An Overview of Environment and Disaster Risk Reduction in the Arab Region

A Community Perspective

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INTRODUCTION

Environmental degradation, settlement patterns, livelihood choices and human behavior are all factors contributing to disaster risks, which in turn results in even more harmfully effects on human development and environmental assets. That environment, development and disasters are interconnected is hardly disputed, but the synergies between these factors can often be confusing. At the same time as it is recognized that ecosystems are affected by disasters, it is often forgotten that protecting ecosystem services can both save lives and livelihood. Environmental degradation tends to multiply the actual impacts of hazards and limits an area's ability to absorb those impacts; this often decreases the overall resilience to hazard impacts and recovery from disasters. In other words, disasters not only reveal underlying social, economic, political and environmental problems but also contribute to worsening them and causing serious challenges to sustainable development.

In the Arab region the effects of human behavior on the environment has caused a growing concern since the early 1980s and from the end of the same decade the question of climate change has gradually received more attention. Research today predicts a particular strong impact of climate change on the Arab region which has underlined the value of natural resources and environmental conservation. With climate change it is likely that many new threats and challenges to national security and regional stability will rise. Rural and urban poor are already under stress, and for some groups such as women headed households, adaptation to climate-induced stress, and increased disaster risk will create major challenges. Climate change, water and environment management emerge as a very prominent link between disaster risk reduction and poverty reduction in the Arab region, and one must be prepared for increased disaster risk to change habitation patterns, challenge food security and compromise poverty reduction. Environment, climate change and disaster risk reduction must therefore be treated as an integrated whole to create sustainable development, and be implemented on all levels, including amongst communities.

The discussions in this booklet aim to address the complexity of risk in the Arab region, and present some tools which can be used by local governments, civil society and other institutions working in the field of environment and disaster risk reduction.

PART I:

INTRODUCTION TO DISASTER RISK REDUCTION AND ENVIRONMENTAL CONSERVATION

CHAPTER 1: Common understanding of key concepts and terminology

Recent years have seen no shortage of how devastating consequences can raise from natural hazards like floods, earthquakes, drought, storms and landslides, especially if these events occur in highly vulnerable and populated areas. Disasters compromise development and poverty reduction through macroeconomic impacts, damage to physical infrastructure, capital and stocks, as well as long term hampering of productivity, growth and macroeconomic performance. Additionally, loss of tax revenue and diversion of resources into disaster response have economic implications for state provision of social services simultaneously as food prices tend to rise. In 2008 there were a clear increase in the number of deaths and economic losses from disasters compared to the yearly average in the period of 2000-2007. A total of 321 registered disasters worldwide in 2008 killed some 235,816 persons, affected 211 million others and cost a total of US$181 billion[1].

Environment and disaster risk

The increasing incidence and intensity of natural hazards and climate change have a distinct impact on the environment and vice versa and must therefore be seen as an integrated whole. In this context environment refers to all of the external factors, conditions, and influences that affect an organism or a community. This includes everything that surrounds an organism or organisms, including both natural and human-built elements. Environmental concerns are essential components of human well-being and contribute positively to human security, providing basic materials for good life, health and social relations. If these are being compromised and overexploited it will ultimately lead to increase of natural hazards.

When natural hazards becomes a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources it is referred to as a **disaster.** In other words we can say that **disaster risk = hazard x vulnerability / capacities.**

[1] CRED, 2009; CRED promotes research, training, and information dissemination on disasters, with a special focus on public health, epidemiology, structural and socio-economic aspects. It aims to enhance the effectiveness of developing countries' disaster management capabilities as well as fostering policy-oriented research.

Disasters are first and foremost a local phenomenon where the local communities are on the frontlines of the immediate disaster impacts including emergency response, disaster preparedness and for reducing underlying risks factors. Disasters must be seen as much more than a state of emergency, as they carry longer term social impact on the affected communities including loss of public facilities like hospitals, schools and administrative buildings, followed by a compromised overall functioning of the community. For individuals, disasters effectively remove the income sources by damaging or destroying homes, livestock, infrastructure or small scale businesses. Local communities experience a vital setback in development gains already made and the longer term consequences from disasters keeps nations, communities and individuals trapped in poverty cycles. It is often the cumulative effect of high- frequency and low-impact disasters that cause most losses, particularly amongst the poor.

Disasters are often portrayed as acts of nature, or of a natural order. Yet this is not an accurate reflection of reality. The major factors influencing disaster risks are human and social vulnerability, matched with the overall capacity to respond to, or reduce the impact of natural hazards. An integrated approach including environmental conservation is often enough adopted in the field of disaster risk reduction. At the same time relief organizations tend to focus on damage to life and property, ecological services and their indirect economic values are often omitted completely from disaster assessments. Mainstreaming ecosystem concerns- both ecological and economical- into the development agenda and integrating them into disaster risk reduction, becomes essential. An ecosystem is a functional unit consisting of all the living organisms (plants, animals and microbes) in a given area, as well as the non-living physical and chemical factors of their environment, linked together through nutrient cycling and energy flow. An ecosystem can be of any size – a log, a pond, a field, a forest or the Earth's biosphere – but it always functions as a whole unit.

It is only by addressing environment and natural hazards together with poverty that we can separate communities trapped in a grinding poverty cycle, and the ones who secure lives and livelihoods. Poverty is heavily contributing to escalating disaster risk by reducing existing coping capacities and future resilience. Another patch of common ground is that the less privileged are suffering the most from the immediate and long term disaster impacts. Environmental losses are often overlooked, even if this might have the most significant and long term effects on livelihood as an income sources (e.g. agriculture) for the poor. Disasters should therefore be seen as an integrated part of development and without major efforts to address disaster losses, disasters will become a serious obstacle to achieve of the Millennium Development Goals. Consequently, hazards, vulnerabilities and capacity building needs to be considered in projects and activities aiming at enhancing environmental conservation and reducing disaster risk.

Natural hazards

A hazard can be defined as a potentially damaging physical event, phenomenon or human activity which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. It is important to keep in mind a more general understanding of the

nature of hazards since it involves a consideration of a wide range of physical phenomena. However, the frequency and impact can be influenced by environmental degradation, however due to the intricate and complex relationship between different hazards, cataloguing a hazard is often a challenging and difficult task. Primary hazards can and often give rise to collateral or secondary hazards that can pose even greater threat to a community. In the same line it is worth mentioning that when referring to natural hazards it does not mean that this is purely a natural phenomenon. It is a myth that humans have little influence over the occurrence of natural hazards, even the shortage of rainfall. Human activities triggering global warming and thereby affect the frequency and intensity of extreme climate events. On a local scale, deforestation and desertification have demonstrable effects on local rainfall patterns and are complicit with the occurrence of drought. Climate change as a global phenomenon will challenge the way humans live today and lead to intensified natural hazards like floods, storms, sea level raise, and desertification, and as such risk reduction can become a tool for mitigating the negative impact of climate change.

Human behavior triggering desertification can lead to less rainfall and increased number of droughts in the Arab region.

Vulnerabilities

Vulnerability is defined as danger rooted in conditions of physical, social, economic and environmental exposure that needs to be assessed and managed on a continuing basis. The interaction of vulnerability factors in a community is a key to understand risk reduction and should be addressed according to the balance of factors coming into play. The following should be considered when we estimate the vulnerability of a community:

Physical factors are usually materially oriented, and come from the field of landuse and planning, engineering and architecture. Vulnerability from a physical perspective, even though continually being broadened in scope, still refers mainly to consideration and susceptibilities of location and building environment. Physical vulnerability is often determined by aspects such as population density level, the remoteness of a settlement and the site, design and materials used for critical infrastructure and for housing.

Social vulnerability is normally linked to the level of well-being of individuals, communities and societies. It includes level of literacy, education, the existence of peace and security, access to basic human rights, participate/good governance, social equity, positive traditional values, customs and ideological beliefs and overall collective organizational systems. Some groups are more vulnerable than others, and people less privileged because of their class or ethnic minority affiliations or young or old age might be worse off. Public health, including physical, mental and psychological

well being is a critical aspect of social vulnerability. Traditional knowledge systems, as well as cultural aspects such as indigenous beliefs, traditions and ways of coping are important determinants in risk perception. Extreme religious belief in destiny might present a challenge in moving forward towards the acceptance of a culture of prevention and protection

Economic factors including the economic status of individuals, communities and nations related both to the possibility of higher proportional losses among the poor when a disaster strikes and to their generally more limited capacity to recover from disasters. An economy lacking in diversity is generally more vulnerable. Equally, inadequate access to basic socio-economic infrastructure such as communication networks, transport, water, healthcare facilities increases people's exposure to risk.

Environmental vulnerability includes the extent of natural resource depletion and data on resource degradation. Reduced access to clean air, safe water and sanitation and inappropriate forms of waste management, especially in heavily populated and urban environments, can aggravate socio-economic vulnerability. Poorer environmental conditions such as diminished biodiversity, soil degradation or growing food scarcity can easily threaten food security for people dependent on the products of land, forests, pastures and marine environment for their livelihoods. As natural resources become scarcer, the range of options available to communities become more limited, reducing the availability of coping solutions and reducing local resilience to hazards or capacity to recover from disasters. Over a period of time, environmental factors can further increase vulnerability by creating new and undesirable patterns of social discord, economic destitution and eventually forced migration of entire communities.

Increased presence of cyclones and storms will affect small scale fishing community's income sources and livelihood.

Increased urbanization and pressure on natural resources like water will demand development of alternative energy sources.

Capacities and coping strategies

Equally important to exposure of hazards and the vulnerability characteristics of a communities are the ability to cope, which is often referred to as capacities. A community's capacity included combination of all the strengths, attributes and resources available that can be used to achieve agreed goals. Capacity may include infrastructure and physical means, institutions, social coping abilities, as well as human knowledge, skills and collective attributes such as social relationships, leadership and management. Capacity also may be described as capability. For community based risk reduction it is important to conduct a capacity assessment which can be described as a process by which the capacity of the community is reviewed against desired goals, and the capacity gaps are identified for further action. The process by which people, organizations and society systematically stimulate and develop their capacities over time to achieve social and economic goals, including through improvement of knowledge, skills, systems, and institutions. Capacity development is a concept that extends the term of capacity building to encompass all aspects of creating and sustaining capacity growth over time. It involves learning and various types of training, but also continuous efforts to develop institutions, political awareness, financial resources, technology systems, and the wider social and cultural enabling of the environment.

Children are a valuable resource in communities and by starting education from a young age, a culture of risk reduction will be developed.

Considering the damaging effect disasters have on individuals, communities and nations disaster risk reduction needs to be mainstreamed into development policies, plans and programmes. Disaster risk reduction should be seen as concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events. It should be noted that while the term "disaster reduction" is sometimes used, the term "disaster risk reduction" provides a better recognition of the ongoing nature of disaster risks and the ongoing potential to reduce these risks.

CHAPTER 2: Environmental conservation and disaster risks in the Arab region

Linkage between environment and disaster risks

The total area of the Arab Region is about 14.2 million km^2, where 90% of it lies within arid, semi-arid and dry sub-humid areas, this in combination with socio-economic vulnerabilities[2] makes the region particularly disaster prone to hydrological hazards and climate change. The region can generally be characterized by harsh environment, fragile ecosystems and limited water resources and arable lands. It might be interestingly to note that environmental concerns, natural hazards and disaster risk reduction in the Arab region have received relatively little attention, compared regions such as the Americas, Africa, or Asia. Yet, environmental conservation and disaster risk reduction in this region are no less worthy of attention, but rather often forgotten in the midst of the economic stagnation, political conflicts and complex emergencies. This is a serious oversight, since water shortage is one of the most significant challenges for the future and natural hazards and environmental concerns often underlie the political conflicts.

Destruction after floods in Upper Egypt, climate change is causing an increase in the frequency and intensity of extreme weather events

The rapid population increase by some 3% annually (which is considered among the highest in the world) along with the changing consumption patterns and life styles have lead to increased food demand and hastened land degradation in this arid environment[3]. Land degradation in the Arab region due to misuse is widespread and is proceeding at accelerating rates. Failures of resource management policies are aggravated by overgrazing, overexploitation of water and land resources, over-cultivation of marginal lands, deforestation, and the use of inappropriate technologies. Years with intensified impact of drought and desertification affects rural areas, the agricultural sectors as well as the urban centers and economic development. By the end of the last century and in spite of the national, regional and international efforts to combat desertification and mitigate the effect of drought and desiccation, desertification is still one of the major environmental problems in the Arab Region. Egypt, Tunisia, Algeria, Syria, Jordan have all over the years experienced re-occurring droughts leading to reduction in agriculture and food shortage, and the recent droughts in Jordan and Syria were the worst recorded in 30 years.

[2] According to World Bank hotspot study 2005, 5 of the most disaster prone countries of the world are located in the Arab Region: Jordan, Tunisia, Algeria, Morocco and Lebanon.

Flash floods have claimed many lives and severely affected the livelihoods of thousands of people across the region. In March 2003, flooding in the Jordan River caused extensive damage to farmland leading to loss of an entire season's crops. Most recently in October 2008, Algeria, Morocco and Yemen have experienced extraordinary flooding. In Yemen floods displaced approximately 25,000 people and destroyed more than 3000 homes beyond repair. Algeria and Morocco were hit by the worst flooding for decades affecting more than 12,000 families. It is also worth mentioning that the region experienced its first cyclone in 2007 at a speed of 170km/h with strong winds, heavy rain and high tides. The most severe impact was registered Oman where a floods and landslides lead to millions of US$ in economic damage.

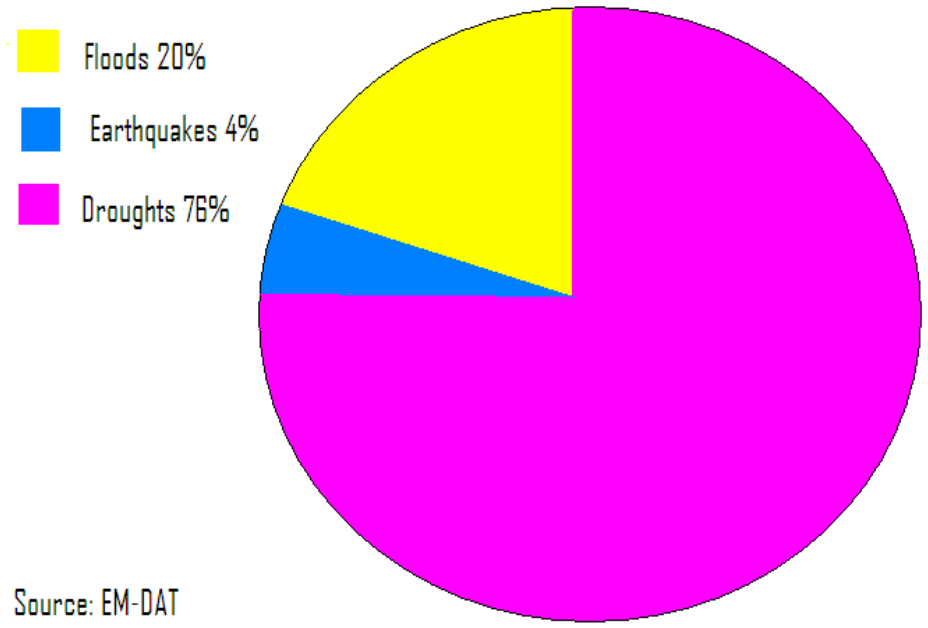
After drought and floods, earthquakes represent the most significant risk to human livelihood in the Arab region. Earthquakes have affected approximately 1.3 million people and caused more than US$11 billion in economic damage in the Arab region between 1980 and 2008. A number of earthquakes have been recorded in the region over the last years, Jordan (February 2004) and in Lebanon (February 2008) both with minimal damages to lives or infrastructure. However, the 1960 earthquake in Morocco resulted in about 12,000 fatalities and the recent one in February 2004 left 600 people dead and more than 30,000 people homeless. The 1980 earthquake in Algeria resulted in about 2,500 deaths and in 2003 another earthquake caused more than 500 deaths and 4500 injuries. The earthquake of 1992 in Egypt left more than 370 people killed and at least 3300 hurt. Along with earthquakes, aftershocks can cause secondary effects, the nontectonic surface processes that are directly related to earthquake, including tsunamis, landslides, liquefaction and ground cracking. In mountainous areas landslides often follow as a reaction to the earthquakes. This includes rock falls, rock slides, rock avalanches, soil block slides, slow earth flows and soil lateral spreads. If rock and landslides are not dealt with they can end up covering fertile land and thereby destroy or reduce agriculture production.

Implementation of building codes are of critical importance in seismic zones

Additionally, the region contains active sea-floor spreading in the Mediterranean, Red Sea and the Gulf of Eden, posing a threat of a tsunami as well as an active tectonics in the Atlas Mountains of the Maghreb countries. Tsunamis can in a simplified way said to be long-period ocean waves which are usually caused by sea-floor movements during an earthquake. This causes waves that get higher as it reaches shallower water and in the worst case scenarios the waves will hit land with such a strength that the livelihood nearby will be damaged. The Indian Ocean Tsunami in December 2004 in an example still fresh in most minds, which affected Oman, Yemen, and Somalia in the Arab region. The Mediterranean is also earthquake prone and tsunamis have occurred through the history of the region and should still be considered as a potential natural hazard. Tsunamis damages the coral reefs, mangroves, sea-grass beds, beaches and coastal wetlands can be severely damaged, depleting natural resources that communities rely upon for survival. Food security is

directly tied to marine resources for many of the coastal communities in the region. In order to make sure fisherman can rebuild their economy and people can eat, reefs, wetlands and marine protected areas must be restored after a tsunami. Environmental Conservationists should therefore work with local officials to rebuild the lost scientific and management capacity needed to bring damaged ecosystems back to health. However, early warning systems and risk reduction can reduce the negative effects a potential tsunami can have on the Arab region. A schematic distribution of the most common hazards is displayed in figure 1.

Figure 1: Number of total affected population in Arab Countries[4] due to disasters caused by natural hazards between 1980 and 2008[5]

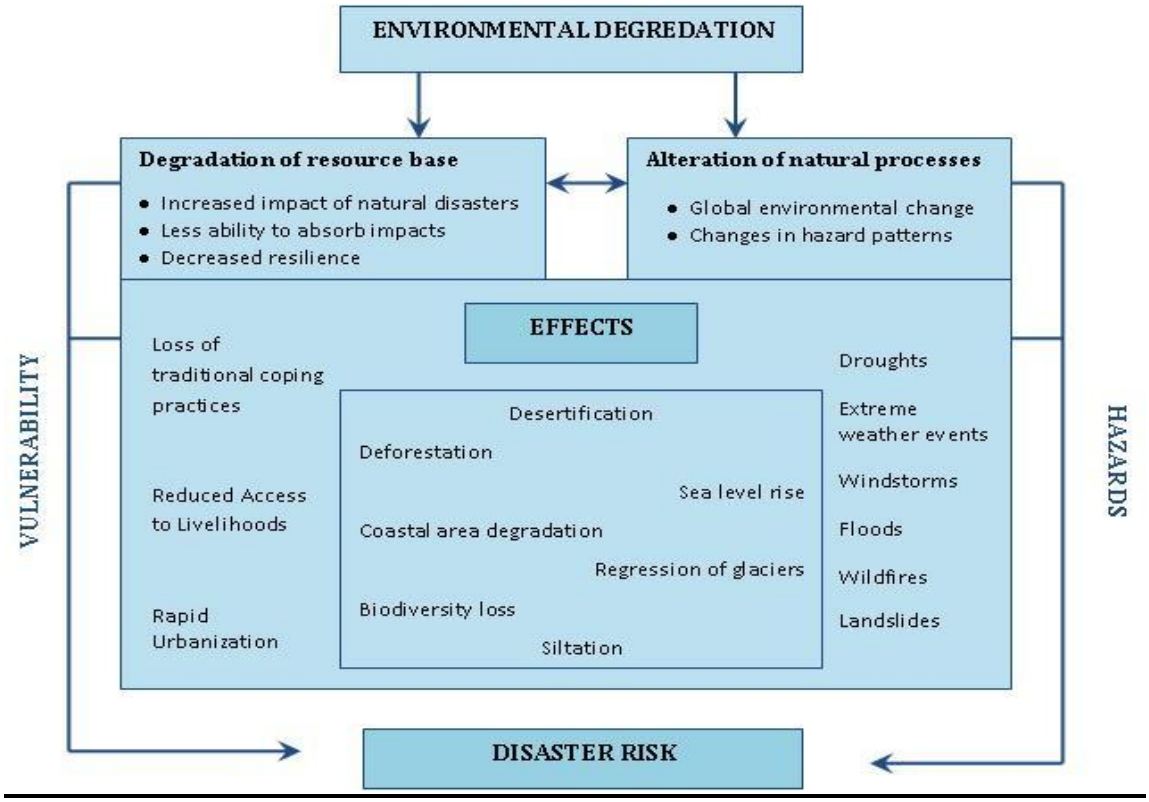


As disasters are the convergence of hazards and vulnerable conditions, and vulnerabilities are increased by environmental degradation, settlement patterns, livelihood choices and behavior, environmental dimensions must be addressed in disaster risks reduction measures. Environmental degradation multiplies the actual impacts of hazards and limits an area's ability to absorb those impacts, which in turns decreases the overall resilience to hazard impacts and recovery from disasters. Understanding and recognizing the linkages and interconnectedness between environmental degradation, vulnerabilities and disaster risk will enable the development of comprehensive approaches to reduce disaster risk and protect communities. At the same time, it should be recognized that as much as environmental degradation is a hazard in itself, the

[4] Data cover the following countries: Algeria, Comoros, Djibouti, Egypt, Iraq, Jordan, Lebanon, Libya, Mauritania, Morocco, Oman, Palestine, Sudan, Syria, Tunisia and Yemen.

environment is vulnerable in times of disasters and should therefore be considered in damage assessments and in the reconstruction phase of a post-disaster recovery process. Figure2 presents a diagram illustrating the linkages between vulnerabilities, environmental degradation and disaster risk.

Figure 2: Linking environmental degradation, vulnerabilities and disaster risk[6]



Source: Living With Risk (2004)

Environment, climate change and natural hazards

Climate change is now one of the most pressing environmental concerns, and it cannot be overlooked as the consequences are already affecting livelihood in many countries worldwide, particularly the low and middle income countries. Most scientists agree that global warming is a reality, and the Intergovernmental Panel on Climate Change (IPCC) states there is a "very high confidence" that humans have played a major role in climate change since 1750 by overloading the atmosphere with carbon dioxide and other greenhouse gases. Arab region is expected to be one of

[6] Living with Risk: A global review of disaster reduction initiatives. United Nations, International Strategy for Disaster Reduction (ISDR), Geneva, 2004.

the most vulnerable regions to the impact of climate changed due to environmental and socio-economic preconditions. This implies that urgent measures must be taken.

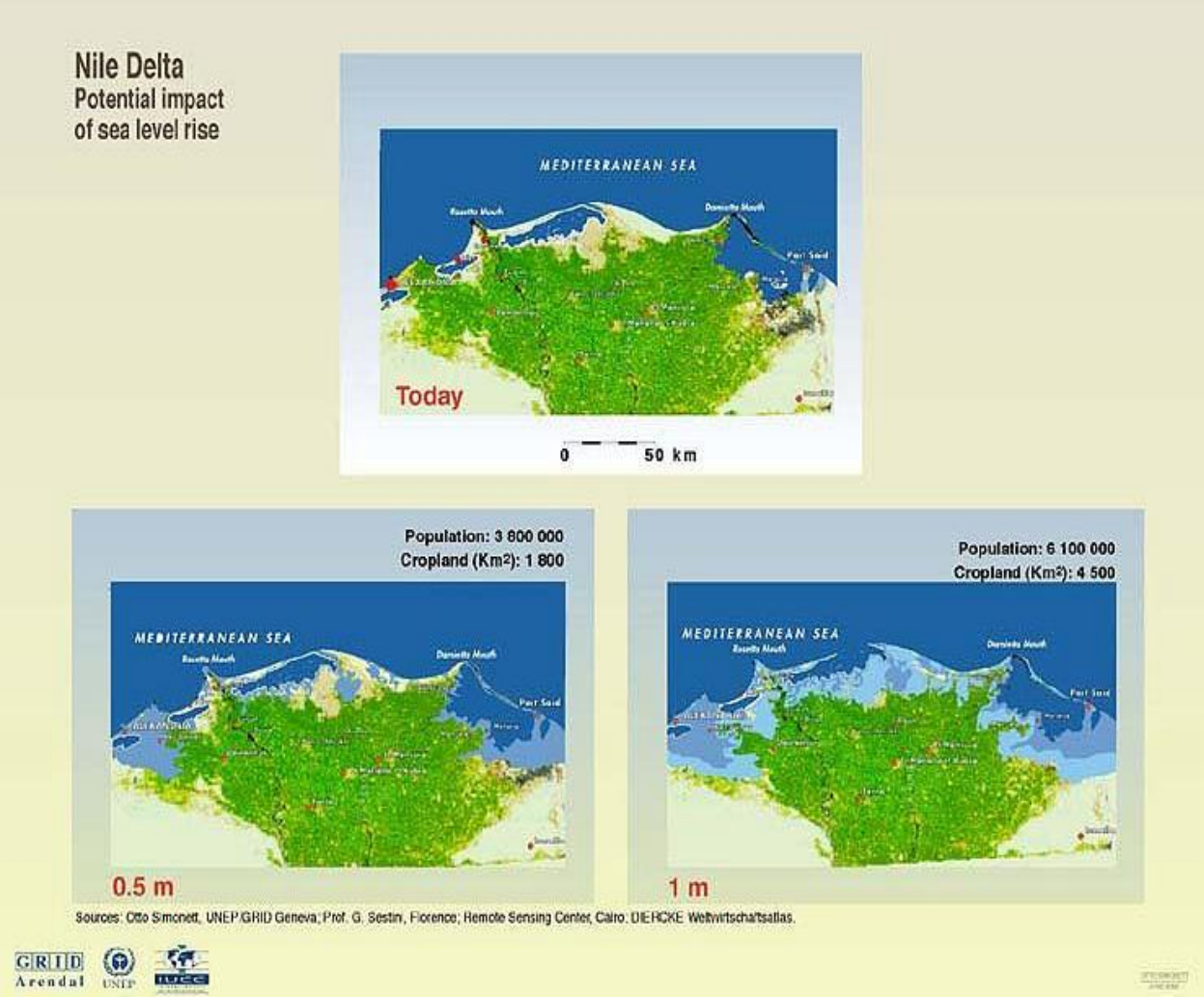
If current trends in emissions of greenhouse gases continue, global temperatures are expected to rise faster over the next century than over any time during the last 10,000 years. Due to the observed and projected increases in temperature, evaporation, sea level and precipitation variability, depletion of underground water and of freshwater systems might cause serious problems for the livelihood in the region (IPCC, 2007a). The communities should also be prepared for extreme precipitation events, which are likely to increase in frequency and intensity, enhancing flood risk. Increased frequency and severity of floods and droughts will also have implications for sustainable development (IPCC, 2007a). Another example of the combined effect of climatic factors and physiographic features is the formation of serious floods during the rainy season. Despite the low rate of rainfall, expanded areas of watersheds lead to the collection and formation of floods going with a high rate through wadies or dry areas, causing damage to installations, infrastructure and farmlands. A clear example is the flash flood that occurs in Sinai, Egypt, where watersheds of extended areas and an annual average rainfall of only 50 mm can cause serious floods and follow slope patterns to the Gulf of Suez and Gulf of Aqaba.

Another effect of climate change will be intensity of storms and winds. The processes of wind erosion, mobile sand dunes and sand encroachment are active in all countries of the Arab region. The areas affected, along with the rate and the magnitude of the adverse environmental impacts of such processes, vary from one country to another. Wind erosion is one of the major factors of land degradation, both at the national and regional levels. The problem of sand drifting is due to climatic factors, combined with geological aspects of soil attributes and human-induced factors, including deforestation. Rates of deforestation are particularly high in the tropics, where the poor quality of the soil has led to the practice of routine clear-cutting to make new soil available for agricultural use. Moreover, military operations in wars and conflicts cause considerable changes in surface features, which stimulate deflation, abrasion and drift migration. The adverse environmental and land degradation impacts of sand encroachment and mobile dunes include encroachment on productive agricultural lands, leading to marked lowering of productivity and loss of top soil layers of higher fertility and soil nutrients. Wind drifts cause serious constraints to infrastructure and adverse impacts on health and social activities. Water shortage is already the main constraint in most countries of the region, and IPCC model simulations indicate that water scarcity may worsen substantially as a result of future changes in climatic patterns, including change desertification, rainfall patterns and sea level rise (SLR).

SLR comes as a consequence of rising temperatures, and it is may cause the loss of significant portions of agricultural land in the Arab region. It is very likely that 20th century global warming has contributed significantly to the observed sea level rise, through thermal expansion of sea water and widespread loss of land ice (IPCC, 2001b). One meter SLR can potentially result in loss of 12% to 15% of agricultural land in the Nile Delta region, and reduce Qatar's land area by 2.6%.

The UN-HABITAT report "The State of African Cities 2008" further states that "without human intervention to prevent catastrophe, a 50 cm increase is predicted to displace over two million people, destroy 214,000 jobs and cost over $35 billion in the coastal area between Alexandria and Port-Said." [7] Several studies on global warming highlighted the serious and potentially catastrophic impacts of climate change on the Nile Delta, the breadbasket of Egypt and the home for almost one third of Egypt's 80 million people. Not only lives would be lost with rising water levels and increasing salinity in the Delta, but people's livelihoods will be devastated and ecosystems will be damaged. Higher temperatures will throughout the region affect the water resources and food production; furthermore it will increase the incidence and impact of drought in the region, which already has been documented in Algeria, Morocco, Syria, and Tunisia[8].

Figure 4: The potential impact of sea level rise in the Nile Delta, Egypt.



Vulnerabilities and disaster risk reduction

As a whole, the region has seen little decrease in absolute poverty measures since the early 1990s. The political and social challenges mixed with pockets of hardships and poverty is hiding behind significant wealth throughout the region. Moreover, the Arab region had one of the lowest per capita GDP growth rates in the 1990s and early part of this decade, which translated into slow progress in human development compared to other developing countries. Alternative income sources should be developed as climate change will present a threat to major income bringing sectors like agriculture and tourism throughout the Mediterranean coastal zones. In North Africa and the Middle East, changes in average climate is associated with a doubling of carbon dioxide which can cause yield losses of over 20 percent for wheat, corn and other coarse grains - even before allowance is made for losses through other causes. In coastal zones large areas of productive land may be lost through flooding, saline intrusion and water logging. In Egypt, for example, agricultural production may cease altogether over an area extending 20 km inland. In the coming years it will be critical to provide for drought resistant cropping strategies, including contingency cropping patterns to match late or early rains, (floods or droughts), closely linked to meteorological monitoring and forecasting to maximize the gain of agriculture.

The rapid urbanization in the Arab region in combination with increased vulnerability to disasters creates a higher demand for urban planning, identifying, assessing and monitoring risk. The changes in agriculture will create an increased pressure on already strained urban areas. Over 50% of the Arab population is now living in urban areas, which is an increase of 100% in less than 50 years[9]. The rapid urbanization, population increase, development of critical engineering mechanism for industrialization of cities with modern types of buildings and the concentration of population living in hazardous areas are matter of growing concern. Care has to be ensured to enforce and apply land use by laws which are consistent with hazard risk mapping; landslide prone slopes and flood prone river banks should be ecologically conserved while providing hazard safe and livelihood accessible areas to slum dwellers. Furthermore, seismic proof construction and building codes are hardly observed or enforced in the region. Risk reduction measure and disaster preparedness will not only minimize damages in case of disasters but also safe-proof development gains in the region and prevent adverse effects for the economy which at this stage is affected by the global struggle. While urbanization demands improved water supply for productive activities which raise economic growth through agriculture and the urban

Rapid urbanization is seen as one of the most prominent environmental problems and increases the vulnerability to disaster risks.

manufacturing and service sectors, care has to be taken to ensure balanced utilization of ground water where extraction does not exceed the natural rates of re- charge, and measures to enhance ground water recharge and conservation need to be dovetailed to prevent losses from future droughts and floods on account of ground water depletion.

Agriculture is the highest water consumer in the region (some 80 per cent of total consumption) and the main cause of over-exploitation and degradation of quality. The situation is further complicated by the fact that several water resources are shared by a number of countries. At national level, policies, investment in technology and innovative water use have been employed in an attempt to conserve and protect the available resources. However, the policies adopted and actions taken seem to be largely ad hoc and are therefore of limited effectiveness. Other substantial impediments in most of the Arab region include the relative lack of scientific information on natural hazards and biodiversity of the region, and the difficulty of sharing relevant research findings between them self in spite of having powerful inter governmental organizations in place. Water storage and water management infrastructure improve water management for agriculture, but should integrate measures to make this structurally hazard resistant, e.g. check dams in seismic zones to be seismically safe, or in landslide zones to be consistent with soil stabilization measures

Political and institutional commitment in the Arab region

A comprehensive approach to reduce disaster risks is set out in the United Nations-endorsed Hyogo Framework for Action, 2005-2015 (HFA), adopted in the Second World Conference for disaster reduction in Kobe, Japan 2005. HFA can support national and local institutions to implement disaster risk reduction activities in the Arab region as HFA urges governments to pursue the *"substantial reduction of disaster losses, in lives and in the social, economic and environmental assets of communities and countries"*. The government of the Arab region has increasingly acknowledged HFA as a tool and guidance towards a holistic disaster risk reduction approach. HFA set out three strategic goals and five priorities of action, and environmental concerns and opportunities are relevant to the implementation of all five priorities of action. However, priority of action number 4: Reduce the underlying risk factors, especially recommends environmental and natural resource management. In the aftermath of the Kobe Conference a number of supporting documents like Words Into Action: A Guide for Implementation the Hyogo Framework (2007), Indicators of Progress: Guidance on Measuring the Reduction of Disaster Risks and the Implementation of the Hyogo Framework for Action (2008) have been published to provide the "know how" for governments, regional intergovernmental organizations, UN agencies and NGOs in the

Political commitment is a process based on negotiations- which afterwards must be implemented at all levels.

implementation of HFA. Upon request of the governments in the region United Nations International Strategies for Disaster Reduction (UNISDR) established a regional office in Cairo to support the implementation of HFA in the West Asian and North African region.

In the Arab region, the League of Arab States (LAS) is taking the lead in promoting the integration of disaster risk reduction measures in key regional policies on climate change, environment and disaster risk reduction coordination mechanisms. It also supports and calls for the implementation of HFA at the regional and national levels. Most recently, the Council of Arab Ministers Responsible for Environment (CAMRE), in its 20th session, 20-21 December 2008, has reaffirmed commitment to reduce disaster risk and increase cooperation and coordination with the International Strategy for Disaster Reduction (ISDR) to ensure implementation and follow-up of HFA and establishment of national platforms or committees for risk reduction across the region.

In general, there is a progressive trend of understanding and recognition of the negative impact of environmental degradation and the need for coping with the environmental emergencies and disasters. Yet the linkages between environmental degradation, vulnerabilities and disaster risk reduction has not appeared nor been appreciated across national environmental policies or disaster management plans. The integration of the concept of disaster risk reduction into environmental management and climate change adaptation came clear in the Arab Ministerial Declaration on Climate Change, adopted in the Council of Arab Ministers Responsible for the Environment in its 19th session 5-6 December 2007. The Declaration among other recommendations stresses on the potential risks of climate change and calls for adaptation programmes to *"include appropriate mechanisms for risks insurance, improvement in the management efficiency of natural resources through the use of appropriate techniques and advanced monitoring, control and early warning systems, as well as adequate preparedness to confront disasters caused by climate change".* Nations and local actors need to support the implementation of these polities to make words into action.

Arab Network for Environment and Development (RAED) is gathering and creating an umbrella for civil society organizations all over the Arab region and it enjoys an observer status in the Council of Arab Ministers Responsible for Environment (CAMRE) and the Council of Economic and Social Affairs. Thus, RAED can provide an excellent link between the policy level and local level where the 250 members organizations in 18 Arab countries carry out they daily work. Thought its network and partners RAED has close cooperation with the national and local governments in the region and well as UN agencies. To further strengthen integration of disaster risk reduction into environmental practices in the region RAED and UNISDR formed a partnership which was formalized through a MoU, signed 14 August 2008. The two organizations are now cooperating closely with a number of joined activities at a regional and national level.

PART II:

TOOLS FOR IMPLEMENTING DISASTER RISK REDUCTION IN ENVIRONMENTAL HAZARD ZONES

CHAPTER 4: Community Approach

Women and men often play different roles in a community and both groups should be seen as an asset for reducing environmental vulnerabilities and risks

Disasters can strike with surprise or they can be a seasonal hazard that comes around every year. In both cases, the communities can provide a valuable framework for analyzing patterns of vulnerability to environmental change and identifying opportunities for reducing these vulnerabilities. By community, we imply both rural villages and urban neighborhoods. It can be difficult for an outsider to identify a community as the description of "where a community starts and ends" depends on feedback from the community itself. A community can therefore be defined in several ways, but most definitions include common features like experiences, locality, culture, language and social interest. These characteristics imply that a community needs to have some common social structures as glue- this can typically be schools, community policies, common rules and regulations and in most cases a clearly defined geographical area.

A community based approach to environmental conservation and disaster risk reduction would be incomplete without recognizing that environmental degradation is in itself a hazard. The loss of biodiversity or desertification, for instance, will continue to severely affect local communities and wider economic systems. Environmental management and community-based resource management can promote more resilient communities through supporting sustainable livelihoods, conflict prevention and strengthening cooperation for good governance. Political commitment needs to be present, but isolated governmental and institutional interventions have proven themselves to be insufficient, occasional and only reactive, and are often far more costly than developing local disaster risk reduction capabilities. Therefore it is recommended that community based disaster risk reduction is a process within and for the community; which means that activities, projects and solutions should be tailored for the individual community. When the

process is lead by the community itself and not as an official request from the central authorities, it is often referred to as a "bottom-up" process.

Box 1: Views from the Frontline

The Global Network for Civil Society Organizations for Disaster Reduction, Arab Network for Environment and Development (RAED), and UNISDR have lead the community based disaster risk reduction study "views from the frontline" in the Arab region. This is a global study which is meant to supplement the Global Assessment Report which is an important contribution to monitoring implementation of HFA. This study will be able to look into disaster risk reduction at community level, collecting information from local governments and civil society organizations to document their experiences and provide some direction how disaster risk reduction could be strengthened at local level. World Vision in Lebanon, the national coordinating organization in Lebanon, has found that through their questionnaires the project has also indirectly raised the awareness of disaster risk reduction amongst the respondents and the participating organizations as well as highlighted the importance of disaster risk reduction initiatives for the specific community and its development.

Moreover, the project results provided baseline data, not just to monitor the progress made towards HFA but it also identify gaps in areas where action needed. By including the communities their exercise is utilized for identifying strengths and weaknesses in the respective community.

The full report of views from the frontline is available from June 2009.

To make disaster risk reduction sustainable for communities located in environmental hazard zones, a large number of diverse actors must be involved in the process and committed to follow ups any further actions. Involvements from the most vulnerable groups, like women and children are considered vital for successful and sustainable long-term achievements. Often, financial means for assisting the implementation of the specific project comes from a central governmental or even from external donors: this may bring about complications as decisions are not made in the community. In particularly for mitigation projects such as reinforcement of river banks or more physical structures this will challenging as the community members need to be a part of the process to learn to preserve the structures after ended project cycle. Thus, community members should in these cases participate in the design and construction processes to ensure community ownership and maintenance skills. The successful use of community based disaster risk reduction approach is based on the combination of all capacities, including all strengths and resources available for reducing disaster risk within individual community.

In the initial phases of a community based disaster risk reduction often contains a risk assessment, including risk mapping, then continuing with establishment of a risk monitoring and evaluation

system. Based on the outcome of the risk assessment the local government develops local plans, early warning system and educational activities. The following chapters will look into some of the basic of these processes.

CHAPTER 5: Risk Assessment

Risk assessment is a common first step in a community based disaster risk reduction process and there is a variety of tools available. The following steps and tools are not meant to be all-inclusive, but rather to present and explain a few of the techniques used to develop and assess risk at a community level.

A strength, weakness, opportunity and threat (SWOT) analysis

SWOT analysis can be a useful tool in the initial phase of a risk assessment as guidance for the community to capture and identify the community's overall areas of development including geographic and programmatic scope of action, perceived effectiveness and level of acceptance and support by community members and local institutions. Identification of the SWOT is essential because subsequent steps in the process of planning for achievement of the selected objective for the community might come as a result from the SWOT analysis. The benefits of the technique are the identification of the links between each of the perceived "threats" which relates to the community's "weaknesses", the "weaknesses" to related "opportunities", and the "opportunities" to related "strengths". The items at which the most lines (links) converge indicate the priority threats to be mitigated, weaknesses to be corrected, opportunities to be seized, and strengths to be reinforced. An example of results from a SWOT analysis is presented in figure 3.

Figure 3: Fictive results of a SWOT analysis

Strengths	Weakness	Opportunities	Threats
Local knowledge of water resources and seasonal floods	Lack of people centered early warning systems	Well established flood management systems	Information about floods are not reaching the population in timely or comprehensible manner
Autonomy for the local governmental administration	Lack of integration of environmental conservation in local development plans and policies	Ability to carry out development plans and policies without macro management from national level	Local government show little interest in investing in environment and disaster risk reduction

The SWOT analysis can be complemented by **an environmental impact assessment (EIA)** which is a policymaking tool that provides information on the environmental impacts of activities. The EIA encourage the private sector and individuals to consider the impacts of their actions on vulnerability factors. As part of a detailed risk assessment EIA can provide alternative solutions for how to include environmental considerations in disaster risk reduction measures. The focus on environmental change as a parameter of risk also reminds us that risk is not always systematic but rather it changes with time, social, political and economical conditions, and reflects vulnerability and capacities for a specific community at any given time. An EIA could be used to assess risk in coastal areas facing sea level raise, e.g along the Mediterranean, to assess the impact on agriculture and food security. It should however be noted the EIA is not necessary an easy task to administer and it can be a costly and time-consuming process. The short coming of this technique include the current focus on post-event impact assessment and not promoting its use as part of the planning process, although the results can efficiently feed into a SWT analysis and future policies and strategies.

Hazard and risk maps

Following the SWOT analysis, the community can benefit from developing a **hazard and/or risk map**, which displays the community or geographical zone that identifies the places and the structures that might be negatively affected by a natural hazard. Mapping can be of a single hazard such as fault maps and flood maps, or it can take form as a multiple hazard map which combines all the present hazards in a single map to give a composite picture of the situation. The individual mapping technique can be beneficiary in certain situations as it is a visual form of information which can be easily be understood by decision makers and planners. Multiple hazard maps provide other strengths as it has the possibility of providing common recommendations for mitigation techniques, outline sub-areas requiring which more information, additional assessments, specific hazard-reduction techniques which needs to be identified and land-use decisions benefiting all hazard considerations simultaneously. The production of a risk map requires consideration of areas and features threatened within the community or geographical zone, consultation with people and groups of varying expertise, and the discussion of possible solutions to reduce risk. Hazard/ risk maps can help to locate the major hazards and function as shared criteria for decision-making, provide a record of historical events that have had a negative impact on the community, and identify risks so the community can find solutions or take precautions. The limitations of the technique are that the volume of information needed for natural hazards management, particularly in the context of integrated development planning, often exceeds the capacity of manual methods and thus drives the use of computer assisted techniques.

One of the most common computer assisted techniques is the so called **geographic information system (GIS).** This is a mapping which uses a geographic information system, a computer-based tool, for risk and/or hazard mapping. The benefits of the technique are the increase in productivity of hazard-mapping technicians, it can give higher quality results than what can be obtained manually and it can facilitate decision-making and improve coordination among agencies when

efficiency is at a premium. The limitations of the technique include the lack of trained personnel, difficulties in exchanging data between different systems, the challenge of including social, economic and environmental variables, variability in access to computers and the quality and detail of the data required by GIS analysis.

A successful risk assessment should be able to provide information on where, when, how and why environmental degradation and disasters are likely to occur. As seen in this chapter, the information can be presented in many forms, including telemetric data that alert to seismic activity in real time, climate projections that help explain long-term changes, and forecasts that indicate upcoming storms. In addition, risk information also conveys important descriptions of patterns and causes of vulnerability. Monitoring and observation of environmental conditions includes a mix of space- and ground-based systems. Environmental information is also the basis for spatial planning for identifying appropriate buffer zones, land use or building codes. It feeds into the models, forecasts and projections that help anticipate and reduce risk. Risks and vulnerabilities are dynamic by nature and must therefore be a continuous effort.

RECOMMENDATIONS FOR CONDUCTING RISK ASSESSMENTS

- Introduce local actors for identification, prioritization, implementation and supervision of mitigation work;
- Timely availability of resources;
- Continuing with specific capacity-building work, for instance, by the use of GIS;
- Risk assessments and analyses are important when establishing the historical pattern of disasters, as it helps to identify and implement mitigation measures based on past experience.

CHAPTER 6: Disaster risk reduction as a part of Local Planning

The risk assessment can function as a door opener for good governance, local planning and facilitate a structured dialogue amongst stakeholders. Regulatory frameworks for environmental conservation and disaster risk reduction need to be enforced, and the political will to balance competing interests and bring about the many changes that may be necessary are not a one-time effort. Rather this is a continuous process needing a strong nation and local policies and plans, and multi-sectoral coordination mechanisms to ensure a sustainable effort in implementing the same plans. As such, good governance is not only a matter of legislation, as it is also a question of appropriate, effective and flexible institutions. Key options for improving how institutions address environment and disaster-related issues include fully engaging environmental managers in local disaster risk reduction mechanisms and incorporating risk reduction criteria in environmental regulatory frameworks.

Moreover the governments and local administration needs to take environmental conservation and disaster risk reduction into account for strengthening the resilience of their development investments. Environmental management supports risk reduction through protecting and enhancing the ecological conditions that promote resilience and adaptation to a changing climate. It is therefore vital the causal links between development, disaster risks and environmental degradation is recognized in poverty-reduction activities. To succeed this can therefore not be done through one department or sector within the national or local administration as disaster risk reduction is per definition multi-sectorial by nature.

A multi stakeholder dialogue aiming at a common goal is a functional method to incorporate the stakeholders concern and address the complexity of disaster risk reduction. This form of interaction helps in building a consensus for how to reduce disaster risks within the specific community, at the same time as the process itself enhances social awareness of hazards, vulnerabilities, coping mechanisms and risk reduction. As a result vulnerable stakeholders will be empowered through information sharing and coalition building and promotion of action by local governments, private entities, women and civil society. Dialogue helps to clarify roles and can lead to collaboration between institutions and across sectors at a community level.

Effectiveness of disaster risk reduction:
Disaster risk reduction policies and plans can be said to be effective if the policies and practices of all sectors incorporate risk-reducing elements, if political support is developed for disaster risk reduction expenditures and regulations, and if the agencies and people responsible for implementation know what is expected then and are willing to act.

Box 2: National Environmental Day for Egypt (27th of January)

Arab Office for Youth and Environment (AOYE), an Egyptian NGO took the lead to initiate the National Environment Day in Egypt. This day has been celebrated the 27th of January every year since 1997, and it highlighting the importance of follow-up on the Environmental Law which has been active since 1994 in Egypt as well as promoting environmental issues on the national agenda. Every year one specific environmental theme like the river Nile (2006), climate change (2007/08), disaster risk reduction (2009) is selected for a public event gathering more than 150 persons from the governmental institutions, academia, civil society and the media. The participants are coming from all over the country which gives the local actors a chance to raise concerns regarding implementation of environmental conservation at a community level and benefit from interaction with counterparts from a vide specter of sectors. This is an excellent example to illustrate how the civil society can take the lead in shaping the development agenda, and function as a mediator for information sharing between the stakeholders working in the field of environment as well as disseminate information about these public concerns through the media.

A initial multi stakeholder workshop or consultation can bring all relevant community stakeholders together before the risk assessment, to make the assessment itself a consultative process. The second workshop would typically be to present the results from the risk assessment. The governmental departments in the local administration, NGOs and Red Cross/Crescent local branches, universities and other relevant stakeholders should be involved throughout the process and have the chance to be heard. A key to success would be to produce clear and a tangible recommendation for further planning processes to reduce disaster risk. However, it does require effective leadership which is often done through appointment of a focal point institution. This is likely to prevent diffusion of responsibilities.

National policy, legal and institutional frameworks for disaster reduction needs to be known for the involved stakeholders at a community level. If national frameworks illustrate clear gaps, it might be a goal to enhance or create a formal basis for guidelines on how to achieve safer communities. More specifically, this task will help to identify capacities and gaps in the policies, legal and institutional frameworks; to design effective plans and programmes to improve the identified gaps and to develop a baseline from which the individual community can measure and monitor progress. To identify areas of improvement and to foster buy-in for proposed changes, participatory self-assessment is generally more effective than evaluation by outsiders. National enhanced policies on disaster risk reduction can also contribute to improved governance, for example by stimulating local government policymaking and action, strengthen land-use planning and build safety enforcement. It is therefore of critical importance that an open dialogue is kept between the local and central administration.

Without commitment at national level, local disaster risk reduction planning will be more challenging. However, there should be a combination of a top-down with a bottom- up approach where national or central governmental institutions needs to recognize that decision-making processes should be kept close to the community at risk, have clear lines of accountabilities based on established responsibilities, and enable multiple stakeholders to contribute to environmental conservation and disaster risk reduction. Yet, even very good process may not succeed in converting recommendations into changes in the legal framework due to lack of political commitment or resources, and/or competing priorities and stakeholders interests. These obstacles can be overcome by gaining support from political leaders, launching a media campaign, appointing a disaster risk reduction champion who will advocate and support the process or engage in public interest litigations (in situations involving public safety). In other words, this is a living process where institutional assessments need to be updated periodically to reflect ongoing changes in risks of a given community and administrative arrangements.

Developing a comprehensive package of policies and programmes should consider both structural and non-structural measures. Structural measure includes such as a programme to develop a communication system that provides real-time climatic or hydrological information/ data bases, accompanied by non-structural measures, such as training government officials on how to use the information in the data base for their decision making.

Implementing strengthened or newly established local frameworks for disaster risk reduction will need financing. Often the funding comes from central level or from international organizations, which might delay or even complicate the process. However, with directed and dedicated lobbing from the community it is likely that the funds will follow based on the results of the risk assessment. Additionally, dedicated budget lines and funding mechanisms are essential means to integrate disaster risk reduction into development programmes, plans and policies. Amongst other possibilities, national and local governments could consider setting aside a percentage of development budgets for mitigation funds to support hazard-resistant or vulnerability-reducing components within ongoing development projects. Investments in disaster risk reduction projects can save lives, livelihood and millions of dollars for a community in longer term, and are therefore justified as a development asset.

RECOMMENDATIONS FOR LOCAL PLANNING

- Influencing policy makers to recognize successful practices for national and international dissemination might assist the process also on local level;
- Participatory plans and community-driven approaches are of the utmost importance for achieving objectives and goals;
- An integrated development approach is needed for tackling complex situations involving environmental conservation and disaster risk reduction;
- Establishing agreements with local- and municipal governments are of the utmost importance. It allows for clear identification and distribution of roles and responsibilities among stakeholders. It also encourages transparent municipal administration, in coordination with strategic allies.

CHAPTER 7: People Centered Early Warning Systems

Basic principles for people centered early warning systems

The objective of a people centered early warning system is to empower individuals and communities threatened by hazards to act in sufficient time and in an appropriate manner to reduce the possibility to personal injury, loss of life, damage to property and environmental degradation. People-centered early warning systems rely on the direct participation of those most likely to be exposed to hazards. Without the involvement of local authorities and communities at risk, governmental interventions and responses to hazard events are likely to be inadequate.

A local, bottom-up approach to early warning, with active participation of local communities enables a multi-dimensional response to problems and needs. In this way, local communities, civic groups and traditional structures can contribute to the reduction of vulnerability and the

strengthening of local capacities. In developing early warning systems it is essential to recognize that different groups have different vulnerabilities according to culture, gender or other characteristics that influence their capacity to effectively prepare for, prevent and respond to disasters. Women and men often play different roles in society and can thereby be influential towards disseminating information to different community members. In more traditional societies women tend to be the key person to prepare families, children and the household while men have more decision making power. Elderly, disabled and socio-economically disadvantaged tend to be the more vulnerable groups demanding special attention. Information, institutional arrangements and warning communication systems should be tailored to meet the needs of every group in every vulnerable community.

Multi-hazard early warning systems are often activated and used rather than a single-hazard warning systems. Economies of scale, sustainability and efficiency can be enhanced of systems and operational activities that are established and maintained within a multi-purpose framework that consider all hazards and the needs of the end user. Multi-hazard systems also help the public better understand the range of risks that face and reinforce desired preparedness measures and warning response behaviors. A complete and effective early warning system comprises four inter-related elements, spanning from knowledge of hazards and vulnerabilities through to preparedness and response capacity. There should be strong inter-linkages and effective communication channels between all of the four elements which are further described below.

Steps towards a successful people centered early warning system

The first step of a successful early warning system is to know the risks where data is systematically collected followed by a risk assessment. As seen in part I) risk arise from the combination of hazards, vulnerabilities and the communities' ability to cope, at a particular location- one or more of these three factors can easily change over time and it is therefore of great importance that risk assessments are updated on a regular basis with systematic analysis of data. It will therefore be of particular importance to consider the dynamic nature of hazards and vulnerabilities that arise from processes such as urbanization, rural land use change, environmental degradation and climate change. Risk assessments and maps help to motivate people to prioritize the need of a early warning and guide preparations for disaster prevention and responses.

Simple Checklist for People Centered Early Warning Systems:

Risk Knowledge:
- Are the hazards and the vulnerabilities well known?
- What are the patterns and trends in these factors?
- Are risk maps and data widely available?

Monitoring and Warning services:
- Are the right parameters being monitored?
- Is there a sound scientific basis for making forecast?
- Can accurate and timely warnings be generated?

Dissemination and communication:
- Do warnings reach all of those at risk?
- Are risk and warnings understood?
- Is the warning information clear and useable?

Response Capability:
- Are response plans up to date and tested?
- Are local capacities and knowledge made use of?
- Are people prepared and ready to react to warnings?

The second step will be the monitoring process. Continuous monitoring of hazard parameters and precursors is essential to generate accurate warnings in a timely fashion. Warning services for different hazards should be coordinated where possible to gain the benefit of shared institutional procedural and communication networks.

The third phase, dissemination and communication of risk information and early warnings are of critical importance to succeed. Warnings must reach those at risk. Clear messages containing simple, useful information are critical to enable proper responses that will help safeguard lives and livelihoods. Regional, national and community level communication systems must be pre-identified and appropriate authoritative voices established.

At last but not least the response capacities must be in place and a continued effort to build national, and community response capacities will therefore be of great significance. The communities need to understand their risks and be well informed on the options for safe behavior, available escape routes and how best avoid damage and loss to property at any time.

Well-developed governance and institutional arrangements support the successful developments and sustainability of sound early warning systems. They are the foundations upon which the previously outlined four elements of early warning are built strengthened and maintained. Good governance is encouraged by robust legal and regulatory framework and support by long-term political commitment and effective institutional arrangements. Effective governance arrangements should encourage local decision-making and participation which are supported by broader administrative and resource capabilities at the national or regional level.

Local governments usually have direct responsibilities for citizens' safety and a considerable knowledge of the hazards to which their communities are exposed. They must be actively involved in the design, development and maintenance of early warning systems. Also, it is necessary that they understand the information received and are able to advise instruct or organize the local population in a manner that increase their safety and reduce the risk of losing resources on which they depend. However, the communities them self must also be involved in the process, particularly those most vulnerable as they are at the core of a people-centered early warning systems. Their inputs to system design and their ability to respond ultimately determines the extent for risk associated with natural hazards. They should be aware of the hazard and the related effect to which they are exposed to, and be able to take specific actions to minimize the threat of loss or damage. As a part of the civil society non-governmental organizations (NGOs), including volunteers, play a critical role in raising awareness among individuals and organizations involved in early warning systems, particularly at community level. Furthermore they play an important advocacy role to help to ensure that early warning stays on the agenda of government policy makers. An early warning system for cross border hazards places an additional challenge.

Box 3: Nile Basin Discourse

The river Nile is the source of life along its river basin and the provider of the most valuable asset in the region- water. In 1999 the Nile Basin Initiative (NBI) was formally launched by Ministers of Water in the nine countries who share the river; namely Egypt, Sudan, Ethiopia, Uganda, Kenya, Tanzania, Burundi, Rwanda, the Democratic Republic of Congo and with Eritrea as an observer. This partnership seeks to develop cooperation and share substantial socioeconomic benefits and promote regional peace and security.

In 2003 the civil society of the same countries formed the Nile Basin Discourse (NBD) to support the NBI and the communities along the Nile Basin. Within the NBD National Discourse Forums (NDFs) have been formed and are responsible for developing plans and activities at a national level. These are later approved by the board of the NBD, and joint fundraising is done to support the projects at community level. The NBD shows how plan and policies can be made into practices at a local level contributing to sustainable resources use and disaster risk reduction. Civil society organizations are not only capable to contribute to the local and national agenda but they can also promote cross border cooperation and initiatives.

Early warning for different hazards: advantages and challenges

Earthquake: Regional earthquake monitoring systems have been installed in most earthquake-prone regions. However, earthquake prediction capability remains vague because the methodology to forecast the location, magnitude and time of occurrence still not available. If forecasted, critical systems such as gas supply lines can be shut down, fire stations and ambulance doors opened before the most server shaking reaches the location. The warning to be issued depends on both the distance from the epicenter and the depth of the earthquake, and the lead time may be just a few seconds. It is better to act on an initial earthquake shock as a warning of possible further shocks and hazards such as fire or building collapse. It is, for instance, recommended to quickly shut off a gas stove or more it to a safe place.

Flood: Dedicated systems to monitor and forecast river basin floods are well established in developed countries, but there are still steps to be taken in the Arab region. Operational global flood forecast form specialized warning systems that provide warnings three days before the feared event but several initiatives are under way to extend this time period. Most flood warning systems are stand alone- national operations, but warning systems have been developed covering several international rivers like Rhine and Elbe in Europe and Zambezi in Southern Africa.

Landslide: The timing of landslides can be predicted provided that the slopes are monitored, which often is not the case. Landslide early warning systems need to take into account observation of uphill environmental degradation due to deforestation, landuse systems and wildland fires.

Drought: Early warning systems for drought are complex and still under developed. They rely to a large extent on monitoring of observed patterns for monthly and seasonal rainfall, stream flow, ground water level from snow pack and statistical data. Requirements for early warning range from a few weeks to several months. Nonetheless, many countries have developed drought early warning systems capable of combining information from various sources and providing warnings of the imminent onset of droughts. Traditional forecasting remains an important source of climate information in many rural communities. There is a growing appreciation that traditional observations and outlook methods may have scientific validity, and there is an increased interest in harmonizing traditional and modern scientific methods of climate prediction.

RECOMMENDATIONS FOR PEOPLE CENTRED EARLY WARNING SYSTEMS

- Making warning understandable: Most can be done by translating warnings into a simple, understandable language for all. People need to know what to do with the warning, where to go and which route to take;
- Encourage local ownership: Early warning systems are more likely to succeed in conveying messages through if the people at risk are included in design, development and maintenance. This means that communities- and not just national experts- must take part in mapping local hazards, conducting practical drills and building local awareness;
- Local knowledge: Personal experience and oral history are important but not always reliable. Experience must be discussed critically and supplemented with public education on secondary risk and their causes;
- Awareness through education: Children who are aware of risks of flood, landslide and earthquake spread awareness through their families and neighborhoods and become more receptive as adults.

CHAPTER 8: Public Information and Disaster Risk Reduction Awareness

Public awareness

Addressing the factors that create adverse environmental conditions requires strengthened governance systems, improved education, public awareness, capacity building systems and appropriate technologies based on both scientific advances and traditional knowledge. Public awareness processes aims at informing the general population about risks and how people can act to reduce their exposure to hazards. In general, awareness allows people to protect themselves in their everyday lives and through their professional responsibilities. Notion of disaster risks increases the effectiveness of early warning and policy implementation. Public awareness includes a

broad specter of activities including awareness campaigns, education, training and mass media. The following section are not including all options, rather providing a set of possibilities which can easily be carried out at community level.

Awareness-raising is an interactive process in which different parties are engaged, each with its own roles, responsibilities and ways to make its voice heard and to create social influence. In awareness campaigns, policymakers and other interested groups aim at changing behavior by altering social norms and attitudes. Typically, campaigns focus on providing information and knowledge to influence individual attitudes. Knowing the results of their behavior and realizing the importance of change can influence people to alter their conduct. Other awareness initiatives may seek to influence social norms. Designing a campaign in a participatory manner can help organizers stay closer to the ideas, constraints and opportunities of the target audience. Overall, knowledge exchange with women's and community groups are more useful than top-down communication of expert knowledge.

Local knowledge which has been build up and passed down through generations is a precious resource that can contribute to disaster risk reduction in the Arab region. With the disruption of traditional lifestyle and changing settlement patterns, it is a challenge to maintain the continuity of traditional knowledge through transmission from generations to generations. Indigenous knowledge should be considered as a complement to scientific knowledge in development community- based disaster risk reduction plans and policies.

To know the target group is a strategic key for information campaigns, the focus should be on locally perceived problems and their solutions. The information presented should aim at changing the behavior by reflecting a wide range of issues that are important to people's own lives, with desirable outcomes and practical solutions which will be feasible to carry out. In the Arab region, knowledge and professional abilities are available in many communities, yet it is quite seldom that all resources are fully utilized. A special effort is needed to reactivate traditional values to enhance coping mechanisms and strategies. These should and can easily exist along either modern technology aimed at building resilience to disasters. These types of campaigns can involve all groups in society including children and one of the greatest advantages that high impact can be combined with low cost.

Civil Society Network as a mediator for information sharing

Montada al'Biah is a monthly newsletter reporting on environmental news from the Arab region which has continuously existed since 1989. Today 1500 copies are sent out every month to governmental officials, United Nation organizations and civil society organizations all over the Arab region. Publications like this are of great importance to share information and provide the stakeholders working in the field of environment a forum to present news and share information. This contributes to a stronger awareness and relationships of the involved stakeholders.

The Arab Network for Environment and Development (RAED) is the editor and coordination body and with its more than 250 member organizations in 18 Arab countries it functions a natural center point for knowledge transfer. In addition to this, RAED has a number of partnerships with international and regional agencies like UNISDR, UNDP, UNEP, UNEP-ROWA, UNEP/MAP, UN-ESCWA, UN-ECOSOC, ICESCO, UNISCO, ALECSO, and others.

Education

A culture of safety starts with building up knowledge of disaster risk reduction at a young age. Educating younger generations instills disaster risk reduction as a value in society- a value that will be transmitted from one generation to the next. Development or inclusion of disaster risk reduction into the formal curriculums is a political process that will take some time requiring new text books and training of educators/teachers. Normally this is done through establishment of a task force and various committees to focus on the different levels of education, including higher learning institutions like universities.

Drawing and other competition might be used to get children interested in environmental conservation and disaster risk reduction

However, this does not imply that the formal curriculum will be the only way, disaster risk reduction can be incorporated into various school programmes through cultural training, extracurricular and non-teacher centered activities. At a community level it might be easier to promote the inclusion of disaster risk reduction topics in

existing subjects beyond science and geography, alone such as reading, art, sociology, engineering, environmental management, hydrology, planning and public health. Despite these types of efforts in schools, the links between disaster education and communities might still require strengthening, where students leading are leading actors in this process. In the Arab region some of Red Crescent National Societies and UNDP country offices, UNISDR and UNESCO have all contributed to production of educational material for children for environmental conservation and disaster risk reduction.

The different stakeholders contribution to education[10]:

What children can do:

- Children and youth can take advantage of the first aid and other risk reduction training provided by NGOs and often by national societies of the Red Cross/Crescent. It is also possible for older children to teach younger ones
- Children and youth can pass on to their parent what they are learning about hazards and risk reduction in school

What parents can do:

- Parents can ask questions about school safety at school board meetings. They can lobby governmental officials for the resources required for school safety
- Parents can join other community members to support their children's learning of risk reduction and help spread the use of participatory risk assessment in the community
- Parents who have lost children in school disasters can join together as an association or an NGO to do whatever they can to present other parents from suffering similar losses. The way grieving parents organize will take diverse, culturally appropriate forms around the worlds.
- Parents and teacher associations exist in various forms in many countries. These can become forums for discussion of what their children and youth can learn about safety and hazards and how schools can be protected.

What educators and other professionals can do:

- Professionals are working hard to enrich education with knowledge important to sustainable human development, peace, justice and safety. Nevertheless, these are ways that their efforts focus more clearly on natural hazards without detracting from the work they do in other important areas
- Schools can come up with initiatives to teach classes once a week on disaster risk reduction and natural hazards, and use other lessons, such as geography/biology, to take the children out and mark out risk zones and/or draw risk maps of their community.

What international organizations can do:

[10] Source: *Let Our Children Teach Us! A review of the Role of Education and Knowledge in Disaster Risk Reduction,* ISDR system Thematic Cluster/Platform on Knowledge and Education, July 2006

- Together with professionals, educators, communities, children and youth, they can develop a short list of "quick win" actions that can rapidly increase the safety of schools and raise the risk awareness level among school teachers and children
- They can support coalitions and partnerships between schools and create knowledge network amongst schools
- They can develop and provide educational material

What donors can do:

- Include disaster risk reduction measures in their funding of school construction projects
- Fund educational projects for disaster risk reduction

Involvement of Media

Local media can play an important role in providing information before, during and after disasters. Journalists can go beyond the brutal facts of an avalanche or a flood and help people and governments understand the whole process. The media's convergence with disaster risk reduction derives from the need to inform, educate and empower communities with relevant knowledge for influencing public actions and policies towards environmental conservation and disaster risk reduction. UNISDR and RAED have jointly established a media network in the Arab region to promote environmental conservation and disaster risk reduction. This network is open to all journalists who have an interest in the field and the members will receive information on a regular basis and have the chance to participate in media trainings.

The media are today the major channel for spreading information to a larger audience. At times it can be hard for the disaster risk reduction practitioners to compete with more dramatic agendas and formulate messages in a way that catches the media's attention and interest. To ensure that the messages are adequately prepared and transmitted into local newspapers, radio and TV channels, both the information sources and media must make sure these messages are understandable and meet information requirements.

A good media message should:

- Address public concern
- Contain what people want to know
- Give guidance on how to respond
- Provide accurate and timely information
- Use examples, stories and analogies to make a point
- Never assume that there is a common understanding between experts and target groups.

To be effective, knowledge must be presented in a way that relates to local conditions and customs. While this has long been accepted as a cardinal principle in sustainable development, it is not yet been integrated in risk reduction strategies. Understanding that disaster risk reduction effort is essentially local in nature and requires community actions, communities can voice their needs to donors and the general public by using the following strategies;

- Sharing information from disaster assessment
- Prompting public auditing at all levels of disaster response

- Supporting better access to information and communications technology for vulnerable communities
- Building information-sharing partnerships with local government authorities and civil society networks

RECOMMENDATION FOR PUBLIC AWARENESS

- Introduced educational units, teachers, and students to risk reduction. Respect local processes of participatory planning ensure ownership of the initiative, the empowerment of social sectors to make decisions related to local planning, and the legitimacy of commitments made;
- Adequate technical and social knowledge and skills are necessary for overcoming challenges;
- Arrange alternative income generation through light engineering training;
- Combine planning and organization activities with practices at the community level (e.g. reforestation, cleaning of water reservoirs), and at the city level (e.g. contingency plans, drills);
- Implement demonstrative mitigation works of different costs and sizes in order to show different stakeholders what is possible;
- Train and providing equipment to volunteer groups, let the youth take an active role.

SUMMARY

The effects of human activity has on the environment have caused increasing concern since the 1970s, and international policy frameworks have been developed and implemented over the past thirty years to control and mitigate this impact. However, society now faces dynamic global environmental change on such a massive scale that human activities must be adapted not only to reduce the environmental change, but also to respond to the effects of that change. Scientists and decision makers have only recently recognized the need for policy to tackle the complexity of this interaction. The Hyogo Framework for Action, the Millennium Declaration and the UN Millennium Ecosystem Assessment have different focuses but a similar few that environmental degradation, poverty and disaster risk share common causes as well as common consequences for human security and well-being. They also recognize that ecosystem services, environmental management and environmental information offer opportunities to reduce disaster risk, decrease poverty and achieve sustainable development. Growing interest in adaptation to climate change is evidence of this realization. UNISDR and RAED joined forces to address disaster risk in environmental hazards zones and aim at making the communities more resilient- in line with the recommendations put forward in the HFA.

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