

## Background Paper

# Climate Change, Water Stress, Conflict and Migration

Climate change, water stress and other environmental problems are increasingly recognized as major issues threatening human security. Their impacts on human life affect many aspects of international politics. Migration and conflict are two of the possible effects.

Climate change is likely to dramatically increase the frequency and intensity of hydro-meteorological hazards, such as tropical storms, floods, and landslides. All of these phenomena may severely restrict livelihood options for large populations in hotspots. The new challenges that climate change poses on the world's population have already been discussed on high-level international institutions. The General Assembly of the United Nations has addressed this issue and has included climate change in the concept of human security during the human security debate that took place on the 20<sup>th</sup> and 21<sup>st</sup> of May 2010. Furthermore, after having discussed the impact of climate change for the first time in 2007 without reaching clear results, the topic of climate change as a human security issue has been recently discussed in the UN Security Council. The meeting which took place on July 20<sup>th</sup> earlier this year had the purpose of considering whether to expand the Security Council's mission to keep the peace that could potentially be threatened by climate change, including the creation of a new environmental peacekeeping force – green helmets – which could intervene in conflicts caused by shrinking resources. Even though the council settled for a watered-down statement attributing to climate change "possible security implications", there is an increasing attention paid to this subject in the international arena (Security Council 2011).

But besides the political turmoil, climate change is for many around the world a hard reality. For instance, Bangladesh is one of the most vulnerable countries to sea level rise due to its high population density and low-lying land. Based on these factors, the UNDP predicts that 21 per cent of the country could go under salt water due to a sea level rise of approximately 1 meter (Rahman 2007, 12). Migration seems to be the only chance of survival for this population (Hoque Patwari 2009, 7-14). Governments and regional institutions are raising awareness of this issue. According to the Asian Development Bank (ADB), governments in the Asia-Pacific region face the risk of unprecedented numbers of people displaced, within and between nations, by storms, floods and other impacts of climate change (Forest for Climate 2011).

The impacts on climate change may also involve violent conflict. Disasters and environmental degradation are likely to undermine livelihoods by threatening the access to clean water and undermining food security (Reuveny 2007). Conflicts may arise when there is a competition over limited resources, such as land and water.

Following Kolmannskog (2008) such conflicts may relate to climate change-induced migration in two scenarios with the potential of a vicious cycle: forced migration can be triggered by – and itself also trigger – environmental conflicts. If these relationships were put in a simple diagram they would look like as follows :

Case 1: Climate change impacts → conflict → migration

Case 2: Climate change impacts → migration → conflict

And we cannot exclude

Case 3: Migration → environmental degradation → conflict

In the first case, the link between climate change impacts on the environment and migration have an indirect link. Thus initially the climate change impacts may cause violent conflict, and in a second phase those affected by the conflict are forced to flee due to violence. In addition, any type of conflict can further deteriorate or accelerate environmental degradation, which in turn may lead to migration.

Drought is expected to be one of the climate change impacts that could trigger conflict under the first case. According to Kolmannskog, water scarcity may contribute to distributional conflict, although as also other researchers have found, interaction with certain socio-economic and political factors must be present for (violent) conflict to erupt (Suliman 2005, 3). Hence, there is potential for conflict when a population experiences social discrimination in terms of access to the safe and clean water. Schellnhuber *et al.* (2007) argue that the impacts of water scarcity and soil degradation on food security have led to migration rather than violent conflict.

Regarding the second case of links between climate change and conflict, some experts consider migration as one of the most alarming possible effects of climate change (Campbell *et al.* 2007, 10). Research suggests that migration – along with the politicization of ethnicity, the financial effects of a diaspora, and export of existing conflicts – could exacerbate existing conflicts (Kolmannskog 2008, 20-21).

And on the third case, massive influx of migration can put excessive pressure on the environment where migrants relocate. This is mainly due to a sudden increase of demand on resources like water, fuel wood and food. If ethnic groups have to compete for the limited resources. the likelihood that this competition turns into conflict may increase if there is a history of tension between the ethnic groups due to existing social or cultural differences.

, Additionally, other factors such as governance, political stability, economy strength, and the history of violence in the places of transit or destiny of the migration will be potential conflict variables..

A contemporary case of a country being heavily affected by the impacts of climate change, and that illustrates the migration and security dimensions of the problem, is Bangladesh. With a geographic area slightly larger than that of England, but with almost three times England's population, Bangladeshis face severe human and food security challenges. On the one hand, the geographical composition of the country, situated on a delta and crisscrossed by 54 rivers, makes it highly susceptible to nearly every worst-case climate change scenario (Carney *et al.* 2011). A one-meter sea-level rise would leave almost 20 per cent of the country under water. Already occurring sea-level rise is turning much of the country's fertile land into a saline desert, threatening the population's access to locally-produced food and the national agricultural economy.

It is not surprising therefore that many Bangladeshis see migration as best option for survival. Its (historically friendly) neighbour, India, feels, however, that it cannot accommodate large influxes of migrants and has started to build a guarded fence around Bangladesh. Smuggling of migrants and casualties amongst those trying to cross are heightening tensions between the two countries and are compounding the already difficult stability situation in the wider region.

The melting of the glaciers on the Tibetan Plateau and in the Himalayas, the "water tower" of South and South-East Asia will become a major geo-political factor for the region including China, and thus for the world as a whole.

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On the global level, it is hard to predict the number of people in need of moving out of their countries due to environmental factors. But experience from previous years has drawn some estimates of displacements induced by natural disasters. According to the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), at least 36 million people were displaced by sudden-onset disasters in 2008. Of those, more than 20 million were displaced by sudden-onset climate-related disasters (OCHA & IDMC 2008). Moreover, there is evidence that about 4.6 million people were newly internally displaced by conflict in 2008, in contrast to the mentioned 36 environmentally displaced (IOM 2009).

Besides the threats of sudden-onset disasters, slow-onset events such as drought and erosion will have major impacts on freshwater and food production (Kolmannskog 2008, 15). Such impacts are already affecting hundreds of millions of people around the world, while demand for safe drinking water continues to increase due to growing population. According to an IPCC report, it is being predicted that rain will decrease in the already semi-arid to arid sub-tropics, increasing evaporation, rising sea levels, resulting in the salinization of coastal groundwater (Parry *et al.* 2007). Threats to food security are also expected to increase with the temperature rise. The IPCC reported that water problems will affect 74 to 250 million people in Africa by 2020, and more than a billion people in Asia by 2050 (Parry *et al.* 2007).

Predicting the precise number of people that will need to leave their countries because of the impacts of climate change in the upcoming years is not possible. Also it has to be realized that migration in the sense of moving away from one's existing location simply may not be an option due to lack of even the most basic resources to do so. However, it is a fact that there is significant potential for migration and displacement. The impacts of climate change and other forms of environmental degradation (pollution, damming and drainage of water courses and wetlands) are a real phenomenon already affecting large populations around the world, and they will continue to do so on an increasing scale. In turn, the consequent migration due to these climate changes has effects on the global economy, international development, peaceful societies, and national budgets, all of which could have serious implications on human security and wellbeing. As UNEP's Executive Director Achim Steiner expressed it, "the world does not have perfect knowledge on current or future climate changes", but "...human beings have never planned strategies or responses based on hundred percent certainty [...] Rather we make decisions based on risk assessments..." (UNEP 2011). Reports' results by several institutions, including those by the Intergovernmental Panel on Climate Change (IPCC), do not appear favourable and the clock keeps on ticking.

## **1. Definition of environmental migrants**

Currently, there is no legal definition of environmental migrants to which a framework of protection can be attributed. In 1985, a researcher of the United Nations Environmental Programme (UNEP), Essam El-Hinnawi, used the term "environmental refugees" to define those people who involuntarily leave their traditional habitat because of a marked environmental disruption. This was the first attempt of providing a definition, and pointed out the need of a protocol for humanitarian assistance and protection (Oliver-Smith & Shen 2009, 12).

However, the term "environmental refugee" raises controversy because environmental migrants do not qualify as refugees under the 1951 Geneva Convention on Refugees as amended by the 1967 Protocol. Critiques say that referring to them as refugees is misleading for not having a legal basis in international law, and potentially undermining the legal regime protecting refugees (Westra 2009). For these reasons, the term of environmentally refugee has been strongly rejected by the IOM and United Nations – even though on the meeting about climate change as a human security issue that took place on July 20<sup>th</sup> 2011 at the Security Council, the UN Secretary-General Ban Ki-Moon made use of that term to express the severity that climate change impacts pose on human life (Security Council 2011).

Further attempts of defining this issue have been made and, as the number of communities affected by climate change is on the rise, there is an increasing literature on the topic. The current debate presents positions ranging from those advocating for the expansion of the definition of a refugee in the 1951 Refugee Convention, those calling for the adoption of new instruments, and to those claiming that the need of providing environmental migrants with a refugee-like protection is exaggerated and dangerous.

Moreover, another point of discussion is whether the model of protection should cover displacement across borders due to climate change impacts only, or if should include a broader range of environmental factors. Hence there is a need of establishing concrete criteria that determines the access conditions and scope of the model of protection.

## **2. The current debate on climate change and human rights.**

Scholars have identified that among the difficulties of adapting the existing international legal frameworks to protect environmental migrants are the inexistence of environmental rights and the absence of acceptance of environmental refugees under international humanitarian law. In this sense, one of the main problems is the in-existent legal recognition of the gravity of environmental destruction and its impact on humans (Westra 2009). Existing refugee norms consider environmental protection only in the context of warfare. Thus, there is a need of establishing criteria that determine whether an environmental harm constitutes human rights violation.

In the literature on human rights and environmental law, three strategies for constructing a human rights-based approach to climate change can be found: (1) the application of procedural rights found in international law to climate change litigation; (2) a re-interpretation of existing human rights in the environmental context; and (3) the recognition of a distinct right to environmental well-being under the framework of human rights (Aminzadeh 2007, 245). The first strategy is criticized for not

addressing the substance of the issue, and for not creating a coherent legal framework that harmonizes international environmental law and human rights law. But the most heated debate lies between, and within, those advocating for re-interpretation of existing rights and norms, and those in favor of creating new rights and protocols.

Some of those advocating re-interpretation suggest extending the legal definition of refugee of the 1951 Refugee Convention and 1967 Protocol to include those people displaced due to impacts of climate change, or broader environmental factors. Others look at the "fear of persecution" requirement of the Convention and either interpret as form of persecution the environmental harm itself, the intention of harming a specific population group behind man-made disasters, or the intentional omission of assistance and protection of a population group after an environmental disturbance (Lopez 2007, 378-379). Also called "environmental discrimination" (Westra 2009), it means that it is possible to encounter "governments that are intentionally destroying a people's environment, are discriminating against them in the provision of assistance, or are using the consequences of a disaster" (Stavropoulou 2008, 11-12) in ways that could qualify as persecution for one or more of the reasons of the 1951 Refugee Convention. Indigenous groups may be the most vulnerable to this kind of discrimination and special protection might be required (Westra 2009). This position, however, has received the critique from many scholars, claiming that such re-interpretation could include an incredibly large amount of people, and it is suggested to limit the definition with specific requirements. Another difficulty arising is that the "persecution" in the form of the environmental harm is not caused, at least not caused solely, by the country from which persons are fleeing, but rather by other countries.

On the other hand, those proposing the creation of new legal frameworks, justify their position stressing that the spectrum of solutions may range from mitigation resources to relocation. Thus, the term refugee of the 1951 Refugee Convention and 1967 Protocol should not be expanded according to them (Bronen 2009). Furthermore, others call for the need to recognize the plight of environmental migrants as superior to that of regular convention refugees "in the sense that the *jus cogens* norms that are not observed from the beginning of the actions or omissions that cause the condition (in turn causing their flight) are non-derogable, whether or not the states involved have signed a convention dealing with their problem" (Westra 2009, 100). Finally, one more argument in favor of creating a new legal framework of protection of environmental migrants under the human rights regime is the universal jurisdiction of this regime. In contrast to international environmental law, the human rights regime allows greater intrusion upon states' internal affairs and thus reaches situations that international environmental law cannot. Thus, human rights enjoy universal jurisdiction on the theory that "some behaviors are so unacceptable that they are every nation's concern regardless of where they occur or whom they involve" (Osofsky 2005).

### **3. Universal protection or ad hoc basis action?**

Having no consensus on the definition and rights of environmentally displaced people is confusing and unhelpful, but yet expected. The problem lies on two main issues: (1) the difficulty of isolating environmental factors from other drivers of migration, thus establishing the conditions under which environmentally-displaced people can be granted protection; and (2) the lack of environmental rights and effective mechanisms for their protection.

### **3.1 Conditions under which environmental migrants should be granted international protection.**

Scholars and experts have provided classifications of migrants or refugees based on various elements. Some of these elements are subject of debate on establishing the criteria for the conditions under which protection can be granted.

*(i) Degree of compulsion involved in the displacement.* Voluntary migrants choose to relocate for a variety of reasons, most commonly related to economic improvement. Other migrants are forced to relocate by external forces, such as contemplated in the 1951 Convention on refugees. Thus, one may say, all those migrants not meeting the criteria of the mentioned Convention can be considered voluntary migrants.... However, between these clearly defined categories lies a grey area with those people mobilizing due to deficiencies in the local social, economic or environmental context. Many migrants cannot demonstrate direct or social compulsion to relocate. Thus, compulsion can be intense, like in the case of an acute natural disaster; or moderate, like in the case of gradual environmental degradation) (Westing 1992, 203-204). A successful framework for environmentally-displaced people should contemplate measures in cases like displacement as anticipatory move, as way of coping with an emergency condition, or as a last measure of survival and last resort.

*(ii) Duration of displacement.* Depending on the resulting (in)hospitability of the place where the environmental disruption took place, the displacement can be temporary or permanent (Stal & Warner 2009, 8). Slow-onset events leading ultimately to the devastation of ecosystems are the more likely events to generate seasonal and long-term migration. This is particularly the case for people whose livelihoods directly depend on the surrounding ecological conditions. The duration of displacement caused by rapid-onset events will depend on the level of devastation caused and the possibilities of reconstruction.

*(iii) Boundaries of the displacement.* This element refers to whether the displacement is within the national boundaries or across countries. It is emphasized that the scenarios studied in the symposium will focus on those of *international* displacement, while acknowledging that up until now, most environmental migrants stayed in their own country. Research on migration patterns has found that people are more likely to migrate when they have a social network abroad. Thus, migrants are expected to choose the destination where they already know people who live there (McLeman, 2006).

For the effects of the symposium, we suggest the study of a couple of scenarios to be studied in order to define the appropriate legal protection. Since some of the main recommendations that will be drawn from the symposium should aim at drafting a new international legal institution of protection, scenarios that pose plausible *forced* and *international* migration due to climate change impacts are considered. However, these scenarios are not definitive and experts at the symposium will have the opportunity of narrowing down or extending the cases in which protection will be granted.

1) Cases of sudden extreme environmental events that may cause large-scale human displacement in the wake of natural disasters. The drivers of this type of migration are tsunamis, flash floods, and severe storms (cyclones or hurricanes).

2) Cases of advanced stages of gradual environmental change caused by endangered habitats and livelihoods which have reached tipping points and will promote large-scale permanent migration. Drivers of this type of migration are advanced ecosystem degradation such as sea-level rise, water scarcity and desertification.

It is important to study possible scenarios and to consider these elements of environmental migration when establishing under *which conditions* and to *what extent* protection will be granted. Particularly in the case of gradual environmental degradation, the difficulty lies on determining the threshold levels of environmental destruction under which protection is needed. Also, the need to access protection by international law may vary depending on the vulnerability of the affected communities. Governments and communities have different capacities of coping with environmental and climate change impacts. Such coping capacity or resilience depends on various social, economic and environmental parameters that should be considered when granting international protection to those being environmentally displaced (Renaud et al. 2007).

### **3.2 Environmental rights and mechanisms for their protection. A brief overview on existing international and regional legal instruments related to environmental migrants.**

The issues of climate change impacts, human security and migration have already generated a response from the international community. However, they are still recent topics on the international agenda, e.g. the main international instrument dealing with the issue of climate change, the UN Framework Convention on Climate Change (UNFCCC) included the problematique of human mobility for the first time in its decision of December 2010 to establish the Cancun Adaptation Framework, as part of the task to make recommendations on the loss and damage associated with the adverse effects of climate change in relation to both extreme weather events and slow-onset events. These recommendations are to be considered by the 18<sup>th</sup> Conference of the Parties of the UNFCCC at the end of 2012.

As at the moment (medio 2011) the outlook for substantial and binding mitigation agreements is not very positive, attention to the challenges for adaptation, including improved insights in the migration and relocation aspects, becomes more salient.

On the regional level, the Council of Europe (CoE) has acknowledged the relevance of these issues for Europe and has called for the elaboration of a CoE "Framework Convention for the Recognition of Status and rights of Environmental Migrants (Parliamentary Assembly 2008). Within the European Union the European Commission has stressed the need for a policy response to the impacts of climate change on migration (European Commission 2008, 7-8). Other relevant initiatives of the European Union are the research project on environmental change and forced migration scenarios (EACH-FOR), and the research project by the European Refugee Fund on environmental degradation as possible factor of forced migration to EU Member States.

Nevertheless, despite these international and regional initiatives the repercussions of climate change impacts on the individual person have often been neglected in international instruments. The question of how to deal with those being displaced due to environmental and climate factors, particularly what their legal status is, has hardly been touched upon in the international political

agenda. However, the debate among scholars in public international law about the applicability or the potential use of existing international and regional legal instruments in the clarification of the environmental refugees' legal status and international protection., is on-going

*a. Refugee law.* As previously mentioned, there is a heated discussion about the applicability of refugee law in the case of environmental migration. The arguments revolve around whether or not climate-induced displacements fulfill the 'refugee' core elements of the definition in the Geneva Refugee Convention (GRC): (i) well-founded fear of persecution, and (ii) a nexus of the well-founded fear of persecution with one of the enumerated reasons (race, religion, nationality, membership of a particular social group, or political opinion) (OHCHR 1951).

Those advocating the implementation of refugee law in the case of environmental migrants argue that they can fulfill the element of fear of persecution. While there is no defined concept of persecution, it is recognized that it consists of severe harm or violation of human rights, and also of a lack of state protection (Ammer 2009, 42). It is argued that in some instances those elements of persecution are present in environmental disasters or degradation. An often used example is that of the drainage of marshes in southern Iraq. In this region the tribes of the so-called (Shi'a)'Marsh Arabs have established their livelihoods based on marshes through fishing, buffalo breeding and agriculture. Considered rebellious by the Saddam Hussein regime, with the intent to destroy this ethnic group the government started and executed major drainage works of the marshes leading to dramatic loss of livelihoods and deportation, as a result of which thousands of Marsh Arabs died (Lopez 2007, 381-386).

*b. African Union Convention of the Organization for African Unity (OAU) governing the specific aspects of refugee problems in Africa* (adopted on 10.09.1969, in force since 20.06.1974). This regional convention recognizes an expanded definition of refugees as persons who were forced to leave their home country "because their lives, safety or freedom have been threatened by [...] circumstances which have seriously disturbed public order" (OAU 1969).

There is no consensus among international law scholars on whether the protection of environmentally displaced persons can be regarded as obligation under the OAU Convention. On the one hand it is argued that the reason behind the broad refugee definition is found in the support of the flight of displaced people in the wars of independence in the continent (Ammer 2009, 54). On the other hand, it is contended that the OAU Convention unequivocally includes victims of environmental crises since such events seriously disturb the public order (Lopez 2007, 389-390).

Some scholars point out that even though environmental migrants could qualify for the protection by these instruments as there is no need to further demonstrate the relationship between degradation of the environment and human rights violations, the OAU Convention provides only a short term solution for people who return to their countries after the crisis is over. Those affected by durable environmental degradation and with no place to go need a different kind of protection.

*c. Cartagena Declaration.* The Central America's Cartagena Declaration on Refugees also contemplates a broad definition of refugee, which like the OAU Convention sets "circumstances which have seriously disturbed public order" as an element to qualify for refugee status (OAS 1984). However, the International Conference on Central American Refugees (CIREFCA) has clarified the

scope of the definition and announced that "circumstances seriously disturbing public order must result from human acts and not from natural disasters" (CIREFCA 1989, para. 33).

### 3.2.1 Submerging territories

In addition to these legal instruments, there is the extremely urgent case of submerging island States. The disappearance of small Island states is a consequence of sea-level rising, and the UNHCR has acknowledged its relevance as a particular challenge (UNHCR 2008). The most affected island States are Tuvalu, Nauru, Kiribati, Vanuatu, Maldives and the Bahamas. Countries with low-lying coastal zones like Bangladesh and Vietnam will not entirely submerge, but are expected to lose a significant part of their surface. What the status is of a population whose territory has been submerged is not clear from a public international law perspective. Scholars point out two alternatives. The first one is that the country of origin and citizenship continues to exist. This is possible if the government has the right to exercise some forms of sovereignty parallel from the territory of a third state, if the country of origin was ceded territory from a third State, or if new land could be 'created' (land reclamation). Tuvalu, for example, is considering buying land from a third state such as New Zealand (Ammer 2009, 67).

The second option submerging states have is that the country of origin and citizenship ceases to exist. Scholars suggest that an international body would need to be made responsible for determining when the state ceases to exist, and regulate the conditions under which such determination can be made (Ammer 2009, 68). Regarding the citizenship status of the population, it is not clear whether the stateless-ness regime or international protection obligations are applicable (Ammer 2009, 68). The *Convention relating the status of Stateless Persons* bases its definition of stateless-ness on the denial of nationality under the 'operation of law' – that is, no state recognizes a person as a national (OHCHR 1954, art 1 (1)). This means that the convention does not contemplate situations of *de facto* stateless-ness, such as would be the case of a person in possession of a citizenship which in practice is not effective (Ammer 2009, 69). Hence, the population of submerging island States would not qualify for protection under this convention.

As a conclusion, there is a need for international involvement with respect to forced migration. The pressing situation of those being displaced calls for the creation of new international legal instruments that provide them with rights and access to international protection. This challenge, however, should only be part of a larger legal framework for environmental justice aiming at the adoption of sustainable ways of living and defining the responsibility of states..

## 4. Looking for solutions

In this section we present a series of arguments and current debates that aim at concluding policy recommendations. The basis of such debates and policy recommendations fall within four categories: (1) the legal aspects of environmental migration and the search for a legal definition of environmental migrants, (2) measures of prevention and adaptation to climate change, (3) best practices, and (4) capacity building.

### 4.1. Prevention and adaptation to climate change.

As mentioned under 3.2. the UNFCCC is the main international legal instrument to deal with mitigation of and adaptation to climate change and its impacts. The traditional industrialized countries, with the exception of the U.S. have ratified the Kyoto Protocol with binding commitments to reduce their greenhouse gas emissions, on the average with 6% in relation to the base year of 1990, by 2012. The other Parties, formally still 'developing countries' are of course also committed to reducing their emissions on the basis of the principle of 'common but differentiated responsibilities', but do not have obligatory emission reduction targets, and are entitled to financial and technological support from the developed 'Kyoto' countries in meeting their mitigation and adaptation objectives.

It has been recognized now that former developing countries like Brazil, India, China and South Africa with rapid economic growth and quickly expanding industrial sectors and thus large greenhouse gas emissions – China has overtaken the U.S. in 2007 as the first emitter of these gases in the world- cannot remain outside a regime with strict emission limits. Whether that would take the form of a global "Kyoto Protocol" after 2012, will depend on the very difficult negotiations in the upcoming 17<sup>th</sup> Conference of the Parties of the UNFCCC from 28 November -10 December this year in Durban, South Africa. While all efforts are needed to come to a drastic and effective international agreement to reduce emissions, the composition of the global atmosphere is already such that the impacts of climate change will manifest itself for decades in all parts of the world, requiring massive investments in adaptation. This again makes the Cancun Adaptation Framework of December 2010 such a vital instrument.

An excellent first programme to implement that Framework is suggested in the submission by the Institute for Environment and Human Security of the United Nations University in Bonn to the UNFCCC on 15 August 2011(see <http://unfccc.int/resource/docs/2011/smsn/igo/129.pdf> )The submission identifies amongst others knowledge gaps in the role of the environment as a push factor for migration, the need for climate risk management strategy and conflict mediation and the need for new thinking in relation to the possibility that these measures may not be able to keep pace with "the rising and potentially permanent changes associated with desertification, sea level rise, ocean acidification, loss of geologic and other freshwater sources, etc., which can add pressure to human mobility."

While the UNFCCC is the multilateral environmental convention (MEA) with the most political weight – reason: it deals with energy, one of the most if not **the** most important economic and geopolitical commodity – also other MEAs are relevant to carry out the Cancun Adaptation agenda. MEAs like the Convention on Biological Diversity and the Ramsar convention on the protection of Wetlands are of great value to protect the natural defenses of communities against the impacts of climate change, e.g. intact coral reefs and mangroves form first lines of protection of coastal zones against sea level rise.

Also, there is a lot of room for the inclusion and participation of existing channels of multilateral and bilateral assistance and national governments in the climate change adaptation agenda.

**(a) Prioritizing prevention and risk reduction in the disaster management agenda.**

Perhaps one of the most important challenges is prioritizing, on the international and national levels, the more structural and preventative risk reduction in the disaster management agenda. Some observe that there appears to be more attention paid to humanitarian and direct development action than to disaster risk reduction. This may be a consequence of lack of understanding and a cultural divide between development and disaster specialists, and of the perception that risk reduction competes with other development agendas (Schipper & Pelling 2006, 25). Furthermore, risk reduction policies generally work on long-term objectives that do not give visible effects as emergency relief does. Thus, there is a need of integrating disaster risk reduction, humanitarian relief and development into one agenda that allows their collaboration and the sum of efforts from their fields. Even though this may require some rethinking on development practices, in practice even a few administrative changes could make a difference. For example, some experts have proposed to integrate adaptation into development decision-making by applying risk assessments to development assistance projects (Burton *et al.* 2006, 17). This concept has been borrowed from the World Bank's due-diligence policy and the "screening tool" which provides information on climate trends, scenarios and projections, local resilience to climate shocks and adaptive capacity of the environment where a project will be implemented (World Bank 2006).

The benefits of introducing mandatory climate risk assessments on development projects financed by multinational lenders and donor countries providing bilateral assistance are many. Developers can better understand and integrate climate change factors into project planning, help decision-makers develop the policies or measures needed to tackle climate change impacts, and overall contribute to climate change adaptation and risk reduction. But in order for this to happen, the information retrieved by the risk assessments must be formally considered in the project design, review and approval. If a project proposal does not seem to perform satisfactorily on the assessment it should not be approved until it has been modified to reduce the risks to acceptable levels (Burton *et al.* 2006, 17).

As an initiative like this could mean higher up-front costs for donors and recipient countries, incentives have to be built in such integrated projects.

National and international NGOs which of the have a longer term 'tenure' than governments should be involved in project design and, especially in project implementation monitoring.

#### **(b) Implementing Early Warning Systems at the national and local levels.**

A vital role should be played by early warning system tools that aim at generating, disseminating and using information "about potential risks, hazards, and vulnerabilities to empower individuals and communities under threat from natural (e.g. droughts, floods, heat waves, tornadoes and other hazards (famine, violent conflict) to take effective and timely decision-making to protect lives, property and the environment from the effects of disasters" (Vordzorgbe 2007).

Overall they contain three basic elements: monitoring and early warning, risk assessment, and mitigation and response plans which are up-to-date and, if possible, tested.

The first stage of monitoring and risk assessment requires vast human and technological resources needing collaboration with international or regional programs such as FEWS NET (Famine Early

Warning Systems Network), funded by USAID, and the GMFS (Global Monitoring for Food Security) started jointly by the European Space Agency (ESA) and the European Commission Global Monitoring for Environmental and Security (GMES) Initiative. Both initiatives monitor, analyze and identify threats to food security issues (e.g. through vegetation monitoring). (FEWS NET operates in Africa, Central America, Haiti, Afghanistan and the United States, GMFS concentrates on Sub-Saharan Africa. )

Mitigation and response stages require a good local organization, wide-spread information, and vast-reaching communication with the population at risk. This role should be fulfilled by the national and local governments, along with NGOs. Communicating to communities a coming disaster may not be as simple as it seems. Experiences with early warning have shown people perceive risk and respond to it in many different ways e.g. unwillingness to leave their homes and properties to look for shelter, underestimating the danger posed by the disaster risk, or simply not understanding the early warning (Jeggle 2003, 22). Some attribute these responses to differences in education, religion, cultural background, or socio-economic position. Of course the early warning system should be composed in such a way that it meets the various needs. This involves getting to meet the local people and bridging the gap between disaster professionals and people at the grass roots (Jeggle 2003, 22).

There is a major role here for NGOs to fill the gap between researchers and communities. As they know the local conditions and can assist with disseminating information at the community level, preparing community actions, and establishing mechanisms to link communities with policy makers. But in order to do that, they should have better and timely access to the scientific information, and become involved in the research and decision-making process (Jeggle 2003, 34).

In general, early warning initiatives should have the objective that, in the medium to long term, countries build and generate their own local resources to increase their disaster prevention capabilities. In the end, early warning should be brought to the people all over the world and so as to avoid as many human lives losses and as much material damages as possible.

There is vast room for improvement. Early warning practice could greatly benefit from increased international collaboration on telecommunications for disaster prevention, public-private partnerships for preparedness and risk management at local community levels, and social science and public information activities to increase local awareness and response to early warnings (Jeggle 2003, 14).

**(c) Disaster risk prevention and adaptation as ways of achieving water and food security.**

Climate change is having an impact in food and water security. Variability in the frequency of rainfall and changes of mean temperatures will change the availability of water and will challenge the existing agricultural practices. Water security, which in part determines food security, is defined as “the availability of an acceptable quantity and quality of water for health livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks to people, environments and economies” (Grey & Sadoff 2007, 545). According to Grey and Sadoff (2007) there are three typologies of country levels of water security: countries that have harnessed hydrology, countries that are hampered by hydrology, and countries that are hostage of hydrology, often the poorest

countries (Grey & Sadoff 2007, 545). They face 'difficult' hydrologies, which comprise high inter- and intra- annual rainfall variability. To maintain or achieve water security both technological and institutional investments are needed. Much can be learned from practices in the past to conserve and distribute water in culturally and ecologically appropriate ways (Grey & Sadoff 2007, 548).

On food security it is argued that access to technology determines a farm's productivity, no matter how climate change impacts the land and the climatic conditions (Brown & Funk 2008, 580). In absence of such technology and agricultural inputs such as improved seeds and fertilizers ( a new "Green Revolution"), poor farmers will be less able to adapt to climate changes because they have fewer options in their agricultural system to sustain their productivity. (Brown & Funk 2008, 581). A promising initiative has been taken by one of the biggest re-insurance companies in the world, Munich Re, which provides weather-indexed insurance for crop failure (e.g. due to droughts) to poor farmers in developing countries (see [http://www.munichre.com/corporate-responsibility/en/sustainable\\_products/reinsurance/systemagro/default.aspx](http://www.munichre.com/corporate-responsibility/en/sustainable_products/reinsurance/systemagro/default.aspx) ).

A comparable scheme is set up in India by Microensure, receiving funding from the Bill & Melinda Gates Foundation and using comic books to explain the workings of the arrangements to the local farmers.

Of course there is a lot to be learned from older cultures and their ways of coping with changing climatic conditions, for example the use of crop varieties like the Incas did, or using crops resistant to heat and water scarcity (Wojtkowski 2008, 611).

Prominent in addressing the current challenges of food security in relation to climate change is the CGIAR Research Programme on Climate Change, Agriculture and Food Security (CCAFS), in which all 15 research centers of the CGIAR ( Consultative Group on International Agricultural Research) worked together. Their first Theme is "Adaptation to Progressive Climate Change", in which they will analyze and design processes to support adaptation of farming systems in the face of future uncertainties of climate in space and time. It is also a race with time –as they say "The intention here is to try and stay ahead of future change"! The social, economic, cultural and institutional conditions for successful adaptation of farming systems will be included in the research<sup>1</sup> (see <http://ccafs.cgiar.org/our-work/research-themes/progressive-adaptation>)

Indeed, a more holistic approach is indicated (CARE 2011) and clean water, the stability of the availability and access to such resources should be guaranteed by a strong government (Brown *et al.* 2007, 1151), and the willingness of societies to change (Tompkins & Adger 2005, 563).

BOX: For instance, adaptation measures to hurricanes could include the availability of wind-resistant glass for windows. But it is not enough that they are available. People at risk must also be able to find out that these windows exist, purchase them, effectively install and maintain them. If economic or social constraints do not permit this, there will be a limited response to the adaptation measure. Public policies, power relationships and cultural norms can also play an important role in determining access to resources. According to CARE International socially excluded groups such as

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<sup>1</sup> On 24-25 October 2011 the Global Science Conference on Climate-Smart Agriculture will be held in The Netherlands.

women, children, persons suffering with HIV&AIDS and landless people are the most vulnerable to climate change as they have a limited access to food and water due to political and cultural norms.

Mali is an example of how development assistance and promoting equal access to food and water can help prevent and manage conflicts. Mali, as part of the Sahel region, experiences the extremes of drought and flood, and has a history of armed conflict and humanitarian crises. Climate change has exacerbated the local conditions since mid-1970s with the decline of Lake Faguibine. According to a report by the IUCN, the region surrounding the Lake Faguibine in the north of the country used to be a prosperous wetland system (Andrade Perez *et al.* 2010, 119). Agricultural and pastoral lifestyles were sustained by its flooding regime. But recurrent droughts in the past century have almost completely dried up the lake. As a consequence hundreds have died, many have lost their livestock, and thousands have been forced to leave. These movements occurred not without an increased competition for the remaining resources, leading to the marginalization of the most vulnerable groups. After a long history of unrest and with the re-establishment of peace, a series of initiatives to assist the return of refugees, reconstruct social infrastructure, and introduce irrigated agriculture began in 1995. The main projects were made possible by the German Gesellschaft für Technische Zusammenarbeit's (GTZ) Mali Nord Programme in collaboration with the European Union and the World Food Programme. The United Nations Environmental Programme (UNEP) has also been working on the rehabilitation and sustainable management of the Lake Faguibine system. It does so mostly by working at the community level to strengthen civil society to prevent and control violent competition for the scarce resources. Hence, it is a real need to restore the ecosystem to diminish conflicts and enhance cooperation among competing groups (Andrade Perez *et al.* 2010, 121).

#### 4.2. Best practices

##### **Building resilience to climate variability and promoting food security: The case of Mozambique.**

Mozambique is prone to experiencing considerable year-to-year variability in rainfall. On average, there are 375 to 600 mm of rainfall every year, with rains between October and November and May to June. Extreme events are likely to increase over time, with intervals of heavy rain and drought. These climate patterns have a considerable impact on the livelihoods of people who depend on agriculture. Even though rural populations are familiar with rainfall variability, extreme events such as the floodings in 1977 and 2001, and droughts in 1983-1984, 1994 and 2003, had serious impacts in their livelihoods (Osbahe *et al.* 2008, 1953).

Research by Osbahe and fellow researchers describes the case of Mozambique. This is one of the few countries in Southern Africa that have a relatively well-developed disaster preparedness plan alongside a long-term poverty-alleviation policy (Osbahe *et al.* 2008, 1953). Rural villages in Mozambique, especially those where the population was displaced by the civil war and later returned, are physically and economically isolated. One example of such villages is Nwadjahane, whose population's livelihoods are mostly based on subsistence farming with production of cattle, chickens and pigs, and rain-fed/irrigated cultivation. Therefore their livelihoods are closely connected to the variability and productivity of the surrounding natural resources.

The government in Mozambique has endeavoured to include disaster risk reduction and capacity building in its policies. A multidisciplinary group composed of various ministries was established to perform vulnerability mapping analysis and to collaborate with external networks to provide early warning forecasts (Osbahr *et al.* 2008, 1958). Very relevant was the integration of concerns about disasters and climate change impacts into the development agenda. In Mozambique, government-led programmes are usually delivered in partnership with NGOs, e.g. the multi-donor "PROAGRI" programme, coordinated by the Ministry of Agriculture and Rural Development. The main activities of this programme were micro-finance, and support on setting up small-scale farming in rural areas through technical training, infrastructure development and local organization. This program later became a long-term project to be delivered at the national and provincial levels. It emphasizes building local resilience to drought, food security and poverty-reduction. This initiative is an example that successfully links spatial, temporal, jurisdictional, institutional, and management scales at different levels (Osbahr *et al.* 2008, 1959).

### **Community-based disaster management in Philippines: raising awareness and empowering local people.**

Involving communities at risk in disaster management while raising awareness can be an effective way to reduce disaster risk and help communities cope with climate change impacts. The Red Cross and Red Crescent Societies have developed Disaster Preparedness activities that "address everyday risks of communities through programmes such as health, social welfare and first aid activities" (Kokawa 2003, 125). These activities have the aim of increasing self-reliance, raising awareness of vulnerability and the root causes of disasters, and developing skills. The activities are implemented with the help of volunteer networks that have a good knowledge of the local conditions and can easily interact with communities.

In the Philippines, a typhoon- and flooding-prone country, this approach has been successfully implemented in high-risk communities. The programme works with both local government and communities to ensure that development and mitigation strategies are shared and sustained. The key areas addressed by this programme are dissemination of technical information and training, raising awareness of risks and vulnerability, accessing to local knowledge and resources, and mobilizing local people (Allen 2006, 86). With the training obtained, the communities develop hazard maps, disaster action plans and build teams to be operational in focal points (Kokawa 2003, 126). Furthermore, Allen (2006) observes that raising awareness contributes to increasing the willingness to cooperate in disaster preparedness initiatives of community members once they become knowledgeable of the vulnerability their livelihoods have to hazards. She also argues that raising awareness "as well as fulfilling an educational function, it [...] engenders participation in practical CBDP (community-based disaster preparedness) initiatives" (Allen 2006, 86).

The Community-Based Disaster Preparedness initiative requires high levels of community participation; hence it is necessary that the community enjoys of a relatively high level of cohesion to yield good results. This way the community is in a better position to play the function of collectively identify problems, take decisions and act on them, and allocate resources (Allen 2006, 83).

### **Early Warning System in Bangladesh: Effectiveness through simplicity and low technology.**

After a long history of severe cyclonic storms, Bangladesh has improved its disaster management and response. On November 15<sup>th</sup> in 2007 the cyclone Sidr – a category-5 equivalent tropical cyclone on the Saffir-Simpson Scale, and the strongest named cyclone in the Bay of Bengal – hit the coast of Bangladesh.

Even though the damages caused were severe and extensive, the number of casualties was smaller compared to that of the cyclone that hit Bangladesh in 1991 – 3,447 lives were lost in 2007 in comparison to more than 138,000 in 1991. Many attribute this improvement of the population's response to the early warning system that was put in place in response to the cyclone Sidr and that resulted in mobilizing over 40,000 Red Crescent volunteers to warn people through megaphones about the coming cyclone. It went as follows:

First, the authorities in Bangladesh were alerted to the coming cyclone seventy-two hours before it made landfall. The WMO global cyclone observatory fed data to the regional outpost at the Indian Metereological Office in New Delhi, which subsequently communicated this to the Bangladesh government. Once the government of Bangladesh received the alert, it passed it on to the local Red Crescent Office. A network of 40,000 Red Crescent volunteers, who had been specifically trained for this task, were mobilized at the 15 affected districts (out of Bangladesh's 64). The volunteers bicycled around the districts at risk and ordered the population to enter the 1,800 disaster shelters that were built along the coasts. By the time the cyclone indeed made landfall, about 2 million people were already sheltered. One the most peculiar characteristics of this early warning and response system is the easy technology that was used. Bhupinder Tomar, Senior Disaster Preparedness Officer at the International Federation of the Red Cross and Red Crescent in Geneva, explains that the project is centered on "preparing people for disasters by using community based volunteers who do everything from street theatre to school education and lectures to women's groups" (IRIN 2007). The volunteers are set up in various committees that focus on different issues, such as warning, first aid, shelter and relief. When a cyclone alarm goes off they go on their bikes and megaphones to the streets to alert people.

This example of early warning system is relevant because it can be easily replicable. According to Tomar, the only important factor to consider when implementing this system is that there needs to be a fairly high frequency of disasters so that people accept there is a genuine risk (IRIN 2007). Indeed, a major study revealed that 95 per cent of the surviving households of the cyclone of 1991 were aware of the official cyclone warnings but only 17 per cent of them responded by seeking shelter before the landfall of the storm. Of those who did not respond, 45 per cent did not believe the storm would be as severe as the warning made it seem, 16 per cent did not understand the warning, and another 16 per cent was not able to reach shelter due to the strong winds and floods (Twigg 2003, 21). In that year previous false alarms were one of the main reasons for refusal to trust the warning, and many were skeptic about having a cyclone striking at that time of the year.

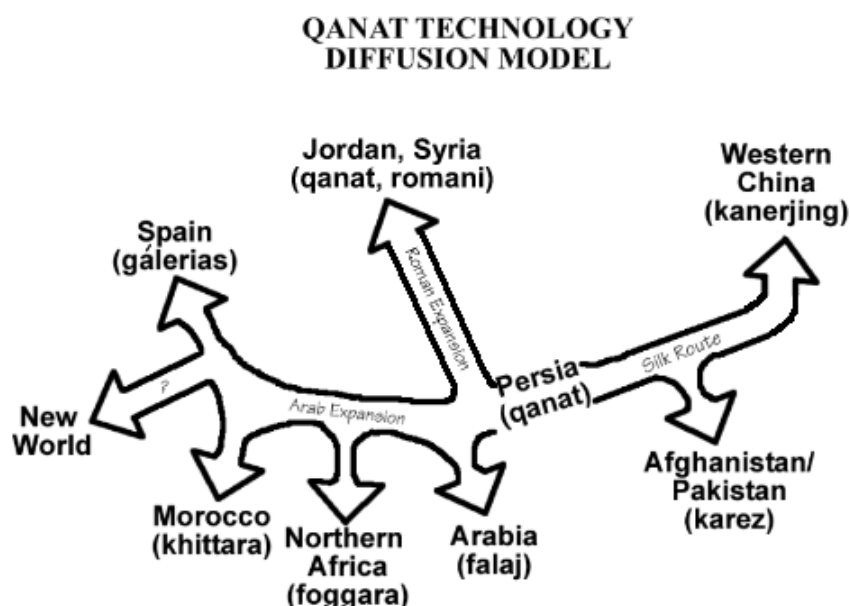
But Bangladesh still faces challenges on disaster preparedness and disaster risk reduction. Preparedness remains patchy particularly in rural coastal areas where there is a lack of infrastructure. According to Howell (2003) many rural people do not fully understand the signal system. Women in particular are the most vulnerable. They have serious problems to have access to information and lack preparation to face disasters partly due to the *purdah* culture – which includes

the seclusion of women from public observation by wearing concealing clothes from head to toe and by the use of high walls, curtains, and screens erected within their homes. Their isolation impedes them from interacting with others as a way to learn about a nearing risk. In addition, women are not allowed to leave their homes without the permission of their husbands, even when in need of going to a cyclone shelter (Howell 2003, 2). The statistics confirm these facts. In the cyclone of 1970 the entire adult female population of the island of Monpura was lost, and in 1991 the mortality rates were significantly much higher for women and children than for men (Howell 2003, 2).

Important in Bangladesh (and other countries) is the work of the NGO Displacement Solutions which assists people displaced by, amongst others, climate change, in recovering lost housing, land and property belongings (HLP). Displacement Solutions has established a Global HLP Rights Expert Registry with over 125 experts who can be called upon in case of need to recover losses or if compensation is required (see [www.displacementsolutions.org](http://www.displacementsolutions.org) )

**Water security.**

On water security there are many good and bad practices around the world. A very sophisticated system of subterranean water transport was developed in old Persia (the *qanats*) and found its way to other parts of the world as shown hereunder.



Of course current demand for water due to population growth, urbanization, industrialization and the impacts of climate change require different solutions to water security, but it does not hurt to look at the good practices of the past, not only technological, but also institutional so as to provide equitable distribution of the water, to receive inspiration for the present and future challenges. Worrysome is the pumping of water out of aquifers with fossil water, not only in the Middle East, North Africa, China and India, but also in the U.S., where the Ogallala fossil water aquifer is running out, compromising the bread basket function of the U.S. on the world food market (see:

[http://www.naturalnews.com/031658\\_aquifer\\_depletion\\_Ogallala.html](http://www.naturalnews.com/031658_aquifer_depletion_Ogallala.html)). Also the Netherlands with its difficult hydrology has developed interesting experiences, which are replicated elsewhere.. The safe settlement and survival of the Dutch population has required highly sophisticated water infrastructure and corresponding institutions, such as the water boards with their own parliaments, that were important elements of the foundation of modern Dutch democracy (Grey & Sadoff 2007, 554). As part of the Netherlands development cooperation the experience and expertise of the Dutch water sector is now being applied in the delta areas of Egypt (Nile), Bangladesh (Ganges/Brahmaputra), Indonesia (Jakarta delta), Mozambique (Inkomati delta), Vietnam (Mekong), to help defend these vital economic areas in the countries against sea level rise, (water) pollution and to assist with development of the port facilities. This programme is called Water Mondiaal.

Irrigation can be a mixed blessing as the following example from India shows.. Characterized by its monsoon, India experiences extreme intra-annual rainfall variability. Nearly 70 per cent of the rural population depends on agriculture for subsistence and employment, influencing their livelihoods and increasing their vulnerability to climate variability (Kumar 2003, 1). The expansion of irrigation is seen by many as the key to sustaining agricultural production and food security. But government's investments in water infrastructure have paid positive effects to the economy. According to Grey and Sadoff there is a direct correlation between investments in irrigation and significant declines in poverty. Irrigated districts have an average of 25 per cent poverty rates, whereas those lacking irrigation show an average of 70 per cent poverty rate (Grey & Sadoff 2007, 556). However, irrigation systems should not be taken as the best possible solution to achieve water security. The intensive use of irrigation can cause the degradation of land and water resources. Thus, irrigation should not be treated as a long-term solution (Reddy 2002, 2). Furthermore, the Indian government has been making efforts to de-link the country's economy from its climatic vulnerability by shifting away from agriculture and betting on manufacturing, communications and transport. The challenge of achieving reliable and sustainable access to water, however, still remains.

Another good example of water security policies by improving institutional arrangements is South Africa. Investments in water management infrastructure began during the apartheid period with the purpose of promoting the farming, mining and financial sectors. These investments were aimed only to serve the white population, while the rest of the country was left undeveloped. Although highly inequitable, those investments reduced vulnerability and laid a basic infrastructure base.

With the end of apartheid water management policies have an emphasis on equity. Riparian laws, which tie the right to use water to the ownership of land along rivers and groundwater aquifers have been abolished. The South African government is now the custodian of all water bodies and no ownership of water is allowed, except on a contract basis when they are allocated by the state (Reddy 2002, 2879). Another example is the Vaal River System, which is located in a semi arid region that experiences extremes of rainfall and drought. This system includes inter-basin transfers with other seven rivers systems and sixteen dams. It is regulated by law that specific flow allocations in each river basin for basic services are preferably directed to the poor and for in-stream environmental flows, before other allocations are considered (Grey & Sadoff 2007, 557).

### **4.3 Capacity development**

The UN Development Programme (UNDP) has defined the concept of capacity as “the ability of individuals, institutions and societies to perform functions, solve problems, and set and achieve objectives in a sustainable manner” (UNDP 2009).

How to do this in the face of climate change and the impacts it may have on migration and conflict? Of course individuals have to be made aware of what is happening, what may be coming towards them and what options they have in their various capacities (at home, at work, as a consumer, as a voter, as a politician) for preventative action and to cope with inevitable climate change and its impacts.

Climate change and water stress will play out differently in the various parts of the world and will be perceived differently according to the specific ecological, political, economic and cultural conditions. For the Inuit in Northern Canada and Greenland it is totally different than for the pastoralists in the Horn of Africa or for the fishermen in the mangrove areas between India and Bangladesh. The extreme droughts, floods, cyclones and firestorms in Australia have prompted the Climate Institute (based in Melbourne & Sydney) to look into the public and mental health aspects of the impacts of climate change in the country. In the Foreword of the recent report *A Climate of Suffering: the real cost of living with inaction on climate change* it says: “The emerging burden of climate-related impacts on community morale and mental health –bereavement, depression, post-event disorders, and the tragedy of self-harm – is large, especially in vulnerable rural areas.” Relocation and migration towards cities is already occurring and will increase in the future. Adequate counseling to prepare individuals and communities to cope with both the slow-onset impacts and the extreme events will have to be provided by public authorities and NGOs.

It is not possible to give a full overview of all capacity development issues related to the theme of this paper as they deal with so many aspects of human behavior on all levels, from the local to the global. Only a few concluding observations and recommendations will be given here.

### **Awareness raising**

This will have to be done around the world with all the diversity of experiences and perceptions. It is worrisome that in parts of the world where mitigation should be a political priority, climate science denial seems to be on the rise. People are unwilling to make the needed changes in life-style, especially those associated with high energy inputs, and then discard the science behind those changes. The spread of this denial in the U.S. makes it unlikely that the U.S. will come with a strong pro-active climate position to the up-coming negotiations of the 17<sup>th</sup> Conference of the Parties in Durban on a successor to the Kyoto Protocol. As already indicated, lack of a strong mitigation agenda in the coming years will aggravate the adaptation challenges with resulting impacts on migration and conflicts. Positive is that many young entrepreneurs see their future in designing and commercializing sustainability and the same holds for many of the existing major corporations. Part of it is sometimes *greenwash* but those in the private sector with a longer term perspective, including many (pension) fund managers, feel that in the end only climate-sound investments will pay back..

In the U.S. awareness amongst the military about the security threat of climate impacts has risen over the past years. They have concerns about volatile areas in Central and South Asia, about the

control of the Arctic, and about sea level rise as it affects their low-lying naval bases on the coast of the U.S. and in the Indian and Pacific Oceans. Many also realise that the U.S. armed forces as by far the biggest consumer of fossil fuel in the world, is very much part of the problem. Reducing the *footprint* is a growing focus of attention.

More awareness is needed of the special vulnerability of women and children to impacts of climate change and water stress<sup>2</sup>.

### **Institutional change**

Institutions like governments with their ministries will change when society and social perceptions change, but it may take time. Organisations, especially big organisations, are resistant to change, because of bureaucratic procedures, traditional career patterns and sometimes corruption by short-term interests. Historically unprecedented rises in temperature and frequencies of extreme weather events require new thinking and collaboration within and between ministries. How to build in proper and timely reactions to early warning signals about coming droughts or floods? How to learn from best practices in other countries and to overcome the syndrome of "not invented over here"?

The UNFCCC decisions contain provisions for financial and technological cooperation between the various countries. In the field of forests, the so-called Reduction of Emissions from Deforestation and Degradation (REDD), there will be only transfers of funds if a strict Monitoring, Reporting and Verification system is put in place. These entail the kind of institutional innovations needed to have governments mainstream climate change, water stress and the associated social impacts in their policies.

Also the traditional development agencies such as the World Bank, the regional development banks and the bilateral donors have to 'climate-proof' their projects with the recipient countries and have mitigation and adaptation options and issues explicitly taken up in the environmental and social assessments which are part of project development. (See also Klein, 2007)

Independent monitoring of relevant adaptation factors such as forest cover, wetlands, mangroves, soil moisture<sup>3</sup> is a vital tool to verify compliance with international environmental agreements as a precondition to prevent conflicts and to define situations in which environmental migrants are entitled to international assistance. Here there is a clear role for The Hague in its international capacity as Legal Capital of the World with its courts, tribunals and academic centers of expertise especially on the compliance and enforcement of international law. In The Hague scientific evidence of climate change, observations of social effects and insights in applicable legal arrangements should

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<sup>2</sup> Irene Dankelman, an ecologist specialized in gender and environment issues and a former teacher at UPEACE will be in Vietnam during the symposium delivering a training on gender, disaster risk reduction and climate change for the staff of several ministries. She works at the Radboud University in the Netherlands and is a resource person on these and the other social aspects of environmental change.

<sup>3</sup> An important role is played here by the Soil Moisture and Ocean Salinity (SMOS) satellite programme of the European Space Agency (ESA)

be brought together to help lay the basis for the practical solutions which of course have to be finalized and implemented at the local level.

### **Societal change**

Some societies are more at risk than others and some societies have a higher liability to prevent further climate change, because of their past, than others. That liability should also stretch towards assisting vulnerable societies in coping with social and humanitarian impacts of adaptation. As mentioned above, both discouraging and encouraging signs can be observed. While the climate denialists and ecologically destructive short-term interests still are formidable obstacles to global, national and local sustainability, the growing scientific evidence of climate change, water stress and its impacts on conflict and migration and the growing body of initiatives, experiences and best practices to handle these impacts in a socially equitable way plus the enthusiasm of young entrepreneurs, farmers and students all over the world, give hope.

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