: GECHS); at: <http://www.gechs.org/downloads/annual_reports/2004-2005.pdf>.

Giddens, Anthony, 2009, [2]2011: *The Politics of Climate Change* (Cambridge: Polity).

Gleditsch, Nils-Petter, 2012: "Whither the weather? Climate change and conflict", in: *Journal of Peace Research, special issue: Climate change and conflict*, 49,1 (Jamuarty-February9. §-!=:

Nordås, Ragnhild; Gleditsch, Nils-Petter, 2007, "Climate change and conflict", in: *Political Geography*, 26,6: 627-638.

Gleditsch, Nils-Petter; Nordas, Ragnhild, 2009: "Klimawandel und Konflikt: Ein kritischer Überblick", in: *Friedenswarte*, 84,2: 11-28.

Gleditsch, Nils-Petter; Nordas, Ragnhild, 2009: "Klimawandel und Konflikt: Ein kritischer Überblick", in: *Friedenswarte*, 84,2: 11-28.

Gleick, Peter H., 1989: "Climate change and international politics: Problems facing developing countries", in: *Ambio*, 18,6: 333-339.

Bohle, Hans-Georg; O'Brien, Karen, 2007: "The Discourse on Human Security: Implications and Relevance for Climate Change Research. A Review Article", in: *Climate Change and Human Security.* Special issue of: *Die Erde*, 137,3: 155-163.

Homer-Dixon, Thomas F., 1991: "On the Threshold: Environmental Changes as Causes of Acute Conflict," in: *International Security*, 16,2 (Fall): 76-116.

Homer-Dixon, Thomas F., 1994: "Environmental Scarcities and Violent Conflict: Evidence From Cases," in: *International Security*, 19,1 (Summer): 5-40.

Homer-Dixon, Thomas F., 1999: *Environment, Scarcity, and Violence* (Princeton, NJ: Princeton University Press).

Homer-Dixon, Thomas F.; Deligiannis, Tom, 2009: "Environmental Scarcities and Civil Violence", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Grin, John; Mesjasz, Czeslaw; Kameri-Mbote, Patricia**;** Behera, Navnita Chadha; Chourou, Béchir; Krummenacher, Heinz (Eds.): *Facing Global Environmental Change: Environmental, Human, Energy, Food, Health and Water Security Concepts* (Berlin – Heidelberg – New York: Springer-Verlag): 309-324.

IPCC, 2014/2015: *Impacts, Adaptation and Vulnerability*. Working Group II Contribution to the Fifth Assessment Report of the IPCC (in preparation).

IPCC, 2007: *Climate Change 2007. Impacts, Adaptation and Vulnerability.* Working Group II Contribution to the Fourth Assessment Report of the IPCC (Cambridge – New York: Cambridge University Press, December); at: <http://www.ipcc-wg2.org/>.

Jopp, Heinz-Dieter; Kaestner, Roland, 2008: "Climate Change and Security in the 21st Century", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Mesjasz, Czeslaw; Grin, John; Dunay, Pal; Behera, Navnita Chadha; Chourou, Béchir; Kameri-Mbote, Patricia; Liotta, P.H. (Eds.), 2008: *Globalization and Environmental Challenges: Reconceptualizing Security in the 21st Century* (Berlin – Heidelberg – New York: Springer-Verlag): 901-914.

Kahl, Colin H., 2003: "The Political Ecology of Violence: Lessons for the Mediterranean", in: Brauch, Hans Günter; Liotta, P.H; Marquina, Antonio; Rogers, Paul; Selim, Mohammed El-Sayed (Eds.): *Security and*

Environment in the Mediterranean. Conceptualising Security and Environmental Conflicts (Berlin-Heidelberg: Springer 2003): 465-476.

Kahl, Colin H., 2006: *States, Scarcity and Civil Strife in the Developing World* (Princeton, NJ: Princeton University Press).

Kurtz, Gerritt, 2012: "Securitization of Climate Change in the United Nations 2007-2010", in: Scheffran, Jürgen; Brzoska, Michael; Brauch, Hans Günter; Link, Peter Michael; Schilling, Janpeter (Eds.): *Climate Change, Human Security and Violent Conflict: Challenges for Societal Stability* (Berlin et al.: Springer): 669-684.

Lee, James R., 2009: *Climate Change and Armed Conflict: Hot and Cold Wars* (London: Routledge).

Leemans, Rik, 2009: "The Millennium Ecosystem Assessment: Securing Interactions between Ecosystems, Ecosystem Services and Human Well-being", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Grin, John; Mesjasz, Czeslaw; Kameri-Mbote, Patricia**;** Behera, Navnita Chadha; Chourou, Béchir; Krummenacher, Heinz (Eds.), 2009: *Facing Global Environmental Change: Environmental, Human, Energy, Food, Health and Water Security Concepts* (Berlin – Heidelberg – New York: Springer-Verlag): 53-61.

Leemans, Rik; Rice, Martin; Henderson-Sellers, Ann; Noone, Kevin, 2011: "Research Agenda and Policy Input of the Earth System Science partnership for Coping with Global Environmental Change", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Mesjasz, Czeslaw; Grin, John; Kameri-Mbote, Patricia; Chourou, Béchir; Dunay, Pal; Birkmann, Jörn (Eds.), 2011: *Coping with Global Environmental Change, Disasters and Security – Threats, Challenges, Vulnerabilities and Risks* . Hexagon Series on Human and Environmental Security and Peace, vol. 5 (Berlin – Heidelberg – New York: Springer-Verlag): 1205-1220.

Lomborg, Björn, 2004, [2]2009: *Global Crises, Global Solutions: Costs and Benefits* (Cambridge: Cambridge University Press).

Mathews, Jessica Tuchman, 1989: "Redefining Security", in: *Foreign Affairs*, 68:2 (Spring): 162-177.

Mathews, Jessica Tuchman, 1991: "The Environment and International Security", in: Klare, Michael; Thomas, Daniel (Eds.): *World Security: Trends and Challenges at Century's End*, (New York: St Martin's Press).

Mathews, Jessica Tuchman, 1992: "Preserving the global environment: Implications for U.S. policy", in: Kegley, C. W. J.; Wittkopf, E. R. (Eds.): *The future of American foreign policy* (New York, NY: St. Martin's Press): 85-94.

Mathews, Jessica Tuchman, 1993: "Nations and nature. A new view on security", in: Prins, Gwyn (Ed.): *Threats without enemies: Facing environmental security* (London: Earthscan): 25-37.

Mathis, Mitchell; Aguilar-Barajas, Ismael A, 2003: "Applying the concept of the hydro-

Matthew, Richard A.; Barnett, Jon; MacDonald, Bryan; O'Brien, Karen (Eds.), 2010*: Global Environmental Change and Human Security* (Cambridge, MA: MIT Press).

Matthew, Richard A.; Macdonald, Bryan, 2009: "Environmental Security: Academic and Policy Debates in North America", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Grin, John; Mesjasz, Czeslaw; Kameri-Mbote, Patricia**;** Behera, Navnita Chadha; Chourou, Béchir; Krummenacher, Heinz (Eds.), 2009: *Facing Global Environmental Change: Environmental, Human, Energy, Food, Health and Water Security Concepts*. Hexagon Series on Human and Environmental Security and Peace, vol. 4 (Berlin – Heidelberg – New York: Springer-Verlag): 791-802.

Moran, Daniel (Ed.) 2011: *Climate Change and National Security. A country-Level Analysis* (Washington, D.C.: Georgetown University Press).

Myers, Norman, 1989: "Environment and Security", in: *Foreign Policy*, 74 (Spring): 23-41.

NRC [National Research Council], 2013: *Climate and Social Stress. Implications for Security Analysis* (Washington. D.C.: National Academy Press).

NSS [National Security Strategy], 2010: *National Security Strategy of the United States*: (Washington, D.C.: The White House, May).

NIC [National Intelligence Council], 2008: *Global Trends 2025: A Transformed World*. NIC 2008-003 (Washington, D.C.: US Government Printing Office, November); at: <www.dni.gov.nic/NIC_2025_project. html>.

NIC [National Intelligence Council], 2012: *Global Trends 2030: Alternative Worlds.*. NIC 2012-001 (Washington, D.C.: US Government Printing Office, November); at: <www.dni.gov.nic/NIC_2025_project. html>.

Noon, Kevin; Nobre, Carlos; Seitzinger, Sybil, 2011: "The International Geosphere-Biosphere Programme's (GBP) Scientific Research Agenda for Coping with Global Environmental Change", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Mesjasz, Czeslaw; Grin, John; Kameri-Mbote, Patricia; Chourou, Béchir; Dunay, Pal; Birkmann, Jörn (Eds.), 2011: *Coping with Global Environmental Change, Disasters and Security – Threats, Challenges, Vulnerabilities and Risks* . Hexagon Series on Human and Environmental Security and Peace, vol. 5 (Berlin – Heidelberg – New York: Springer-Verlag): 1249-1256.

O'Brien, Karen; Lera St. Clair, Asunción; Kristoffersen, Berit (Eds.), 2010: *Climate Change, Ethics and Human Security* (Cambridge: Cambridge University Press).

Oswald Spring, Ursula; Brauch, Hans Günter; Edwards, Guy; Roberts, J. Timmons, 2013: "The Impact of Climate Change on Human Security in Latin America and the Caribbean", in: Redclift, Michael; Grasso, Marco (Eds.): *Climate change and Human Security Handbook* (Cheltenham: Edward Elgar, 2013).

Oswald Spring, Úrsula; Brauch, Hans Günter, 2011: "Coping with Global Environmental Change – Sustainability Revolution and Sustainable Peace", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Mesjasz, Czeslaw; Grin, John; Kameri-Mbote, Patricia; Chourou, Béchir; Dunay, Pal; Birkmann, Jörn, 2010: *Coping with Global Environmental Change, Disasters and Security – Threats, Challenges, Vulnerabilities and Risks* (Berlin – Heidelberg – New York: Springer-Verlag): 1487-1504.

QDR (Quadrennial Defense Review), 2010: *Quadrennial Defense Review Report February 2010* (Washington, D.C.: U.S. Department of Defense, February).

Redclift, Michael; Grasso, Marco (Eds.): *Climate change and Human Security Handbook* (Cheltenham: Edward Elgar, 2013).

Rothe, Delf, 2012: "Security as a Weapon: How Cataclysm Discourses Frame International Climate Negotiations", in: Scheffran, Jürgen; Brzoska, Michael; Brauch, Hans Günter; Link, Peter Michael; Schilling, Janpeter (Eds.): *Climate Change, Human Security and Violent Conflict: Challenges for Societal Stability* (Berlin et al.: Springer): 243-258.

Scheffran, Jürgen, 1999: "Environmental Conflicts and Sustainable Development: A Conflict Model and its Application in Climate and Energy Policy", in: Carius, Alexander; Lietzmann, Kurt M. (Eds.): *Environmental Change and Security* (Heidelberg-Berlin: Springer): 195-218.

Scheffran, Jürgen, 2002: "Conflict and Cooperation in Energy and Climate Change", in: Holler, Manfred; Kliemt, Hartmut; Schmidtchen, Dieter; Streit, Manfred E. (Eds.): *Yearbook New Political Economy* 20 (Tübingen: Mohr Siebeck): 229-254.

Scheffran, Jürgen, 2008: "Climate change and security", in: *Bulletin of the Atomic Scientists*, 64,2: 19-25.

Scheffran, Jürgen, 2008a: "Preventing Dangerous Climate Change", in: Grover, V.I. (Ed.): *Global Warming and Climate Chang*, 2 volumes (Enfield, NH: Science Publishers): 449-482.

Scheffran, Jürgen, 2008b: "The Complexity of Security", in: *Complexity*, 14,1: 13-21.

Scheffran, Jürgen, 2009: "The Gathering Storm - Is Climate Change a Security Threat?" in: *Security Index***,** 87,2 (Spring): 21-31.

Scheffran, Jürgen, 2010: "Assessing and Preventing Climate Conflicts and Security Risks", Paper presented in the Panel "Peace and Security in the Anthropocene", International Studies Association Convention, New Orleans, 17 February 2010.

Scheffran, Jürgen, 2011: "The Security Risks of Climate Change: Vulnerabilities, Threats, Conflicts and Strategies", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Mesjasz, Czeslaw; Grin, John; Kameri-Mbote, Patricia; Chourou, Béchir; Dunay, Pal; Birkmann, Jörn (Eds.): *Coping with Global Environmental Change, Disasters and Security*. Hexagon Series on Human and Environ-mental Security and Peace 5 (Berlin: Springer): 735-756.

Scheffran, Jürgen; Battaglini, Antonella, 2011: "Climate and conflicts: the security risks of global warming", in: *Regional Environmental Change*, 11,Supplement 1: S27-S39.

Scheffran, Jürgen; Brauch, Hans Günter, 2013: "Conflicts and Security Risks of Climate Change in the Mediterranean Region", in: Goffredo, Stefano; Dubinsky (Eds.): *The Mediterranean Sea: Its History and Present Challenges* (Dordrecht et al.: Sprigner).

Scheffran, Jürgen; Hannon, B., 2007: "From Complex Conflicts to Stable Cooperation", in: *Complexity*, 13,2: 78-91.

Scheffran, Jürgen; Jathe, Markus, 1996: "Modeling the Impact of the Greenhouse Effect on International Stability", in: Kopacek, Peter (Ed.): *Supplementary Ways for Improving International Stability 1995* (city: IFAC, Pergamon): 31-38.

Scheffran, Jürgen; Link, Peter Michael; Schilling, Janpeter, 2012: "Theories and Models of Climate-Security Interaction: Framework and Application to a Climate Hot Spot in North Africa", in: Scheffran, Jürgen; Brzoska, Michael; Brauch, Hans Günter; Link, Peter Michael; Schilling, Janpeter (Eds.): *Climate Change, Human Security and Violent Conflict: Challenges for Societal Stability* (Berlin et al.: Springer): 91-132.

Scheffran, Jürgen; Brzoska, Michael; Brauch, Hans Günter; Link, Peter Michael; Schilling, Janpeter (Eds.): *Climate Change, Human Security and Violent Conflict: Challenges for Societal Stability* (Berlin et al.: Springer)

Schilling, Janpeter; Scheffran, Jürgen; Link, P. Michael, 2010: "Climate Change and Land Use Conflicts in Northern Africa", in: *Nova Acta Leopoldina NF*, 112,384: 173-182.

Schnabel, Albrecht, 2007: "Climate Change, Human (In-)Security, and Stability". Paper presented at an international conference on Climate Change and Security, S. Rajaratnam School of International Studies, Nanyang Technological University and the Embassy of Switzerland in Singapore, 11-12 October.

Schnabel, Albrecht, 2007a: "Towards Systematic, Consultative, Feasible Early Warning Partnerships". Paper presented at the conference From Early Warning to Early Action: Developing the EU's Response to Crisis and Longer-term Threats, European Commission, Brussels, 12-13 November.

Schwartz, Peter; Randall, Doug, 2003, 2004: *An Abrupt Climate Change Scenario and Its Implications for United States National Security*, Contract study for the U.S. Department of Defense (Washington, D.C.: DoD, Net Assessment - Emeryville, CA: Global Business Network); at: <http://www.environmentalde-

fense.org/documents/3566_AbruptClimateChange.pdf> and at: <http://www.gbn.com/ ArticleDisplayServlet.srv?aid=26231>.
Sindico, Francesco, 2007: "Climate Change: A Security (Council) Issue?", in: *Carbon and Climate Law Review*, 1: 26-31; at: <http://ssrn.com/abstract=1013186>.
Smith, Dan; Vivekananda, Janani, 2007: *A Climate of Conflict: The Links Between Climate Change, Peace and War* (London: International Alert); at: <http://www.international-alert.org/publications/getdata.php?doctype=Pdf&id=322&docs=980>.
Smith, Dan; Vivekananda, Janani, 2008: *A Climate of Conflict* (Stockholm: SIDA); at: < http://www.sida.se/sida/jsp/sida.jsp?d=118&a=36114&language=en_US>.
Stern, Nicholas, 2006, 2007, [4]2008: *The Economics of Climate Change – The Stern Review* (Cambridge – New York: Cambridge University Press).
Stern, Nicholas, 2009: *The Global Deal. Climate Change and the Creation of a New Era of Progress and Prosperity* (New York: Public Affairs).
Tertrais, Bruno, 2011: "The climate wars myth", in: *The Washington Quarterly*, 34,3 (Summer): 17-29.
UN, 2007: "Security Council Holds First-Ever Debate on Impact of Climate Change on Peace, Security, Hearing over 50 Speakers, UN Security Council, 5663rd Meeting, 17 April 2007"; at: <http://www.un.org/News/Press/docs/2007/sc9000.doc.htm>.
UN, 2009: "Climate change and its possible security implications". Resolution adopted by the General Assembly, A/RES/63/281 (New York: United Nations General Assembly, 11 June).
UN, 2009a: *Climate change and its possible security implications. Report of the Secretary-General*. A/64/350 of 11 September 2009 (New York: United Nations).
UN, 2010: *Human Security - Report of the Secretary-General.* A/64/701 of 8 May 2010 (New York: United Nations).
UNDP, 2007: *Human Development Report 2007/2008: Fighting climate change: Human solidarity in a divided world* (New York: UNDP; New York - Oxford: Oxford University Press),
UNSG, 2009a: *Climate change and its possible security implications. Report of the Secretary-General*. A/64/350 of 11 September 2009 (New York: United Nations).
UNSG, 2010: *Human Security - Report of the Secretary-General.* A/64/701 of 8 May 2010 (New York: United Nations).
UNSG [Secretary-General], 2012: *Follow-up to General Assembly resolution 64/291 on human security. Report of the Secretary-General* A/66/763 (5 April 2012).
Von Falkenhayn, Louise; Rechkemmer, Andreas; Young, Oran R., 2011: "The International Human Dimensions Programme on Global Evnironmental Chgange – Taking Stock and Moving Forward", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Mesjasz, Czeslaw; Grin, John; Kameri-Mbote, Patricia; Chourou, Béchir; Dunay, Pal; Birkmann, Jörn (Eds.), 2011: *Coping with Global Environmental Change, Disasters and Security – Threats, Challenges, Vulnerabilities and Risks* . Hexagon Series on Human and Environmental Security and Peace, vol. 5 (Berlin – Heidelberg – New York: Springer-Verlag): 1221-1234.
Wæver, Ole, 1995: "Securitization and Desecuritization", in: Lipschutz, Ronnie D. (Ed.): *On Security* (New York: Columbia University Press): 46-86.
Wæver, Ole, 1997: *Concepts of Security* (Copenhagen: Department of Political Science).
Waever, Ole, 2008: "Peace and Security: Two Evolving Concepts and their Changing Relationship", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Mesjasz, Czeslaw; Grin, John; Dunay, Pal; Behera, Navnita Chadha; Chourou, Béchir; Kameri-Mbote, Patricia; Liotta, P.H. (Eds.): *Globalization and Environmental Challenges: Reconceptualizing Security in the 21st Century* (Berlin – Heidelberg – New York: Springer-Verlag): 99-111.
Walther, Bruno A.; Larigauderie, Anne; Loreau, Michel, 2011: "DIVERSITAS: Biodiversity Science Integrating Research and Policy for Human Wll-Bewing", in: Brauch, Hans Günter; Oswald Spring, Úrsula; Mesjasz, Czeslaw; Grin, John; Kameri-Mbote, Patricia; Chourou, Béchir; Dunay, Pal; Birkmann, Jörn (Eds.), 2011: *Coping with Global Environmental Change, Disasters and Security – Threats, Challenges, Vulnerabilities and Risks* . Hexagon Series on Human and Environmental Security and Peace, vol. 5 (Berlin – Heidelberg – New York: Springer-Verlag): 1235-1248.
WBGU, 2007: *Welt im Wandel – Sicherheitsrisiko Klimawandel* (Berlin – Heidelberg: Springer-Verlag).
WBGU, 2008: *World in Transition – Climate Change as a Security Risk* (London: Earthscan); at: < http://www.wbgu.de/wbgu_jg2007_engl.html >.
WBGU, 2011**:** *World in Transition – A Social Contract for Sustainability* (Berlin: German Advisory Council on Global Change, July 2011); at: <http://www.wbgu.de/fileadmin/templates/dateien/ veroeffentlichungen/ hauptgutachten/jg2011/wbgu_jg2011_kurz_en.pdf>.
Welzer, Harald 2008: *Klimakriege. Wofür im 21. Jahrhundert getötet wird* (Berlin: S. Fischer).
Wisner, Ben; Fordham, Maureen; Kelman, Ilan; Johnston, Barbara Rose; Simon, David; Lavell, Allan; Brauch, Hans Günter**;** Oswald Spring, Ursula**;** Wilches-Chaux, Gustavo**;** Moench, Marcus; Weiner, Daniel, 2007: *Policy Memorandum by Scientists regarding the UN Security Council's first discussion on Climate Change**:** Climate Change and Human Security*, 15 April 2007**;** at: <http://www.afes-press.de/pdf/ClimateChange_ and_HumanSe-curity.pdf>.