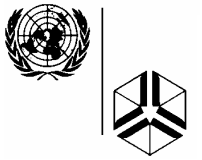

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*"Advancing knowledge for human security, peace and development"*

# Knowing Risk: The Beginning of Any Solution
# A Paradigm Shift

Draft – Check against Delivery

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## Introduction

In "*GIM International,*" the global magazine for geomatics (June 2006), I read recently an interesting opinion article *("Pinpoint"*) contributed by Dr. Mathias Lemmens of ITC Enschedé (the International Training Centre for Geo-Information Science and Remote Sensing in the Netherlands). I am very proud of the ITC and the work it does, as I was the Chair of its Board before I cam to Japan, and I am happy that it is now an associated institution of the UNU. ITC, indeed, has a great potential to contribute to Environment Risk Management.

"Never before in history," Dr. Lemmens argues, "has humankind lived with so many people so close together on such small piece of land." A relevant observation of course, in particular in the country with the highest population density in the world. Not only there, but around the world have the levels of urbanization become extremely high. Rural populations are migrating to an ever larger number of continuously expanding mega-urban conglomerates, often called – when big enough – megacities (> 10,000,000 inhabitants).

They do so in an attempt to snatch a few crumbs falling from the table of wealth generated by an expanding global economy. But: *at what price*??? Nevertheless: these streams of rural people attracted to the economic shimmer of the cities grow day by day. In pre-Christian times an Egyptian pharaoh never ruled over more than a million people. Today the mayor of a moderately sized city such as Amsterdam or Copenhagen rules over more than that number. There are also many mayors (or

governors like in Tokyo-to) who govern over more than five million citizens, some over ten and a few even over more than twenty million.

Many migrants moving from rural areas to cities have to make do with poor housing, cope with lack of potable water and less than poor or completely lacking sanitation, breathe – often heavily – polluted air and are engaged in a permanent battle to fill the stomachs of their children and themselves.

That is *one side of the coin*. The other is that indigent people living in high concentrations within confined areas and in poorly constructed dwellings, are very vulnerable to both natural and manmade disaster, including highly infectious diseases. It is often said that disasters and poverty compound each other in a vicious cycle.

There is no doubt that the effects of the destructive forces of nature are becoming increasingly devastating, in particular in developing countries. Because population growth and urbanization go on and on, the level of destruction and the number of victims also seem to increase continuously, whenever a volcanic eruption, earthquake, fire, typhoon or flood strikes; at least, when no countermeasures are taken to reduce the environmental risk, as well as the vulnerability of individuals and societies.

**Mastering Disasters from Space**

In recent years many initiatives have been developed to cope with natural hazards, to prevent these from creating disaster. One of the ways to go is to try to "*master disasters from space*." Such schemes do feature high on the international agenda. Governments and international organizations, increasingly recognize the value of permanent observation of the planet earth from orbiting platforms as a means of disaster management. The data collected from space can benefit risk reduction, damage assessment and recovery.

Europe has initiated the Global Monitoring for Environment and Security Project (GMES, formally adopted in 2001), while the US Commercial Remote Sensing Policy was authorized by the President on 25th April 2005. US policy provides guidance for licensing and operation of the US commercial remote-sensing space systems and the use of their products by US government and foreign institutions and organizations. The policy aims "*to advance and protect national security and foreign interests by maintaining the nation's leadership in remote sensing space activities and by*

*sustaining and enhancing remote sensing industry.*" Envisaged spin-offs of the US policy are that it will foster economic growth, contribute to environmental stewardship, and enable scientific and technological excellence.

The European GMES-project aims at using remote-sensing data, especially today's wealth of very high-resolution satellite data, to improve the monitoring of the European and global environment to enhance the sustainable management of resources and security of citizens. One GMES goal is directed towards European self-provision with respect to the production of very high-resolution satellite images, so that the continent becomes independent of US commercial remote-sensing firms. The programme is considered an European flagship next to the Galileo navigation system. But: somehow there is a lack of widespread awareness of the GMES initiative, and many projected services have not yet got off the ground.

The US and European initiatives are mainly directed towards supporting the collection and dissemination of space data for support of managing disasters taking place on their own respective territories. The United Nations on the other hand, is more globally oriented; with respect to data collected from space the organization focuses its attention primarily on developing countries. The Global Earth Observation System of Systems (GEOSS) is primarily intended to provide this service.

During the UNISPACE III conference, held in 1999, one recommendation flagged up the need "*to implement an integrated, global system, especially through international co-operation, to manage natural disaster mitigation, relief and prevention efforts, in particular of an international nature, through Earth observation, communications and other space-based services, making maximum use of existing capabilities and filling gaps in worldwide satellite coverage.*" During its 59th session (2000) the UN General Assembly approved a study to examine the possibility of establishing an international entity to provide co-ordination and the means for optimizing the effectiveness of space-based services for use in disaster management.

Although all these initiatives are still mainly languishing at the policy, research and study levels, they do offer good hope that somewhere in future Earth observation from space may contribute to a significantly safer world. A world in which disasters can be managed in such a way that loss of lives and demolition of economies can be minimized. In the meantime the Japan Aerospace Exploration Agency has recently launched (24 January 2006) the Advanced Land Observing Satellite Daichi, one of

the aims of which is to carry out Earth observation for sustainable development and global disaster monitoring.

## Beyond Technological Solutions

Dr. Lemmens concludes from these foregoing facts and observations, that: *"Somehow it seems that the United States puts all its efforts into maintaining world leadership, Europe and the United Nations carry on talking, while only Asia acts."* This maybe true, I don't disagree with his statement. However, I do think that it is more important to conclude, that mastering disasters from space seems to have become a highly competitive field of human endeavour. Governments are prepared to invest much money in it, as is also illustrated, e.g. by their preparedness to invest in other technological solutions such as the early warning system for tsunamis in the Indian Ocean. Some questions, however, will remain:

1. will the competition indeed contribute to a better overall result? or could co-operation, at least in setting standards, be a more attractive option?
2. what more would be needed to prevent hazards from becoming disasters? with all the technology and early warning: how do we organize ourselves so as *to act timely* to reduce environmental risks and the vulnerability of individuals and societies? how can we go beyond technology? make good use of it?
3. what is more: many environmental risks and disasters are of a creeping nature. They need long-term observation to become visible. Often they are even caused by human activities: falling groundwatertables, desertification, landslides, landdegradation, air- and water pollution. Even floods are much more a threat now, than in the past, often as a consequence of human actions. In his annual report focusing on the urgent need to move from a culture of reaction to a culture of prevention (1999), Secretary-General Kofi Annan called these *"un-natural disasters."* Even though these do not get much media attention and do not generate important fund raising campaigns, their overall deadly impact is huge, much larger than that of natural hazards of a much more incidental character? There is more needed than technology to cope with creeping and un-natural disasters.

## Security and the States

Security is both *complex and* also *very simple*. It is complex in that it incorporates military, political, economic, social and environmental factors, and the many linkages between them. In this sense both the theory and practice of national and international security have undergone an evolution. While basic physiological human needs have changed little, our conceptualization of security, and our approaches to achieving and maintaining security, have changed considerably. International security is no longer conceived of solely as defence of national territory against 'external' military threats under state control. An established literature now exists to support a broad and multifaceted approach to security, and these '*non-traditional security' perspectives* – including *human security* – have taken their place in academic and, to an extent, policy circles. But this has not been without controversy in terms of academic rigour and policy relevance.

But security is also a very *simple* concept. Everyone knows what it means to have his or her security threatened. When we look at *in*-security from the individual perspective, we do not find anything new: poverty and hunger, threats to health, illiteracy, environmental degradation, civil conflict, resource insecurity, human displacement through war, underdevelopment, the threat of illegal narcotics, and organized crime. *Anything* that presents a *critical* threat to life and livelihood is a security threat, *whatever* the source. People suffering from extreme deprivation or AIDS, or people having their human rights severely violated, for example, do not need us to invent a new concept to tell them that they are insecure.

Yet it is clear that traditional security has failed to deliver *meaningful* security to a significant proportion of the people of the world at the individual level. This is an empirical reality. For most people, the greatest threats to security come from disease, hunger, environmental contamination, crime and unorganized violence. For many people a still greater threat may come from *their own state* itself, rather than from an '*external*' adversary. Still, attitudes and institutions that privilege '*high politics*' above disease, hunger, or illiteracy are embedded in international relations and foreign policy decision-making. Indeed, we have grown so accustomed to this approach that *for many, 'security' has become equal to state security*.

The fundamental purpose of a state is – or should surely be – to protect the security and promote the welfare of its citizens. In return, the state and state sovereignty are given primacy as the ordering unit and organizing principle of world affairs, based upon the principle of *delegation* of responsibility and power by individual citizens to

their state. But the capacity of many states to fulfill this double purpose is often severely limited. The *changing security discourse* has thus moved beyond protection of a state's territorial integrity, political independence and sovereignty to embrace such issues as the plight of children in armed conflict; terrorism; trafficking in arms, narcotics and people; the spread of infectious diseases; hunger; and cross-border environmental degradation. Security analysts today have to grapple simultaneously with problems of external threats, internal social cohesion, regime capacity and brittleness, failed states, economic development, structural adjustment, gender relations, ethnic identity, and transnational and global problems like HIV/AIDS, drug trafficking, terrorism and environmental degradation.

These issues are often neglected by traditional security thinking, but they shorten the life expectancy of millions and have repercussions beyond their immediate impact that are only beginning to be understood. And when the degradations reach the point where they become life-threatening on a large scale, it would seem ridiculous to insist that this is not a "security" issue. We need *a new approach*; an approach that comes *closer to the reality* of the daily life of individual people.

## A Copernican change?

The human security approach is not necessarily in opposition to state sovereignty and national security; *the state remains the central provider of security* in ideal circumstances. The approach does, however, suggest that international security as traditionally defined – the defence of territorial integrity by military means – does not necessarily correlate with all the dimensions of the security of people, and that an over-emphasis upon statist security can be to the detriment of human security needs. Therefore, while traditional conceptions of state security may be a necessary condition, they cannot be a sufficient one for human survival. Citizens of states that are 'secure' according to the abstract and remote concept of traditional security can be perilously insecure in terms of basic human welfare. A human security approach attempts to redress this asymmetry of attention and resources.

What is necessary – and perhaps what is happening – is *a Copernican change* in perspective regarding the relationship between the state and people. Traditionally, state sovereignty and sovereign legitimacy rest upon a government's control of territory, state independence, and recognition by other states. The role of citizens is to support this system. *The human security approach reverses this equation*, and here we see the revisionist – perhaps revolutionary – potential of the concept. The

*state, and state sovereignty, must serve and support the people* from where it draws its legitimacy. The state derives meaning from the people, not the other way around. This ties in with a broader debate regarding the evolving nature of state sovereignty.

Sovereign statehood remains a core characteristic of the international system. However, the legalist model of international politics – premised upon the primacy of sovereign autonomy, sovereign equality, non-interference, non-aggression, and the irrelevance of domestic forms of government – seems to be demonstrably out of touch with reality in a number of respects. Debates about the evolution, erosion and indeed resilience of sovereignty have existed for decades. It has long been acknowledged that *sovereignty has never been an absolute principle*; encroachments upon sovereignty have always taken place. But it seems that a number of processes at the international and intra-state levels require a reassessment of the contemporary meaning and relevance of sovereignty, in particular as it relates to the constitution of international order and human welfare. The concept of '*conditional sovereignty*' has taken on a renewed importance.

International norms regarding *human rights* have developed an importance that significantly conditions state sovereignty and goes beyond the voluntary nature of international human rights instruments. This has given rise to a solidarist norm of '*individual sovereignty*', whereby the legitimacy of state sovereignty rests not only on control of territory and recognition, but also upon fulfilling certain standards of human rights and welfare for citizens. As a corollary, the sovereignty of states which are unwilling or unable to fulfill certain basic standards may be jeopardized. The use of military force for human protection purposes – such as the case of Kosovo – is the starkest example of this trend, although a wider range of transnational norms, institutions and processes of human rights and accountability also underscore the normative transcendence of sovereignty in this area. Sovereignty, and respect for its legitimacy, rests in part upon the recognition of other states, but the prerogative of exclusive territorial control is arguably now premised upon a broader set of criteria, including human rights, and "*serving the people*".

So, the idea of *Human Security* argues that contemporary security, if it is to be relevant to changing conditions and needs, must focus on *the individual or people collectively*. Traditional ideas of state security are a necessary *but not sufficient* condition of human welfare. The citizens of states that are 'secure' according to the traditional concept of security can be perilously insecure in terms of health, literacy, nutrition, and opportunities. This does not exclude the importance of traditional

ideas of security, but it does suggest that it may be more effective to reorient the provision of security around people. Military defence of territory remains important, of course, but human security embraces a broader, more comprehensive set of issues of importance to people throughout the world. In many ways, indeed, this represents a *Copernican change* in the perception of the relationship between the state and citizens.

**Environment and Human Security**

In September 1999, United Nations Secretary-General Kofi Annan presented his Annual Report *"Preventing War and Disaster: A Growing Global Challenge."* Less than a decade after the fall of the Berlin Wall, it had become crystal clear that the end of the "cold" war had not brought peace to humankind, nor ended human suffering. In 1998, for instance, armed conflicts broke out or erupted anew in Angola, Guinea-Bissau, Kashmir and Kosovo, and also between Eritrea and Ethiopia. Other long-established wars – notably the war in the Democratic Republic of the Congo – went on though largely unreported by the global media. It had also become clear that the impact of wars on civilians had worsened considerably. Internal wars – now the most frequent type of armed conflict – typically take a heavier toll on civilians than inter-State wars. Combatants, also, have increasingly made targeting civilians a strategic objective (Kofi Annan 1999, p.1). Even humanitarian workers are under severe threat, now more than ever.

Security is, however, not only under unpredictable, growing threat because of war and violence. The year 1998 was also *the worst on record for weather-related natural disasters.* Floods and storms killed tens of thousands of people worldwide and displaced many more. Including the victims of earthquakes, some 50,000 lives were lost in 1998 as a consequence of natural disasters. During the 1990s – the hottest decade on record – the world experienced more than three times as many great natural disasters as in the 1960s. In a recent study of WHO on the relation between health and weather, it was estimated that in the year 2000 as many as 150,000 people were killed by global warming and related natural disasters.

*Environmental risks* have increasingly become *the principal source* of human *in*-security. Of course: human communities will always face natural hazards such as floods, droughts, storms, volcanic eruptions or earthquakes. The sobering reality is, however, that today's disasters, too often, are man-made and that human action or inaction exacerbates virtually all of them. The term *"natural disaster"* has become,

increasingly, an anachronistic misnomer. In reality, human behaviour transforms natural hazards into what should really be called *un*-natural disasters (Kofi Annan 1999, p.4).

**Environmental Risks and Natural Disasters**

The state of the world, in terms of economic, social and environmental security, is quite appalling. Today, global inequalities in income and living standards and, therefore, in human security too, have reached grotesque proportions. The gap in per capita income between the richest and the poorest countries in the world is wider than ever. In 1960, the richest countries had, on average, 30 times the per capita income of the poorest. This gap was 60 to 1 in 1990. In 2000, it was about 80 to 1. So, in only four decades, the income gap between rich and poor has more than doubled, almost tripled. The *marginalization of the least-developed countries* is increasing year after year, at an ever accelerating pace. In terms of human security this means for the people living in the poor parts of the world, on the average*: a short and unhealthy life.*

The numbers sadly speak for themselves: in 1998, for instance, in the 10 poorest countries of the world, which are all in Africa, the average life expectancy of individuals was around 45 years. At the same time in the 10 richest countries, life expectancy was 78. A huge difference! It means that a person viewed as elderly in the poorest countries is still a relatively young person, full of potential for the future, in the richest countries, most certainly in Japan. People in the richest countries, on average, do outlive individuals of the poorest countries by more than 30 years, more than the time span of an entire generation. In this context, it is not hard to imagine the role of the lack of access to, for instance, safe water and medical services suffered in the poorest regions of the world.

The spread of infectious diseases, in particular HIV/AIDS also plays a major role. As a consequence in many African countries life expectancy is *decreasing*. According to UNDP's *Human Development Report 2002*, the life expectancy of people in Malawi is now only 40 years. Over 14% of the Malawi population of 11 million are said to be living, currently, with HIV/AIDS. This is the major factor behind this appalling low life expectancy. The life expectancy in Japan is, according to the same source, twice as much (81, Germany 79). What sort of world do we live in, that permits such a disparity in life chances?

The *deprivation* that exists around the world needs to be at the *forefront* of the foreign policy agenda. There is nothing – including the war on terror, the struggle against the proliferation of weapons of mass destruction and "*rogue*" states – more urgent than addressing severe, preventable disease and deprivation, including hunger and lack of adequate shelter; all commonly related to the quality of the environment and the level of development. This means that there exists a great need to focus, right now, on issues such as governance, equity, development, education and also preparedness *to prevent environmental risks to materialize*: natural hazards to become – as the Secretary-General of UN called it – *un*natural disasters.

Environmental crises are, indeed, as urgent as any other human security threat. They are, however, rarely treated as such. In terms of early deaths and deprivation, environmental crises – including lack of freshwater and air pollution – have an urgency that is seldom recognized, even by the human security community, maybe because the process is – in general – very slow; just creeping, after for a long time: unnoticed. However, what seems remote now can, before we know it, become urgent tomorrow, maybe even in the next hour. And the available data on the situation now is more than alarming. As early as 1990 it was estimated that each year worldwide 6,000,000 hectare was lost to degradation. Within the World's Drylands, the area affected by landdegradation amounts in size to the equivalent of Russia, USA and China, taken together. It is not difficult to imagine what this means in terms of poor harvests, hunger and death. *It is difficult to understand why we let this happen*. Landdegradation is not a sudden but a creeping event and the cost of preventing landdegradation is not high, if action is taken early enough. However, once it reaches a point where reclamation becomes economically prohibitive, the land must be abandoned.

The widespread consequences of El Niño and La Niña are at present well-known and feared. Disaster reduction and combating desertification as well as the possible fate of small islands, for instance, all figure high on the agenda of the United Nations. It is this thinking that has also provided the momentum for the United Nations University and the German Government, to launch a special programme on environmental degradation and human security (UNU-EHS), Bonn. This programme will focus specifically on *human vulnerability as a consequence of man-made disasters*: for example flooding, salination of arable lands, desertification, forest fires and landslides in densely populated areas.

**Population, Natural Resources and Environmental Risks**

Environmental change at the local, national, regional and global levels is rapidly altering the balance that sustains life on the planet. The effects of such change pose both a short and long-term threat to human security. Global warming is already having a serious impact upon the well-being of the ecosystems and humans. Desertification and a greater magnitude and frequency of extreme weather events affect the capacity of the ecosystems in producing goods and services. Rising sea-levels threaten all life on small islands, as well as the delta areas and coastal plains in which the majority of the world's population lives. Environmental degradation in the form of air and water pollutants affects human health in many regions. Resource scarcity makes certain regions unsustainable, threatening to ignite new conflicts and producing potentially negative knock-on effects, such as forced human migration. Despite technological improvement, people around the world, particularly in the developing world are still struggling to survive in the face of growing desertification, dwindling forests, declining fisheries, polluted water and air, and climatic extremes and weather events that continue to intensify – floods, droughts, hurricanes and tsunami's.

A core issue in the relation between environmental risk and human security *is the ongoing increase of population and population density* more specifically *in areas less well endowed by nature.* In particular, in major urban agglomerations in developing countries, we can observe an increasing *tension between the number of people* living there *and the natural resources locally available.* Even clean, fresh air to breathe and safe drinking water can be difficult to provide for. At present, already, Mexico City is piping drinking water over a distance of more than 200km into the city and Los Angeles is dependent – for energy and water – on the Colorado River, even more distant.

It is customary in research on urban development to focus very much on size, as expressed for instance in the concept *mega-cities*, i.e. urban regions with more than ten million inhabitants. This *ignores the great variety in population density in mega-cities*, as well as the fact that by tradition in many countries the borders of the territorial units in public administration are drawn in such a way that whatever "*mega-cities*" might exist, these will never become visible in the statistics. The Ruhr area in Germany is a good example. It is not surprising that Munich-Re, the major European Re-insurance company lists both the Ruhr area and the Randstad (in the Netherlands) among the world's mega-cities. *The real environmental risk lies,* after

all, *in high population densities over extensive areas*, the relation therefore between density and size. When you look locally at the relation of size and density of population with the locally available resources, you must come to the conclusion that *geography matters.* It is also clear that very big urban areas, including mega-cities, have become characteristic for many developing countries, in particular in Asia.

To assess whether high population concentrations are sustainable, one must pay attention to both the *site* and the *situation* of the place, as well as the relationships between the different *scale levels* of geographical reality in which the place is embedded. It is, for instance, very interesting to evaluate how metropolitan Tokyo is organizing the space in the combined area within its limits, but it is equally important to assess how Tokyo is fitted within the total space of Japan as a country and also to understand how space is organized at the lower levels in the different constituting parts of Tokyo, as well as the relations between these different scale levels. Just to look at one scale level of reality is, in fact, not an adequate or sufficient approach in planning, in balancing population and resources.

This is just one example of the fact that *the relationship between environment and human security is a complex, dynamic and multi-causal one.* Environmental changes that affect human security almost always interact with other political, social, cultural and economic factors and evolve through various stages before resulting in human insecurity. Furthermore, *environmental insecurities may have different causal roles*: in some cases it may be a proximate and powerful cause; in others it may only be a minor actor in a tangled story that involves many socio-economic, cultural and political factors. The relationship between the environment and security is *also a recursive one*. Just as environmental change may contribute to human *in*-security in the form of war, civil strife and terrorism, these factors could also in turn lead to more environmental degradation and resource scarcities.

The foregoing observations are important to understand that there are *many environmental changes, many risks* and *many hazards*, but **whether a natural event will become a disaster depends very much upon how a society has prepared itself**. That is where considerations of mitigation and prevention enter the equation. There are, indeed, many ways by which you can reduce the disaster *level of* a natural event, or even prevent a natural event from becoming a disaster. Take, for instance, *volcanic slopes* which are extremely fertile. Farmers know perfectly well that these locations are dangerous, because lava streams may come that will put them at risk. But at the same time, the volcanic slope may be the best place

to do their farming. The recent events around the Merapi (Java) illustrate this point clearly: it was very hard to convince the endangered population to leave, when there was still time. Can they be effectively advised at some point to leave it, when it really becomes too dangerous? At such a time early warning systems will indeed become important. How much time will be left to inform and convince people? More importantly: are they prepared? Do feasible evacuation plans exist? Who takes the lead?

The same can be said of many of *the low-lying areas*. Often the alluvial soils are very fertile. Farmers choose to go there, because better agricultural production is possible there. But they also run the risk of becoming the victims of a major flood. It is interesting to know *how to balance* these considerations: The question is, how you can prepare? In such cases, perception, tradition and organization play major roles in whether a natural event will become a disaster or not. Indeed, there are many different and intriguing relations between population, natural resources and environmental risks. "*No risk*" is often not a good option or even impossible. But to *know risk* and to be prepared to take appropriate action is essential to save lives and prevent losses. No Africans on the continent's east coast should have died as a consequence of the recent tsunami, originating from a place as distant as the shores of Acheh. Indeed: knowing risk, and knowing what to just in case, are the beginning of any feasible solution.

**"We, the Peoples"**

Against the background of the UN Secretary-General's report, presented in September 1999, pleading for a *culture of prevention* to replace the existing *culture of reaction*, the Millennium Report "*We, the Peoples*" on the role of the United Nations in the 21st century, was a logical step forward. The core of the report focused on three issues:

- Freedom from Want;
- Freedom from Fear;
- Sustaining our Future

Interestingly enough, the third issue "*sustaining our future*" had been included rather in response to the "*Voices of the People*" than on the basis of a high priority among governments, as very few among them mentioned the issue at that time.

However, in the world's largest ever, public opinion survey, the *Millennium Survey*, among 57,000 adults in 60 countries, sponsored and conducted in 1999 by Gallup:

> ....."*Two thirds* of all the respondents said their government had done too little to redress environmental problems in their country."
>
> ....."Respondents *in developing countries* were among the most critical of their government's actions in this respect."

Some important conclusions were drawn in the chapter on "*Sustaining our Future,*" conclusions that can give proper direction to our efforts to promote and protect our common future. Those statements are:

- We are failing to provide the freedom of future generations to sustain their lives on this planet;
- The challenges of sustainability simply overwhelm the adequacy of our responses – they are too few, too little and too late;
- Reducing the threat of global warming requires, above all, that carbon emissions be reduced;
- The international community has not found the political will needed to make the necessary changes;
- About one third of the world's population already lives in countries considered to be "*water stressed;*"
- We need a "*Blue Revolution*" in agriculture that focuses on increasing productivity per unit of water – "*more crop for a drop*";
- Conserving agricultural biodiversity is essential for long-term food security;
- Environmental issues must be fundamentally repositioned in the policy-making process;
- Only when they reflect a fuller accounting can economic policies ensure that development is sustainable;
- The peoples of our small planet *want their governments to do more to protect their environment.*

In concluding this chapter the Secretary-General made a strong plea for the "*Millennium Ecosystem Assessment*" (MEA); a truly comprehensive global evaluation of the condition of the five major ecosystems: forests, freshwater systems, grasslands, coastal areas and agro-ecosystems. The MA should et. al. strengthen *capacity for integrated eco-system management policies* and provide developing nations with

better access to global data sets. It would take into account and give a more clear insight in diversity around our small planet as: "*Different regions of the world face very different environmental problems, which require different solutions.*" Co-Chairs of the MA are Bob Watson (World Bank) and Hamid Zakri (UNU-IAS). The results of the MA were presented at the UNU (Tokyo-Yokohama) in late March and early April 2005.

**Risk Reduction: Challenges and Concepts**

Many methodologies and techniques have been developed in the past to reduce disaster risk through the reduction of hazards and then through the reduction of vulnerabilities. Depending on the type of disaster, it is possible to select from numerous infrastructure solutions that can be implemented to reduce the magnitude of hazards. However, it is not really viable, sometimes not even advisable, to try to eliminate the hazards completely or to reduce them to a level which makes us believe that the risks are eliminated (completely) through infrastructure development.

There will always be a hazard event, that would go beyond the designed levels of infrastructure solutions; often creating unforeseen complications, or even worse: chaos. A false sense of security could precipitate in more damage and call for more infrastructure development, thus setting off an endless loop; another example to support the one-liner: "*All engineering leads to more engineering!*"

Therefore, the emphasis should be on *reducing vulnerabilities* and *improving coping capacities*. One may question whether the danger itself, or those endangered, should be looked upon first? In this respect vulnerability assessment and monitoring, early warning and response capacities are key areas that need further promotion at global scale.

Hazard, vulnerability, risk and the appropriate response to risk, are crucial concepts for any disaster mitigation policy, aiming to enhance human security. The United Nations University (UNU) is dedicated to "*advancing knowledge for human security, peace and development*" as formulated in its motto. The concept of human security focuses on threats that endanger the lives and livelihoods of individuals and communities. Safeguarding it requires a new approach, a better understanding of many interrelated variables – social, political, economic, technological and environmental – factors that determine the impact of extreme events when they occur.

UNU has a long history of involvement in improving human security. One of the early comprehensive UNU studies was on regions that are particularly vulnerable to environmental degradation. These findings are summarized in the book "*Regions at Risk*" which was published by UNU in 1995.

Hazard mitigation and risk reduction from floods, earthquakes, landslides and a combination of these phenomena has always been an important research theme at the UNU Centre. The programme on '*Catastrophic flood risk assessment*' addresses the important issue of how to move from a '*fail-safe*' approach to adopting '*safe-fail*' *mechanisms to mitigate losses* from a catastrophic flood that would exceed flood control design standards. This demands a major *paradigm shift*, accepting that the complete elimination of flood risk is a difficult, if not impossible, task for many of the large cities in the world. Once this is accepted, the next step is to access catastrophic flood risks and take mitigation measures that include both structural and non-structural measures.

*Multi-hazard urban risks*, exacerbated by complex urban infrastructure is another area of current focus that is studied by multi-disciplinary teams employing high resolution dynamic spatial data that describe both three dimensional urban landscapes as well as the behavioural patterns of urban communities.

The United Nations University Institute for Environment and Human Security *(UNU-EHS)* in Bonn, Germany, is *a very timely addition* to the profile of UNU in risk reduction area. UNU-EHS is to explore and localize threats to human security emanating from environmental degradation, unsustainable land use practices and from natural and human-induced hazards.

Within this framework UNU-EHS is to develop, test and verify *vulnerability indicators*, and will investigate relationships between risks, vulnerability and coping capacities. *'Creeping' environmental hazards* – including climate change, landdegradation, population pressure and migration, changing resource availability and quality, all imperil communities gradually, usually in a hidden way. This undetected increase of vulnerability could become manifested once the weakened group is exposed to an extreme event of natural or human-induced origin. Thus *disasters may be seen as the evidence of this vulnerability, the lack of coping capacity and resilience.*

By addressing these problems from the perspective of human security the need for a paradigm shift in the concept of disaster prevention and preparedness becomes evident. Thus instead of starting with the focus on (natural) hazards, the 'dangers' and their quantification, the assessment and ranking of the vulnerability of affected group, *'those endangered,' should serve as the starting point* in defining priorities and means of remedial interventions. One key task for UNU is to explore, conceptualize and contribute to this paradigm shift through research and then in policy-making and practice.

Developing countries suffer most from natural disasters and this is true for floods, earthquakes, landslides and other natural disasters. This arises from a number of factors. (1) Often the local knowledge base required to identify hazard-prone areas is either non-existent or fragmentary. Research and investigations carried out to understand the risks and hazard zones in these countries are usually insufficient. (2) Secondly, risk reduction measures such as land use planning, appropriate building codes, safety regulations and response plans are in these countries not well-developed and applied. (3) Appropriate financial mechanisms are not used and (4) unfortunately expertise in risk reduction very rarely exists in local institutes and universities.

It is therefore most relevant to the mandate of the United Nations and thus of UNU to assist developing countries in identifying hazard-prone areas and develop effective risk reduction measures. International collaboration is essential to be effective in this respect. The problems are to be addressed in very different settings, requiring ingenuity *to draw on expertise from around the world*. That is the added value and true importance of the *International Strategy for Disaster Reduction*. UNU with its partners who are involved in promoting sustainable development and human security, especially in the developing countries, are very much committed to the promotion of natural hazard risk reduction through research, education, co-operation and networking.

Kobe-Hyogo, the place of one of the biggest earthquake disasters, should not remain a sad memento. It should become a benchmark and starting point for *concentrated action towards improved human security*. With this background, within its cope of mandate and expertise, UNU is dedicated to be involved and to contribute, together with UN and science community partners and Member States to the success of the Hyogo Declaration.

Basic principle of all our work will remain our strong belief that the beginning of any sustainable solution must be: *to know* (all) *the risks* (better).

Thank you very much.

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