Regional Security Implications of Climate Change

A Synopsis

Achim Maas
Dennis Tänzler

January 2009

Regional Security Implications of Climate Change
A Synopsis

Conducted for DG External Relations of the European Commission under a contract for the German Ministry for the Environment, Nature Protection and Nuclear Safety

Achim Maas
Dennis Tänzler

January 2009

Adelphi Consult GmbH
Caspar-Theyß-Straße 14a
D – 14193 Berlin

Fon +49-30-8900068-0
Fax +49-30-8900068-10
E-Mail office@adelphi-consult.com
Internet www.adelphi-consult.com

© Adelphi Consult 2002-2009

Table of Contents

Maps

List of Abbreviations

CIA	Central Intelligence Agency
DPKO	Department of Peacekeeping Operations
IPCC	Intergovernmental Panel on Climate Change
LAC	Latin America and the Caribbean
MDG	Millennium Development Goal
MENA	Middle East and North Africa
NIC	National Intelligence Council
SCO	Shanghai Cooperation Organisation
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNPD	United Nations Population Division
WBGU	Wissenschaftlicher Beirat Globale Umweltveränderung

Regional Security Implications of Climate Change: A Synopsis[1]

This paper is a synopsis of a broad range of studies that have been conducted over the past years on the regional security implications of climate change. The synopsis has been commissioned by the Directorate-General External Relations of the European Commission and funded by the German Federal Ministry for the Environment, Nature Protection and Reactor Safety in the context of the EU Roadmap process on climate change and international security. The purpose of the synopsis is to summarise the findings of these studies in order to identify remaining knowledge gaps regarding the security implications of climate change on a regional level, which need to be filled in by additional regional scenarios and studies.

This synopsis, along with the regional profiles on Africa, the Middle East and Central Asia produced by the Council Secretariat and submitted to the Policy and Security Committee in December 2008, will serve as input documents for the above-mentioned scenarios and the EU Roadmap as a whole.

Among others, the following studies have featured prominently in the climate change and security discourse:

The overwhelming majority of the studies focused on developing countries. Their overall findings can be summarised as follows:

- Existing conflict zones are likely to persist and to widen in geographic scope and intensity. This includes particularly the belt of fragility in the Sahel and Sub-Sahara **Africa**. Current efforts in peacekeeping, humanitarian relief and development work will likely continue or be up-scaled.

1 The authors would like to thank Irina Comardicea for editorial support.

- Social frictions will negatively impact state-society relations in **Asia**, the **Middle East and North Africa (MENA)** and **Central Asia**. Coupled with a likelihood of increasing shocks resulting from disasters, this could accelerate state failure processes, such as in Pakistan. Regional instability particularly in **South and East Asia** can have global repercussions due to the increasing role of Asian states in the global economy.
- In the long run, even more stable states such as those in **Latin America and the Caribbean (LAC)** and **Southern Africa** can face difficulties from increasing local conflicts over natural resources, particular water. Coupled with converging development trends, this could significantly destabilize states over time.
- Finally, **MENA** as well as the post-Soviet space (**Central Asia**, **South Caucasus**) are geopolitically charged regions. In addition, the increasingly ice-free **Arctic** is gaining more and more geostrategic importance due to so far large untapped hydrocarbon reserves and other natural resources. Instability and crisis in these regions can trigger interventions by regional and global powers who feel their interests threatened, further adding to the complexity of the situation. In turn, geopolitical conflicts can have negative impacts on almost all regions by impairing international efforts on adaptation and mitigation.

Most of the studies that serve as background for this synopsis use the trends described in the Intergovernmental Panel on Climate Change (IPCC) 4th assessment report as a baseline. The IPCC outlines average or median trends in climate change and includes only limited potential future adaptation strategies. Even with these average trends, however, the security implications of climate change are significant.

Most of the studies fall in one of the following two categories:

First, global or regional studies: These studies are mostly desk-based and focus on outlining plausible, narrative scenarios for different regions in the world. Despite the variance, most studies come to similar conclusions: Climate change is likely to be a threat multiplier which – through repeated stresses – can erode socio-economic foundations, state institutions and finally stability. These studies are helpful in highlighting threatened regions and outlining the complexities, interactions and feedback loops of climate change and their general political ramifications. Also, they support keeping climate change high on the agenda and argue that climate change is a process where distant events can have local repercussions. However, for programming purposes, the scope of the studies is too wide to provide concrete activities and to operationalise them for country-level roadmap development.

Second, sub-regional and national studies: A number of country-centred studies were published, many for them in Africa and particularly by development organisations such as CARE and Oxfam. This includes also a number of scientific studies, analysing for instance country rainfall patterns and occurrence of conflict. They are much more concrete and highlight country-specific risks and opportunities including potentials of key actors (e.g. ministries, civil society) to become involved. Also, they often include participatory elements such as community workshops and thereby contribute to awareness raising, ownership and empowerment of local people with regard to climate change. Many studies suggest that communities may be more adaptable than global studies suggest, as climate variability and extreme weather

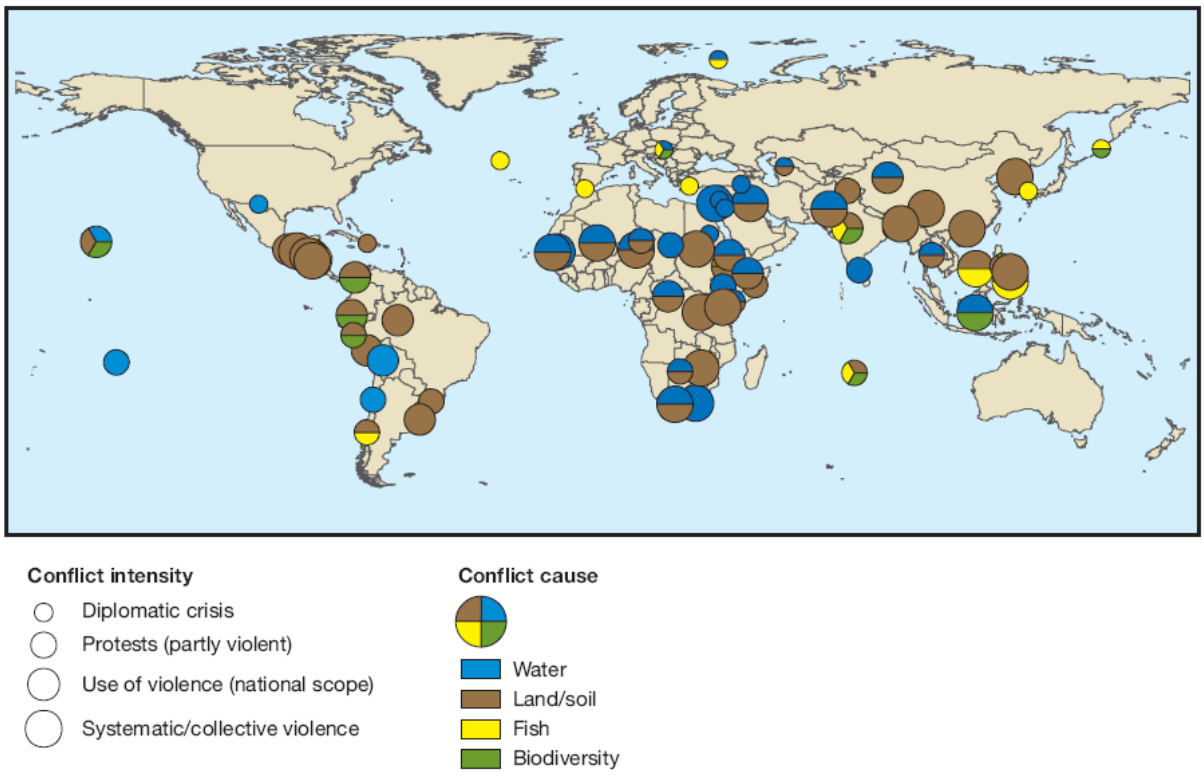
events are already a fact of life in many areas of the world. Still, a lack of capacities to anticipate impacts of climate change and prepare for socio-economic consequences (changes in agricultural production, disaster preparedness, etc.) is still a major issue particularly in developing countries.

The studies differ significantly in scope, methodology, geographical focus and target audience. Nevertheless, they agree that climate change in itself will not be a cause of conflict. Instead, climate change will likely produce knock-on effects, which may catalyse processes leading to tensions and eroding institutions. Additionally, unequal and inequitable distribution of opportunities to access and utilise natural resources between different social groups – which can become exacerbated by climate change – can be an important trigger and driving force of conflict.

This synopsis does not aim to re-iterate the detailed assessments that have been conducted elsewhere, i.e. outlining in detail the estimated percent change in precipitation, change above or below global average temperature or sea-level rise. While such data will be provided were appropriate, overviews will be structured as follows:

- **Climate change trends:** The basic general climate change trends for a region, with particular focus on water, agricultural production and natural disasters are summarized. Known regional deviations from main trends will be included where appropriate. However, many trends and impacts on national and sub-national levels are still unknown and can only be estimated based on observations for neighbouring regions.
- **Converging developments:** Describes briefly the current socio-economic trends that converge with the impacts of climate change and that could exacerbate potential tensions further. These trends include among others population growth, urbanisation, and increasing resource demands.
- **Security implications:** Climate change is first and foremost a challenge for development and individual or human security, which could halt or reverse developmental achievements and threaten livelihoods (United Nations Development Program, UNDP 2007). Going one step further, this section will describe potential impacts of climate change on the existing (armed) conflicts and unstable regions or the potential for emerging conflicts and zones of turmoil. It also highlights, where appropriate, a history of environmental conflicts: Conflicts over renewable resources that may be exacerbated either through natural processes of climate change and/or unsustainable management of natural resources (from Carius et al. 2006: 14, see Map 1).

Map 1: Environmental Conflicts 1980-2005



Source: Wissenschaftlicher Beirat Globale Umweltveränderung (WBGU) 2007 and Carius et al. 2006

Middle East and North Africa[2]

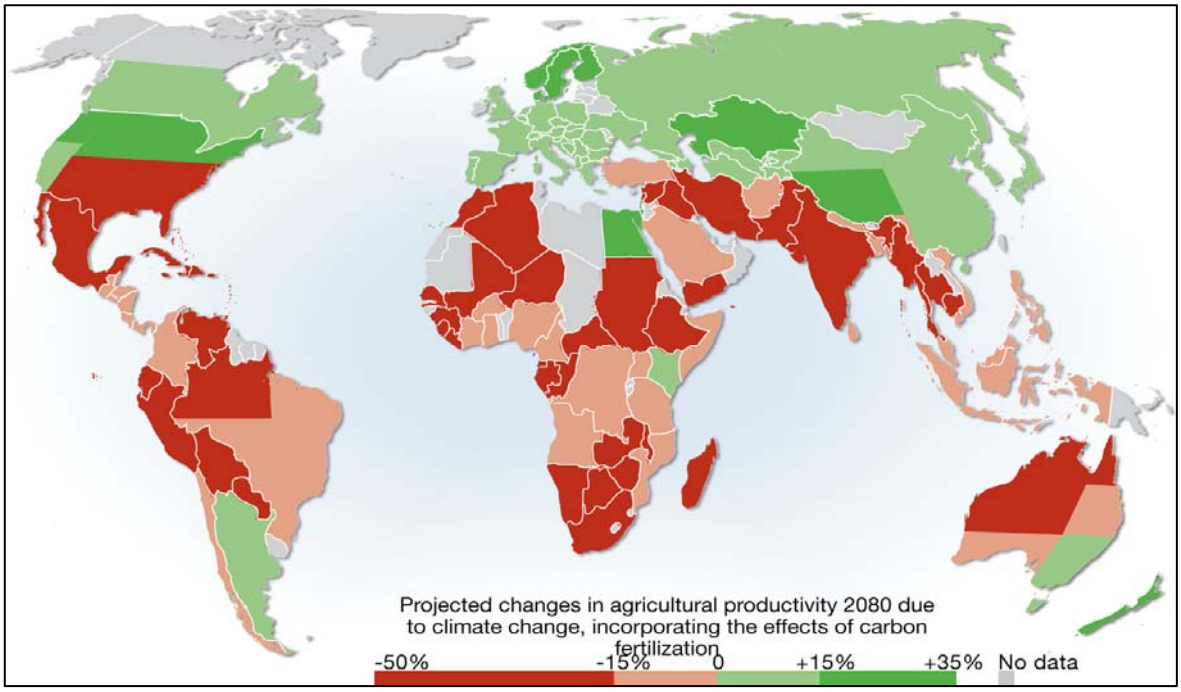
In the **Middle East and North Africa**, climate change impacts will converge with socio-economic processes leading to water and food scarcity, resulting in decreasing employment opportunities and potential economic downturns. As a region already suffering from a number of geopolitical, international and internal conflicts, climate change is likely to worsen divisions, particularly those running along social divisions and unequal wealth distribution and resource access. Crisis events such as sudden food shortages may trigger violent riots and – if left unaddressed – could destabilise states and increase public support for extremist groups offering viable alternatives. Given the geopolitical currents in MENA, this could have global repercussions.

Climate change trends: The Middle East and North Africa (MENA) is likely to be more heavily impacted by climate change trends than the global average, particularly in regional warming. The MENA region is already suffering from physical water scarcity. Climate change will further exacerbate this in the near future, with less precipitation and increased drought frequencies and heat waves. Agricultural productivity is likely to change and decrease

2 Defined here as including Morocco, Algeria, Tunisia, Libya, Egypt, Israel, the Palestinian territories, Lebanon, Syria, Jordan Saudi Arabia, the United Arab Emirates, Qatar, Yemen, Bahrain, Oman, Kuwait, Iraq and Iran.

significantly in most parts of the region, even in the case of carbon fertilisation[3] (see Map 2). Populations are mostly concentrated in coastal regions, making them vulnerable to sea-level rise and storm surges. The Nile-delta is among the most threatened areas, with sea-level rise potentially displacing millions (Freimuth et al. 2007).

Map 2: Change in Agricultural Productivity until 2080



Source: http://maps.grida.no/go/graphic/projected-agriculture-in-2080-due-to-climate-change (10 December 2008).

Converging developments: Both population and economic growth are occuring in the region and further exacerbate existing scarcities. Beyond this, the two major sources of wealth, income and employment in the MENA region, oil and agriculture, will diminish: On the one hand, oil revenues are likely to decrease and may in the long-term even cease sometime during this century. On the other hand and more in the short- to mid-term, climate change will likely decrease agricultural output due to heat stress and reduced available water. Agriculture is highly water-inefficient in the region, resulting in preventable scarcities (Carius et al. 2008). At the same time, MENA's average population is young and will continue that trend for the next few decades. This will put substantial pressure on the labour market.

Security implications: The expected conflict constellations for the MENA region are unlikely to be novel situations: The entire region has suffered from state fragility and civil conflict, in one form or another, over the past decades. Access to, and control of, natural resources, particularly water, has been a part of these conflicts. The question now asks when the combination of converging climate and socio-economic trends will reach critical thresholds, catalysing processes that lead to state fragility. The countries themselves are often run by authoritarian regimes with limited accountability, and suffer from deficits in delivering social services. The latter has, among others, resulted in increased sympathy for Islamist

3 Given that plants consume carbon dioxide, higher available concentrations of CO_2 can actually increase agricultural production within certain limits (IPCC 2007:282).

organisations, which have stepped in where governments have failed – and which in turn has aroused suspicion of governments, leading in many instances to repressive actions.

The global food crisis in 2008 witnessed riots in the Maghreb region. With agricultural production likely to decrease in the region, dependency on food imports will increase and the impact of price hikes will be felt more drastically. In the future, riots could increase in size and scope. Popular discontent could be channelled by extremist groups, which in turn could result in further repressive actions by governments.

The MENA region is charged with geopolitical tensions. Through the Israel-Palestinian conflict, the lingering crisis in Iraq, the conflict over Iran's nuclear program, active terrorist networks, and the legacy of the "war on terror", a great variety of different actors are active in a region that is a close neighbour of the European Union. Violent escalations can thus quickly impact other regions as well.

Furthermore, aside from localised water conflicts, water remains one of the key unresolved issues in the Israeli-Palestinian conflict. While there have been efforts to use joint water management as a pathway for cooperation and peacebuilding, most successes were on the technical level, without much spill-over to the political level (Kramer 2008). The development of nuclear power in the region – potentially under the umbrella of climate change adaptation – could trigger a series of nuclear energy programs, significantly increasing threats of proliferation (National Intelligence Council, NIC 2008).

Africa[4]

Climate change will negatively impact **Africa** and will likely stall or reverse development progress made towards achieving the Millennium Development Goals. The belt of fragility running along the Sahel zone from West to East Africa will likely be re-enforced and potentially widened by climate change. It will continue to require significant international resources for humanitarian aid and peacekeeping. Additionally, at present relatively stable states such as South Africa may experience instability if the pressures induced by climate change are not managed adequately.

Climate change trends: Overall, Africa will be negatively affected by climate change. Even with carbon fertilisation, increased heat and water stress will reduce agricultural productivity significantly. Additionally, aside from increasing water stress, the severity of droughts will increase all over Africa and in particular in west and southern Africa (UNDP 2007: 92).

Regional variation of impacts is significant and current results contradict each other on occasion. Regarding rainfall patterns in the Sahel, for example, studies have come to very different, partly contradicting conclusions (see IPCC 2007; Carius et al. 2008). This makes it difficult to formulate concrete predictions for individual countries or identify potential (sub-) regional hot spots.

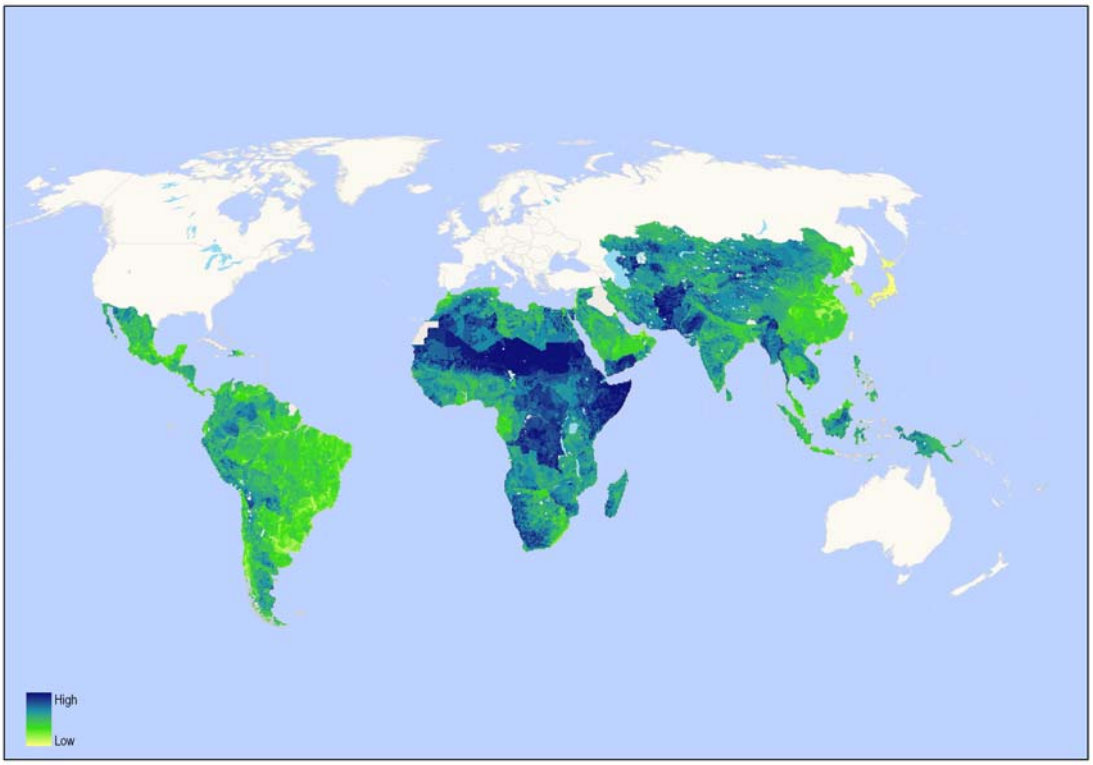
For populations living in costal areas, sea-level rise combined with coastal erosion resulting from urbanisation, increases their short-term vulnerability for weather related disasters and may lead to displacement in the long-term, due to permanent flooding and ground water

4 Excluding MENA countries.

salinisation. Independent of the actual climate trends, human vulnerability towards hazards and related issues is particularly high in the Sahel and Sub-Sahel zones, creating a fragile belt stretching from Senegal in the west to Somalia in the east (see Map 3). Thus, even moderate or limited climate change can present a severe challenge for this area.

Converging developments: The population of Africa is rapidly growing and urbanising for the foreseeable future. Its demand for resources will continue, and increase, as well. By and large, Africa is lagging behind Asian countries such as India and China regarding economic development. It is also significantly behind schedule regarding the Millennium Development Goals (MDGs) (see Martens 2007).

Map 3: Global Human Vulnerability[5]



Source: Earhart and Thow 2008

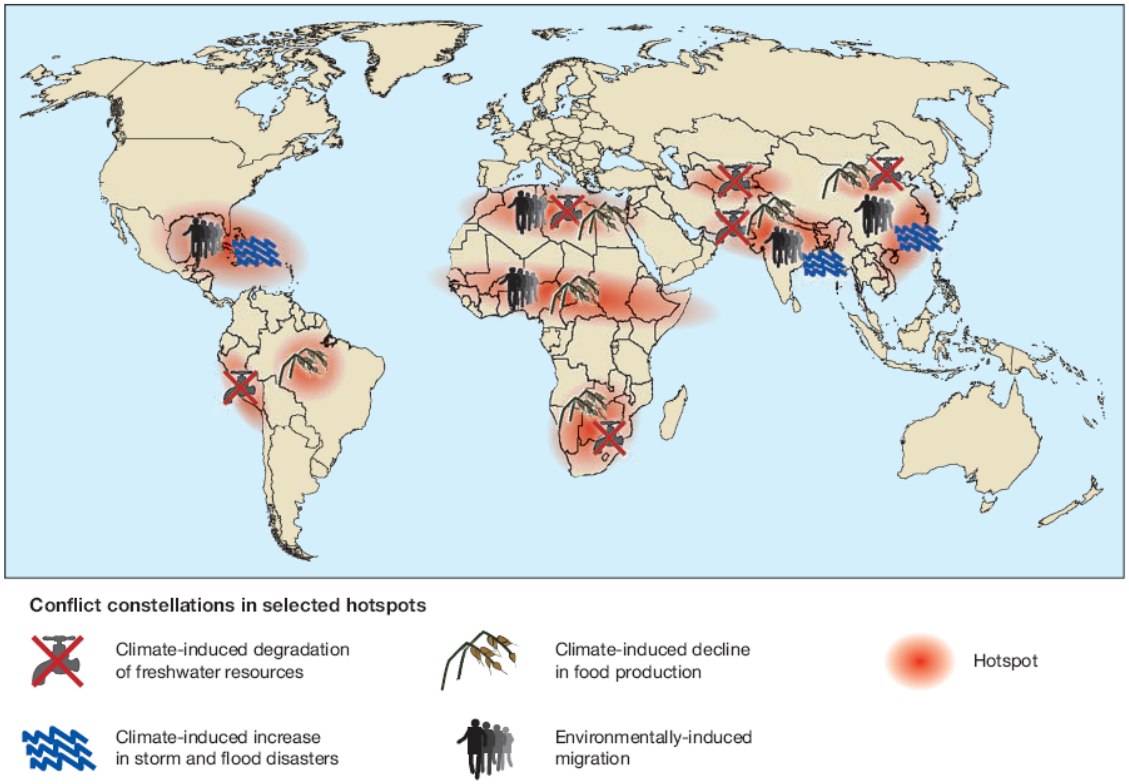
Most African states, however, already face difficulties or fail to deliver basic services, while economic development can hardly substitute by providing the necessary funds. External food aid is likely to continue or increase for the foreseeable future. The richness of Africa's natural resources will continue to draw external attention. Thus, globally increasing resource demands could manifest themselves in a scramble for Africa as international powers and companies attempt to secure supplies. In addition, many countries have large parts of their population concentrated in coastal areas, e.g. Nigeria, Ghana, Kenya and Somalia, a trend that is likely to continue due to increasing urbanisation.

5 In this map, "human vulnerability [is defined as] a combination of natural, human, social, financial and physical factors. Areas shown in darkest blue are likely to be most at risk if exposed to extreme weather, such as floods, cyclones and droughts, or other impacts of climate change. They are also those areas most vulnerable if exposed to other humanitarian hazards – earthquakes for example." (Earhart and Thow 2008: 5).

Security implications: Some of the most tragic events in recent history, such as the genocide in Rwanda, have been linked to questions of land. The conflicts in Darfur and Sudan also have a strong environmental element, with degradation and scarcity of resources as key underlying factors. This situation can be further exacerbated by climate change (see United Nations Environment Program, UNEP 2007). However, as West African examples show, such as Ghana and Burkina Faso, scarcity does not necessarily lead to violence. In fact, adaptation strategies to a changing climate have long been a part of life in Africa (Brown and Crawford 2008).

The continent however, has experienced several major environmental conflicts in the past decades, particularly in the Sahel and Sub-Sahel belt stretching to the Horn of Africa (see Map 1). Strikingly, this belt coincides with the most vulnerable region in Africa (see Map 3), and is prone to a number of potential climate-induced conflict constellations (see Map 4).

Map 4: Conflict Constellations induced by Climate Change



Source: WBGU 2007

Bearing these convergences in mind, it can be inferred that those regions currently suffering from chronic instability will do so also in the future, as climate change will diminish opportunities for pursuing a number of livelihood strategies, especially agriculture. Beyond continued instability, the Sahel region is likely to shift southwards due to desertification, thus placing increased pressures on adjacent countries, including those still in post-conflict stages or struggling with armed insurgencies (e.g. Sierra Leone, Liberia, Nigeria, Uganda, Central African Republic, the Democratic Republic of Congo). Finally, southern Africa faces specific waster-related challenges. Furthermore, the early 2008 riots in South Africa have shown that frustration can discharge violently even in more stable states. Increasing stress levels and inequalities of resource access could further exacerbate social tensions.

From a global perspective, the continuing instability in areas such as the Horn of Africa can continue to impact trade and shipping routes. Furthermore, out-migration from Africa toward other areas may become a concern, especially for host communities and the routes used for transit. The chronic instability in the Sahel belt will continue requiring international humanitarian assistance. And, as mentioned above, the resource richness of Africa provides continuous incentives for external powers to become involved in local affairs, complicating the political situation further.

Militant stands against environmental degradation have already begun in Africa. Armed insurgencies in Nigeria, for example, are fighting governmental forces and attacking oil installations, among other reasons due to the environmental havoc oil drilling produces in the Niger delta. On the other side of the continent pirates along the Horn of Africa are justifying their attacks in part with preserving Somalia's natural richness. While the extent to which this is truly a main driver behind their attacks is questionable, it has substance and justifies their actions at least partly in the eyes of their constituencies and sympathisers (see cf. Middleton 2008).

Latin America and the Caribbean

Latin America and the Caribbean is as yet relatively stable and less vulnerable than other regions in the world. Still, climate change will likely have significant impacts particularly on agriculture and glacier melting rates will threaten the water supply for millions of people. Violence is likely to remain limited to the intra-state level, but disputes over land and wealth sharing will likely increase, triggering social unrest that may destabilise and possibly disable states.

Climate change trends: Latin America and the Caribbean (LAC) will largely follow the global mean trends with regard to warming, but with strong regional variations. A warming of 1°C, which against current emission trends will be nearly impossible to avoid, will result in the disappearance of Andean glaciers, affecting the water supply of 50 million people, especially in Peru. Agricultural productivity is estimated to fall significantly in most parts of LAC, even taking into account carbon fertilisation (see Map 2). The Caribbean in particular will be vulnerable to extreme weather events increasing in frequency and size, coastal erosion and sea-level rise. Countries such as Haiti are already suffering from great environmental stress. Additionally, coastal megacities such as Sao Paolo and Rio de Janeiro will become more vulnerable to climate change. In contrast to other regions, however, LAC's overall vulnerability to climate change is comparatively low (see Map 3).

Converging developments: Similar to other regions, LAC's population will continue to grow and rapidly urbanise, increasing the risks for infectious diseases and vulnerability to disasters. The recent years have seen an upsurge in biofuel production, which could worsen land-use competition, further exacerbated by climate change. Non-sustainable resource management, soil degradation and groundwater pollution may also add to the impacts of climate change (Wissenschaftlicher Beirat Globale Umweltveränderung, WBGU 2007).

Security implications: Currently, the risk of large-scale armed violence prevails only in Colombia and Haiti. The latter, however, has an extremely degraded resource base that is further threatened by climate change and population growth. The inequitable distribution of

wealth and land has led to a number of environmental conflicts (see Map 1). The number, frequency and scope of such conflicts could increase due to climate change. Where states have lost control over some parts under their authority, especially city districts and urban sprawls, criminal gangs have attained de facto control (Carius et al. 2008). The culmination of social unrest triggering state fragility is the most likely cause of future insecurities. From a global perspective, however, potential climate-induced conflicts in LAC are likely to have more regional than global repercussions.

Asia and the Pacific

Climate change will impact, mostly negatively, the lives of several billion people in **Asia and the Pacific** within the next decades – a trend to which are added population growth, economic development, and urbanisation among others. Militarised international disputes, insurgencies, terrorist attacks and social protests are common throughout the region. Escalatory potential is high and could quickly reach the international level. Due to the increasingly important role that countries in the region, especially China and India, are playing globally, a major crisis would be disastrous on a global scale.

Climate change trends: South and South East Asia are warming up faster than the global average, likely resulting in more frequent and powerful extreme weather events, fuelling salinisation particularly in low-lying coastal areas. Even moderate sea-level rise of 30 cm will adversely affect 40 percent of Asia's population. Bangladesh's coastal regions are ranked among the regions most vulnerable to climate change impacts. Additionally, tsunamis could have much more disastrous impacts due to sea-level rises. The small island states in the deep Pacific, and countries such as Indonesia will be particularly threatened and vulnerable. Evacuation programs to resettle affected populations have already begun (Luetz 2008). Food production is likely to decrease significantly over the coming decades, even in best-case scenarios, due to the exhaustion of available cropland already occurring. Finally, the melting of glaciers in the Himalaya will first result in a significant increase of water flows only to give rise to water scarcity subsequently, threatening the livelihoods of several hundred million people.

Converging developments: Several countries in Asia are particularly vulnerable to climate change and related events, specifically Afghanistan, Myanmar and large parts of Pakistan and South West China (see Map 3). The majority of Asia's population and economic centres – especially in India and China, as well as Pakistan, Thailand, Indonesia and the Philippines – are located close to coastal areas. Intra-national rural-urban migration towards these centres is likely to continue, increasing their vulnerability due to deficits in urban governance. Demand for resources and energy, stemming from economic development and changes in lifestyle (cf. WBGU 2007), will put further pressure not only on regional, but global markets. Despite rapid economic growth, agriculture is and will likely remain the major source of income and employment for the foreseeable future: In China 43 percent, and in India 60 percent of the work force is active in the agricultural sector (Central Intelligence Agency, CIA 2008).

Security implications: While interstate war and state collapse is currently largely absent from Asia, militarised disputes and tensions persist. Key elements are the three active

nuclear weapon powers (Pakistan, India, and China), whose strategic considerations co-evolve and are furthermore impacted by global dynamics stemming from rivalries with the USA and Russia (cf. Maas and Schirmbeck 2006). A major disaster in Pakistan, resulting for example from a Katrina-like event impacting its coastal regions, particularly Karachi, could trigger major internal upheaval and external interventions. Already, several Pakistani provinces are effectively outside of governmental control (cf. WBGU 2007; Smith and Vivekanada 2007; Carius et al. 2008).

Armed conflict, insurgencies and terrorist activities are present in a variety of countries. In the case of Sri Lanka, the tsunami in 2004 and subsequently ill-executed humanitarian aid has fanned the ongoing armed conflict (Chafé and Renner 2007). The region has also been impacted by several environmental conflicts in the past two decades (Carius et al. 2006, see Map 1). Furthermore, China in particular has been home to numerous social protests, many relating to environmental degradation (WBGU 2007).

From a global perspective, interstate escalations of tensions in the region would be disastrous: The use of a nuclear weapon could substantially reduce global moral thresholds against subsequent use and trigger global arms races (cf. NIC 2008, Campbell et al. 2007). Even without weapons of mass destruction, China, India and other states in the region have become corner stones of globalisation: Any serious destabilisation would have global repercussions. In case of China the relative stability is partly based on its continued economic growth; a combination of aftershocks of the world financial crisis coupled with economic loss induced by climate change – e.g. via disasters – and unequal access to resources could fuel domestic ethno-political conflicts and social strife (WBGU 2007).

Finally, India, Pakistan and Bangladesh have been major troop suppliers of international peacekeeping forces over the past decades. As of October 2008, the three countries together contributed nearly 30,000 soldiers and police officers – a third of the forces currently employed as UN peacekeepers (Department of Peacekeeping Operations, DPKO 2008). Should this contingent substantially decrease, this could cause a major global blue helmet shortage.

Central Asia and the South Caucasus[6]

Both **Central Asia and the South Caucasus** are likely to be significantly impacted by climate change, resulting in socio-economic stresses. In Central Asia, this could result in strained state-society relations and more exacerbated regional and international tensions, particularly over water. In the South Caucasus it could negatively impact the resolution of existing conflicts. Both regions are of geo-strategic relevance for Russia, Europe, the USA (both) and China (Central Asia), thus escalations in either region could draw the involvement of major global powers. Global conflicts could, in turn, adversely affect the region as well, diminishing capacities for adapting to climate change.

6 In context of this paper, Central Asia includes Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan and the South Caucasus includes Armenia, Azerbaijan and Georgia including the break-away regions (Abkhazia and South Ossetia in Georgia, Nagorny Karabakh in Azerbaijan).

Climate change trends: Central Asia will likely suffer from higher than global average temperature increase, resulting in water shortages and decreased food production. Glacier melting will further exacerbate this in the long-term. The decrease in available water will accelerate soil erosion and thus increase the amount and severity of sand storms. Due to soil pollution, the latter can adversely impact public health, in addition to infrastructure damage. In addition, decreasing water availability will also negatively affect the capacities for hydropower production in the long-term.

On the South Caucasus, the IPCC remains largely silent: There is little concrete data available except for global studies addressing either (eastern) Europe or (western) Asia. However, it can be inferred that glacial melting will, in the long run, decrease water availability in the region and increase water stress. Furthermore, desertification and soil degradation will increase, reducing agricultural productivity in the region. Finally, sea-level rise and surge-driven flooding will be become substantial challenges for both Azerbaijan and Georgia.

Converging developments: The Central Asian population is young and continues to grow rapidly in the region. A significant part of the population (32-67 percent) is employed in the agricultural sector in each country, with water-intensive cotton being one of the major goods produced (CIA 2008). Poverty remains widespread in the region and work-related migration to Russia is common, while wealth is mostly concentrated in small elites in all countries. Current and historical industrial pollution remains an environmental threat. The dried-up Aral Sea is a reminder for the consequences of severe transboundary environmental degradation (Carius et al. 2003). Additionally, hydropower is a key source of electricity in the region, and will continue to increase due to economic development. Kyrgyzstan and Tajikistan, in particular rely on hydropower and aim at expanding the capacities, while the downstream countries need the water for irrigation and argue against the building of new hydropower infrastructure.

In the South Caucasus, economic development has soared in recent years, but has mostly been concentrated in a small number of areas, particularly the capitals. The vast majority of the population in the three countries is employed in the agricultural sector. Population, however, has experienced decreasing growth rates and is expected to shrink until 2050 by 20-30 percent in Armenia and Georgia if present trends continue, while staying roughly stable in Azerbaijan (United Nations Population Database, UNPD 2008). Still, due to increasing living standards and still largely unsustainable development patterns (cf. Wittich and Maas forthcoming), resource pressures are likely to be only less pronounced but not entirely absent.

Security implications: Central Asian countries have kept good relations or improved ties to a variety of global powers, including Russia, China, the USA and the European Union. On a regional level, however, countries are hesitant to cooperate, while tensions over access to water is simmering particular between up- and downstream countries.

In addition the countries themselves are moreover ethnically highly diverse, and conflicts over water and land on a local level have occurred in the past (Giese and Sehring 2007). Grievances resulting from inequitable wealth sharing, corruption, governmental inefficiency and a lack of popular legitimacy have already spurned social protests. The inability to cope

with the challenges posed by climate change and resulting livelihood insecurity could fuel social protests turning into violent uprisings.

In case of the South Caucasus, the situation is different. Against the background of the above-outlined trends, it is likely that pressures on natural resources may even decrease on the national level. On the international level, decreased run-off in the Kura-Araks river basin will mostly affect Azerbaijan as a downstream country. The pollution of the river is already straining the difficult relations between Azerbaijan and Armenia.

A number or manifest and unresolved conflicts remain in the South Caucasus. As the war in Georgia in August 2008 has shown, escalation could happen quickly and draw in global powers. Finally, the South Caucasus could become a major transit corridor for environment-related migrations from Asia to Europe (Wittich et al. 2008). However, regarding the unresolved conflicts, environmental change is less likely to become a direct factor of conflict; more likely, leaders may employ warmongering rhetoric to deflect attention from domestic tensions that could, in turn, result from the socio-economic impacts of climate change.

From a global perspective, the role of Central Asia as energy supplier and the South Caucasus as transit corridor for goods and energy resources make both regions vital for Europe. Both are part of what Russia considers its 'near abroad', while the USA considers both of strategic importance. In addition, the neighbourhood to the prevailing conflict in Afghanistan contributes to the overall sensitivity of the region. Geopolitical conflicts between Russia, the EU and the USA could thus on the one hand adversely impact the region and its ability to adapt to climate change, if these priorities are forsaken in favour of other strategic interests such as energy security. On the other hand conflicts emerging in the region, over access to water for example, can impact strategic relations between great powers and trigger external intervention; in case of the non-violent and limited uprisings of March 2005 in Kyrgyzstan, members of the Shanghai Cooperation Organisation (SCO) already discussed militarily intervention (Haas 2007: 14).

Arctic

The thawing of the **Arctic** is creating a novel situation, as for the first time in modern history cargo shipping through the Artic becomes a viable option. The situation as well as the large untapped natural resources of the Artic, makes the region increasingly attractive for its immediate neighbours. As a result competing territorial claims are emerging. While overall relations between neighbours are relatively stable, they are not without tensions and disputes over use of the Arctic could ensue.

Climate change trends: The Arctic is warming far quicker than the global average. Ice melting has accelerated and if current trends continue, the Arctic will allow shipping through summer months and soon maybe throughout the year. Simultaneously, the drastic change in the Arctic climate will have severe implications for its ecosystem, most likely leading to species extinction and other distortions. In addition, transport through an ice-free but nevertheless adverse Northwest Passage will increase the danger of accidents with catastrophic environmental impacts.

Converging developments: Reduced time and costs for shipping goods from Europe to Asia is making an ice-free Arctic attractive. The persisting threat of piracy in the Gulf of Aden and the Strait of Malacca provides additional reasons why shipping lanes from Europe to Asia should be shifted to the Arctic. Globally rising demands in natural resources, including fossil fuels for the foreseeable future, also point to the Arctic for resource exploitation. According to surveys, up to 25 percent of the planet's undiscovered oil and gas could be located in the Arctic. Furthermore, the Artic is estimated to hold significant amounts of gold, silver, diamonds and other precious resources (Crawford et al. 2008: 5). Finally, living conditions in the regions adjacent to the Arctic (northern Canada, Greenland, and northern Russia) will increase, thus making the region an attractive settlement area.

Security implications: The number of states directly involved in Artic affairs is relatively small so far. The “Arctic region” includes the Arctic Ocean and territories of the eight Arctic states: Canada, Denmark (including Greenland), Finland, Iceland, Norway, Russia, Sweden and the United States. As all of them are relatively stable states, the warming of the Artic is unlikely to cause major social frictions. However, the warming climate will likely have far-reaching consequences for the populations accustomed to the Artic, such as the indigenous populations of Greenland and Northern Canada. If their concerns are left unaddressed, grievances could develop and transform into organised protests.

Interstate tensions, however, can not be ruled out. In the so-called “Turbot war” in 1996 Canadian warships fired warning shots to Spanish trawlers fishing just outside of Canadian waters (Brown et al. 2008: 9). Canada already pointed out that an ice-free Northwest Passage as the shipping route through Canada’s Arctic represents internal waters. In contrast, other countries such as the United States argue that these waters constitute an international strait. In 2006 Canada announced the ordering of up to eight military icebreaker patrol ships as well as the intention to build a new naval base to defend sovereignty in the Arctic.

A race for the Artic and its resources is therefore likely to cause tensions, particularly if political events and crises in other parts of the world spill over into Arctic relations (cf. Crawford et al. 2008). However, for the time being territorial claims of the Arctic countries beyond the continental shelf that goes out to 200 nautical miles will be determined under the International Convention on the Law of the Sea. While the risk of military escalations may be low, it would be all the more disastrous due to the destructive capacities of the states involved. The Ilulissat Summit of May 2008 aiming at strengthening regional cooperation and coordination between stakeholders in the Artic is a promising sign. However, by the invitation of Denmark, only Norway, Iceland, Russia and the USA attended the summit, leaving relevant actors such as EU and the local communities out (Crawford et al. 2008).

Summary of Recommendations and Remaining Gaps

While some studies focused on assessing the threats of climate change as such, and on developing scenarios, many also provide recommendations. While they differ in their level of detail and scope, those recommendations can be summarised along the following lines:

- **Awareness Raising:** While climate change has featured prominently in the discourses of recent months, it is necessary to keep the topic high on the

international agenda to ensure follow-up action. To improve ownership and adaptation capacities, spreading knowledge and continued raising of awareness on all levels of society is necessary, particularly in those communities who will be affected first.

- **Further Research:** Knowledge regarding climate change impacts is still very limited beyond the general global trends. Further research and analysis on regional and national levels, starting with pilot regions and countries, is necessary. Worst-case scenarios, including so-called tipping points resulting in rapid, non-linear climate change, must be further researched. Additionally, findings should be operationalised so as to (1) inform policy planning, (2) provide indicators for early warning systems, and (3) target key audiences.
- **Stakeholder Dialogue:** Supporting regional cooperation, exchanging views and jointly developing plans and strategies is considered a priority. The group of stakeholders is not limited to governments, but includes also civil society and the private sector. Due to the transnational nature of climate change, enhancing transboundary cooperation should be a priority.
- **Capacity Building:** Existing tools may be adapted, and new tools developed, to adequately cope with climate change. In addition, widening research competence and capacities for assessment and analysis on national and local levels around the world will be necessary.
- **Policy Priorities:** Mainstreaming climate change into conventional policy should be a top priority. Both mitigation and adaptation strategies need to be boldly pursued and emphasized in all policy sectors. Preparing for adequate management of environment-induced migration and assessing the conflict sensitivity of such efforts to avoid unintended consequences should be of top priority.
- **Priority Regions:** While priority regions are very much dependent on the regional focus of a study, two types of target countries emerge. First, already weak and fragile states that could be driven toward collapse if climate change issues remain unaddressed, and whose instability may pose significant risks for neighbouring countries. Second, so-called pivotal states (e.g. Halden 2007) that are regional powers capable of influencing their wider regions, and whose destabilisation would have severe repercussions for the entire region.
- **International System Development:** The different international frameworks working on issues related to climate change – mitigation and adaptation, emission trading, food, water, energy, etc. – need to be linked and integrated to allow for a comprehensive approach. The international community should also reform existing institutions where necessary and appropriate, to cope with the challenges of climate change. This includes not only continuing the negotiations on climate change mitigation, but also developing global early warning and information networks on climate change and security.

These recommendations are – with additional tailoring – applicable to every area of the world. However, knowledge gaps remain for a number of regions. While global or continental studies address many areas, they remain superficial and have a tendency to focus

repeatedly on 'usual suspects', i.e. countries where climate change is likely to have obvious impacts. Examples include, for instance, Bangladesh in Asia, the countries of the Nile river basin and North Africa within the MENA region, and the former Soviet republics in Central Asia. Other examples include areas that only limitedly engage with others – such as continental South East Asia or the Afghanistan/Iran/Western Pakistan triangle. As a consequence, this synopsis is no exception.

At the time of writing, early 2009, additional studies are produced or prepared, including some that focus on the Levant region within MENA and Sub-Sahara Africa[7], Uganda and (northern) India, Nepal[8], and others. Based on these upcoming studies, and those already produced, our recommendation is to conduct additional studies and develop scenarios on the following regions:

1) **Continental South-East Asia**, particularly Myanmar, Thailand, Vietnam, Laos, Cambodia;
2) **Indian-Pacific Ocean Island States**, particularly Sri Lanka, Indonesia, the Philippines, Malaysia, Papua New Guinea and the small island states of the Indian and Pacific Ocean;
3) **South-West Asia,** particularly the Arab Peninsula, Iraq, Iran, Afghanistan and (western) Pakistan;
4) **Middle America,** particular Venezuela, Columbia, Mexico, (southern) USA and the Central American states.

These regional studies will provide a broader picture and help to identify common regional challenges. However, further national studies will need to be carried out to collect more precise data, operationalise mitigation and adaptation interventions on concrete, sub-national activities, and improve awareness and ownership within the respective societies. The second type of studies mentioned in the introduction could serve as examples.

7 Both carried out by the International Institute for Sustainable Development. Personal communication with Oli Brown, IISD.

8 Within the context of the Conflict Prevention Network, which will be established in early 2009 under the Instrument for Stability (IfS).

References

Alcamo, Joseph, Lilibeth Acosta-Michlik, Alexander Carius, Frank Eierdanz, Richard Klein, Dörthe Krömker und Dennis Tänzler 2005: A new approach to the assessment of vulnerability to drought. In: Proceedings of Final Symposium of the German Climate Research Programme (DEKLIM). Leipzig, Germany.

Anderson, John and Joanna Chiavri 2008: Energy and Climate Change in the Black Sea Region. In: WWF and Heinricht Böll Stiftung (eds): Greening the Black Sea Dimension. Brussels: WWF and Heinrich Böll Stiftung, pp. 18-29.

Ashton, John und Tom Burke 2004: The Geopolitics of Climate Change. Verfügbar unter http://www.swp-berlin.org/en/common/get_document.php?asset_id=1267 (24 March 2008).

Ban Ki Moon 2007: A Climate Culprit In Darfur. In: Washington Post, 15.6.2007; verfügbar unter http://www.washingtonpost.com/wp-dyn/content/article/2007/06/15/AR2007061501857.html (24 March 2008).

Barnett, Jon und W. Neil Adger 2007: Climate change, human security and violent conflict. In: Political Geography 26, pp. 639-655.

Biermann, Frank and Ingrid Boas 2007: Preparing for a Warmer World. Towards a Global Governance System to Protect Climate Refugees. Global Governance Working Paper Nr. 33, November 2007. Amsterdam: Vrije Universiteit Amsterdam.

BMU (ed) 2002: Klima und Konflikt. Berlin: Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit.

Brauch, Hans Günter 2006: Regionalexpertise – Destablisierungs- und Konfliktpotential prognostizierter Umweltveränderungen in der Region Südeuropa und Nordafrika bis 2020/2050. Externe Expertise für das WBGU-Hauptgutachten: „Welt im Wandel: Sicherheitsrisiko Klimawandel“. Available at http://www.wbgu.de/wbgu_jg2007_ex01.pdf (3 August 2007).

Breitmeier, Helmut forthcoming: Globaler Klimawandel und Gewaltkonflikte. Forschung DSF Heft 16, Osnabrück: Deutsche Stiftung Friedensforschung.

Brzoska, Michael 2008: Der konfliktträchtige Klimawandel – ein Sicherheitsproblem? In: Andreas Heinemann-Grüder, Jochen Hippler, Markus Weingardt, Reinhard Mutz und Bruno Schoch (eds) 2008: Friedensgutachten 2008. Münster: LIT, pp. 195-206.

Brown, Oli 2008: The numbers game. Available at http://www.fmreview.org/FMRpdfs/FMR31/08-09.pdf (15 December 2008).

Brown, Oil 2007: Climate change and forced migration: Observations, projections and implications. Available at http://www.iisd.org/pdf/2008/climate_forced_migration.pdf (20 November 2008).

Brown, Oli and Alec Crawford 2008: Assessing the Security Implications of Climate Change for West Africa: Country Case Studies of Ghana and Burkina Faso. Available at http://www.iisd.org/pdf/2008/security_implications_west_africa.pdf (24 March 2008).

Brown, Oli, Alec Crawford and Christine Campeau 2008: Environmental Change and the New Security Agenda. Implications for Canada’s Security and Environment. Available at http://www.iisd.org/pdf/2008/arctic_sovereignty.pdf (10 December 2008).

Brown. Oli, Anne Hammil and Robert McLeman 2008: Climate change as the 'new' security threat: Implications for Africa. Available at http://www.iisd.org/pdf/2007/climate_security_threat_africa.pdf (15 December 2008).

Brown, Oli, Anne Hammil and Alec Crawford 2007: Climate change as 'new' security threat: implications for Africa. In: International Affairs 83:6, pp. 1141-1154

Busby, Joshua W. 2007: Climate Change and National Security. An Agenda for Action. Available at http://www.cfr.org/content/publications/attachments/ClimateChange_CSR32.pdf (24 March 2008).

Campbell, Kurt M., Jay Gulledge, J.R. McNeill, John Podesta, Peter Ogden, Leon Fuerth, R. James Woolsey, Alexander T.J. Lennon, Julianne Smith, Richard Weitz und Derekt Mix 2007: The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change. Available at http://www.csis.org/media/csis/pubs/071105_ageofconsequences.pdf (24 March 2008).

Carius, Alexander 2006: Environmental Peacbuilding. Environmental Cooperation as an Instrument of Crisis Prevention and Peacebuilding: Conditions for Success and Constraints. Berlin: Adelphi Consult.

Carius, Alexander, Dennis Tänzler and Achim Maas 2008: Climate Change and Security.– Challenges for German Development Cooperation. Eschborn: GTZ.

Carius, Alexander, Dennis Tänzler, Achim Maas and Meike Westerkamp forthcoming: Forschungserfordernisse im Kontext von Klimawandel und Sicherheit. Bonn: Bundesministerium für Bildung und Forschung.

Carius, Alexander, Dennis Tänzler and Moira Feil 2007: Addressing the Interlinkages between Natural Resources Management and Conflict in the European's External Relations. Rotterdam: Ecorys Evaluation Consortium.

Carius, Alexander, Dennis Tänzler and Judith Winterstein 2006: Weltkarte von Umweltkonflikten – Ansätze einer Typologisierung. Externe Expertise für das WBGU-Hauptgutachten: „Welt im Wandel: Sicherheitsrisiko Klimawandel". Available at http://www.wbgu.de/wbgu_jg2007_ex02.pdf (3 August 2007).

Carius, Alexander, Dennis Tänzler and Moira Feil 2003: Addressing Environmental Risks in Central Asia: Risks, Conditions, Policies, Capacities. Bratislava: UNDP.

Carius, Alexander und Kurt M. Lietzmann (eds) 1999: Environmental Change and Security. A European Perspective. Berlin: Springer.

Chafé, Zöe and Michael Renner 2007: Disasters and Peacemaking: Helping Communities Heal. Washington: World Watch Institute.

CIA 2008: World Factbook. Available https://www.cia.gov/library/publications/the-world-factbook/ (10 December 2008).

Clark, William A.V. 2007: Environmentally induced migration and conflict. Available at http://www.wbgu.de/wbgu_jg2007_ex04.pdf (20 November 2008).

CNA 2007: National Security and the Threat of Climate Change. Available at http://securityandclimate.cna.org/ (30 July 2007).

Coosbey, Aaron (ed) 2008: Trade and Climate Change: Issues in Perspective. Final Report and Synthesis of Discussions. Trade and Climate Change Seminar, Copenhagen 18-20 June 2008. Available at http://www.iisd.org/pdf/2008/cph_trade_climate.pdf (20 November 2008).

Crawford, Alec, Arthur Hanson and David Runmills 2008: Artic Sovereignty and Security in a Climate-changing world. Available http://www.iisd.org/pdf/2008/arctic_sovereignty.pdf (10 December 2008).

Dalby, Simon 2002: Environmental Security. Minneapolis und London: University of Minnesota Press.

Davis, Tom 2006: A Failure of Initiative. Final Report of the Select Bipartisan Committee to Investigate the Perparation for and Responses to Hurricane Katrina. Washington: U.S. Government Printing Office

Dazé, Angie 2007: Climate Change and Poverty in Ghana. Available at: http://www.careclimatechange.org/files/ClimateChangeandPovertyinGhana.pdf (20 November 2008).

Diamond, Jared 2005: Collapse. How societies choose to fail or survive. London: Penguin Books.

Dokos, Thanos (ed) 2008: Climate Change: Addressing the Impact on Human Security. Athens: Hellenic Foundation for European and Foreign Policy and Hellenic Ministry for Foreign Affairs.

DPKO 2008: Ranking of Military and Police Contributions to UN operations. Available at http://www.un.org/Depts/dpko/dpko/contributors/2008/oct08_2.pdf (10 December 2008).

Drexhage, John, Deborah Murphy, Oli Brown, Aaron Cosbey, Peter Dickey, Jo-Ellen Parry, John Van Ham, Rhich Tarasofsky, Beverly Darking 2007: Climate Change and Foreign Policy: An exploration of options for greater integration. Available at http://www.iisd.org/pdf/2007/climate_foreign_policy.pdf (24 March 2008).

Dupont, Alan and Graeme Pearmen 2006: Heating up the planet. Climate change and security. Lowy Institute Paper 12, available at http://lowyinstitute.richmedia-server.com/docs/AD_GP_ClimateChange.pdf (29 November 2008).

Erhart, Charles, Andrew Thow, Mark de Blois and Alyson Warhurst: Humanitarian Implications of Climate Change. Mapping Emerging Trends and Risk Hot Spots. Available at: http://www.careclimatechange.org/files/MainReport_final.pdf (20 November 2008).

Erhart, Charles and Michelle Twena 2006: Climate Change and Poverty in Mozambique. Realities and Response Options for CARE. Availablte at https://www.care.dk/files/MozambiqueCountryProfile.pdf (20 November 2008).

Erhart, Charles and Michelle Twena 2006a: Climate Change and Poverty in Tanzania. Realities and Response Options for CARE. Available at https://www.care.dk/files/TanzaniaCountryProfile.pdf (20 November 2008).

EU 2008: Klimawandel und internationale Sicherheit. Papier des Hohen Vertreters und der Europäischen Kommission für den Europäischen Rat. Verfügbar unter http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressdata/DE/reports/99391.pdf (24. März 2008).

Evans, Alex and David Steven 2007: Climate Change: the state of the debate. Available at http://www.cic.nyu.edu/internationalsecurity/docs/LondonAccordclimatepaper.pdf (20 November 2008).

Feil, Moira, Meike Westerkamp and Diana Klein forthcoming: Synthesis Report on Regional Cooperation on Environment, Economy and Natural Resource Management. Brussels: Initiative for Peacebuilding.

Forum for the Future and HP Labs 2008: Climate Futures. Responses to Climate Change 2030. Available at http://www.forumforthefuture.org/files/Climate%20Futures_WEB.pdf (20 November 2008).

Frankcom, Nicolas 2008: Climate Change, Security and Sustainable Development. Report of the Conference: “From Bali to Poznan – New Issues, New Challenges”, 18 December 2007. Available at http://www.envirosecurity.org/activities/diplomacy/gfsp/climate/FBTP_Report.pdf (15 December 2008).

Freimuth, Ladeene, Gidon Bromberg, Munqueth Mehyar and Nadeer al Khateeb 2007: Climate Change: A New Threat to Middle East Security. Available at http://www.foeme.org/index_images/dinamicas/publications/publ78_1.pdf (24 March 2008).

Glaser, Rüdiger 2008: 1200 Jahre Wetter, Klima, Katastrophen. Darmstadt: Primus.

Giese, Ernst and Jenniver Sehring 2007: Regionalexpertise – Destabilisierungs- und Konfliktpotenzial prognostizierter Umweltveränderung in der Region Zentralasien 2020/2050. Available at http://www.wbgu.de/wbgu_jg2007_ex05.pdf (20 November 2008).

Haas, Marcel de (ed) 2007: The Shanghai Cooperation Organisation. Towards a full-grown security alliance? Available at http://www.clingendael.nl/publications/2007/20071100_cscp_security_paper_3.pdf (10 December 2008).

Halden, Peter 2007: The Geopolitics of Climate Change. Challenges to the International System. Stockholm: FOI.

Heberer, Thomas and Anja D. Senz 2007: Regionalexpertise – Destabilisierungs- und Konfliktpotenzial prognostizierter Umweltveränderungen in China 2020/2050. Available at http://www.wbgu.de/wbgu_jg2007_ex06.pdf (20 November 2008).

Hendrix, Cullen S. and Sarah M. Glaser 2007: Trends and triggers: Climate, climate change and civil conflict in Sub-Saharan Africa. In: Political Geography 26, S. 695-715.

Homer-Dixon, Thomas F. 2006: The Upside of Down. Catastrophe, Creativity and the Renewal of Civilisation. Washington: Island Press

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

Houdret, Annabelle in cooperation with Uwe Kievelitz and Marielle Mumenthalter 2008: Die Zukunft des Maghreb: Trends in Sicherheit und Entwicklung in Marokko, Algerien und Tunesien. Available at http://inef.uni-due.de/page/documents/Houdret_Maghreb.pdf (22 August 2008).

Houdret, Annabelle and Dennis Tänzler 2006: Umweltwandel und Konflikte. In: Debiel, Tobias / Messner, Dirk / Nuscheler, Franz (eds), Globale Trends 2007. Frieden, Entwicklung, Umwelt: Frankfurt/M.: Fischer Taschenbuch Verlag, pp. 359-376.

IIED 2008: Africa – Up in smoke 2. Available at http://www.iied.org/pubs/pdfs/10018IIED.pdf (15 December 2008).

IIED 2008a: Up in smoke? Asia and the Pacific. The threat from climate change to human development and environment. Available http://www.iied.org/pubs/pdfs/10020IIED.pdf (15 December 2008).

IPCC 2007: Climate Change 2007: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Intergovernmental Panel on Climate Change Fourth Assessment Report. Summary for Policymakers. Available at http://www.ipcc.ch/SPM13apr07.pdf (30 July 2007).

Jakobeit, Cord und Christ Methmann 2007: Klimaflüchtlinge. Die verleugnete Katastrophe. Hamburg: Greenpeace.

Kahl, Colin 2005: States, Scarcity and Civil Strife in the Developing World. Princeton: Princeton University Press.

Kramer, Annika 2008: Regional Water Cooperation and Peacebuilding. A case study from the Middle East. Brussels: Initiative for Peacebuilding.

Luetz, Johannes 2008: Planet Prepare. Preparing Coastal Communities in Asia for Future Catastrophes. Asia Pacific Disaster Report. Bangkok: World Vision.

Maas, Achim and Sonja Schirmbeck 2006: Sicherheit in Ostasien: Eskalationspotenziale und Konfliktprävention. In: Friedens-Warte 78:3-4, p. 163-181.

Mabey, Nick 2008: Delivering Climate Security. International Security Responses to a Climate Changed World. Whitehall Paper. New York et al.: Routledge.

Martens, Jens 2007: Armutszeugnis. Die Millenniumsentwicklungsziele der Vereinten Nationen. Available at http://www.globalpolicy.org/eu/de/publ/armutszeugnis.pdf (10 December 2008).

Mason, Simon A., Adrian Muller, Albrecht Schnabel, Rina Alluri and Christian Schmid 2008: Linking Environment and Conflict Prevention. The Role of the United Nations. Draft January 2008. Zürich und Bern: Center for Security Studies, ETH Zürich und swisspeace.

Meier, Patrick, Doug Bond and Joe Bond 2007: Environmental influences on pastoral conflict in the Horn of Africa. In: Political Geography 26, S. 716-735.

Middleton, Roger 2008: Piracy in Somalia. Threatening global trade, feeding local wars. Available at http://www.chathamhouse.org.uk/publications/papers/view/-/id/665/ (9 December 2008).

Myers, Norman und Jennifer Kent 1995: Environmental Exodus. An Emergent Crisis in the Global Arena. Washington, D.C.: Climate Institute.

National Intelligence Council 2008: Global Trends 2025. A Transformed World. Washington: National Intelligence Council.

Nordås, Ragnhild and Nils Petter Gleditsch 2007: Climate change and conflict. In: Political Geography 26, S. 627-638.

Oberthür, Sebastian; Dennis Tänzler and Alexander Carius 2002: Klimawandel und Konfliktprävention. Die Relevanz für den internationalen Klimaschutzprozess. In: BMU (eds) 2002: Klima und Konflikt. Berlin: Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit, pp. 111-146.

Oxfam International 2008: Climate Wrongs and Human Rights. Putting people at the heart of climate-change policy. Oxfam Briefing Paper 117. Available at http://www.oxfam.org/files/bp117-climate-wrongs-and-human-rights-0809.pdf (20 November 2008).

Oxfam International 2008a: Survival of the fittest. Pastoralism and climate change in east Africa. Oxfam Briefing Paper 116. Available at http://publications.oxfam.org.uk/oxfam/display.asp?K=e2008090213562752 (20 November 2008).

Oxfam International 2007: Climate Alarm. Disasters increase as climate change bites. Oxfam Briefing Paper 108. Available at http://www.oxfam.org/files/climate%20alarm.pdf (20 November 2008).

Parris, Brett 2007: World Vision Australia's Policy Position on Climate Change. Available at http://www.worldvision.com.au/learn/policyandreports/files/ClimateChangeFullReport.pdf (20 November 2008).

Paskal, Cleo 2007: How climate change is pushing the boundaries of security and foreing policy. Available at http://www.chathamhouse.org.uk/files/9250_bp0607climatecp.pdf (24 March 2008).

Pemberton, Miriam 2008: The Budgets Compared: Military vs. Climate Security. Available at http://www.fpif.org/pdf/reports/0801milvclimate.pdf (24 March 2008).

Podesta, John and Peter Ogden 2007: The Security Implications of Climate Change. Available at http://www.twq.com/08winter/docs/08winter_podesta.pdf (29 November 2008).

Pumphrey, Carolyn (ed) 2008: Global Climate Change: National Security Implications. Available at http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?PubID=862 (15 December 2008).

Raleigh, Clionadh and Henrik Urdal 2007: Climate change, environmental degradation and armed conflict. In: Political Geography 26,pp. 674-694.

Red Cross/Red Crescent 2007: Climate Guide. Available at http://www.proventionconsortium.org/themes/default/pdfs/RCRC_climateguide.pdf (20 November 2008).

Renaud, Fabrice, Janos J. Bogardi, Olivia Dun, Koko Warner 2007: Control, Adapt or Flee. How to Face Environmental Migration? InterSecTions Working Paper No. 5/2007. Bonn: United Nations University – Institute for Environment and Human Security.

Renner, Michael 2002: The Anatomy of Resource Wars. Worldwatch Paper 162. Washington: Worldwatch Insitute.

Reuvney, Rafael 2007: Climate change-induced migration and violent conflict. In: Political Geography 26, pp. 656-673.

Ross, Michael L. 2004: What do we know about natural resources and civil war? In: Journal of Peace Research 41:3, pp. 337-356.

Satterthwaite, David, Saleemul Huq, Mark Pelling, Hannah Reid and Patricia Romero Lanako 2007: Adapting to Climate Change in Urban Areas. The possibilities and constraints of low- and middle-income nations. Verfügbar unter http://www.iied.org/pubs/pdfs/10549IIED.pdf (24 March 2008).

Schellnhuber, Hans Joachim 2006: Avoiding dangerous climate change. Cambridge: Cambridge University Press.

Schwartz, Peter and Doug Randall 2004: Imaging the Unthinkable. An Abrupt Climate Change Scenario and its Implications for United States Security. Available at http://www.grist.org/pdf/AbruptClimateChange2003.pdf (12 December 2008).

Smith, David and Janani Vivekananda 2007: A Climate of Conflict. The links between climate change, peace and war. London: International Alert.

Stern, Nicolas 2006: The Economics of Climate Change. The Stern Review. Available at http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm (30 July 2007).

Swatuk, Larry A. 2007: Regionalexpertise – Southern Africa, Environmental Change and Regional Security: An Assessment. Available at http://www.wbgu.de/wbgu_jg2007_ex07.pdf (20 November 2008).

Tänzler, Dennis, Alexander Carius and Achim Maas 2008: Assessing the Susceptibility of Societies to Drought: A Political Science Perspective. In: Regional Environmental Change 8:4, p. 161-172.

Tänzler, Dennis, Boris Schinke and Christoph Bals 2006: Is there “Climate Security” for India? “Tipping Points” as Drivers of Future Environmental Conflicts. Background paper fort he workshop "Klimawandel und Sicherheit – Fallbeispiel Indien", 7 December 2006, Potsdam-Institut für Klimaforschung.

Tänzler, Dennis, Alexander Carius and Sebastian Oberthür 2002: Conflict Prevention and Climate Change. Special Event at the 16th Meeting of the Subsidiary Bodies to the UNFCCC, Bonn, 10 June 2002. Available at http://www.adelphi-research.de/projektberichte/ClimateSide.pdf (24 March 2008).

Thow, Andrew and Mark de Blois 2008: Climate change and human vulnerability: Mapping emerging trends and risk hotspots for humanitarian actors. Summary for decision makers. Bath: Maplecroft.

Tolba, Mostafa K. and Najib W. Saab (eds) 2008: Arab Environment Future Challenges. Available at http://www.afedonline.org/afedreport/Full%20English%20Report.pdf (9 January 2009).

UNDP 2007: Human Development Report 2007/2008. Fighting Climate Change. Human Solidarity in a Divided World. New York: UNDP.

UNDP/UNEP/OSCE 2004: Environment and Security. Transforming Risks into Cooperation. The Case of the Southern Caucasus. Available at http://www.envsec.org/southcauc/pub/envsec_transforming_risk_enb.pdf (30 September 2008).

UNEP 2007: Sudan Post-Conflict Environmental Assessment. Available at http://postconflict.unep.ch/publications.php?prog=sudan (1 April 2008).

UNFCCC 2007: Climate Change: Impacts, Vulnerabilities, and Adaptation in Developing Countries. Bonn: UNFCCC.

UNPD 2008: World Population Prospects: The 2006 Revision. Available at http://esa.un.org/unpp/p2k0data.asp (9 December 2008).

UNSC 2007: 5663rd Meeting, Tuesday, 17 April, 10am. S/PV.5663. New York: UNSC.

US Department of Energy 2008: Connecting Across Boundaries. Enhancing Strategic Intelligence and National Security Readiness to Meet Global Energy and Environmental Challenges. Synthesis Conference Report, 12 March 2008. Washington: US Department of Energy.

WBGU 2007: World in Transition – Climate Change as a Security Risk. Berlin and Heidelberg: Springer.

Welzer, Harald 2008: Klimakriege. Wofür im 21. Jahrhundert getötet wird. Berlin: Fischer.

Winkelmann, Ingo 2007: Wem gehört die Arktis? SWP-Aktuell No. 56. Berlin: Stiftung Wissenschaft und Politik.

Wittich, Anja and Achim Maas forthcoming: Regional Cooperation in the South Caucasus. Lessons for Peacebuilding, from Economy and Environment. Brussels: Initiative for Peacebuilding.

Wittich, Anja, Achim Maas and Alexander Carius 2008: Environment and Security in the Black Sea Region. In: WWF and Heinricht Böll Stiftung (eds): Greening the Black Sea Dimension. Brussels: WWF and Heinrich Böll Stiftung, pp. 39-43.

Wolff, Aaron T. 2007: A Long Term View on Water and Security: International Waters, National Issues and Regional Tensions. Available at http://www.wbgu.de/wbgu_jg2007_ex08.pdf (20 November 2008).

Zhang, David D., Jane Zhang, Harry F. Lee und Yuan-qing He 2007: Climate Change and War Frequency in Eastern China over the Last Millennium. In: Human Ecology 35, S. 403-414.

Zhan, David D., Peter Brecke, Harry F. Lee, Yuan-Qing He, and Jane Zhan 2007: Global climate change, war and population decline in recent human history. IN: PNAS 104:49, pp. 19214-19219.