

SECURITY THROUGH SUSTAINABILITY: MAPPING ENVIRONMENT-SECURITY HOTSPOTS IN ASIA AND EUROPE

PD Jose and Lassi Linnanen

*Faculty, Corporate Strategy & Policy Area
Indian Institute of Management Bangalore
Bannerghatta Road, Bangalore 560 076, India
Email: jose@iimb.ernet.in*

*Professor, Environmental and Quality Management
Helsinki University of Technology,
Finland
Email: lassi.linnanen@gaia.fi*

1. INTRODUCTION

The rapid environmental deterioration being witnessed the world over has given rise to a new class of security concerns at the national and regional levels. Notables among these are the interplay between environmental sustainability, national and regional security issues. It is now well established that environmental issues have a strong potential to stimulate conflict at the local, regional, national and global levels. Unless these concerns are incorporated into national and international agreements and policies, these new age insecurities are likely to break the fabric of world peace. The inter-linkages between these issues have been examined to a great detail by several researchers such as Dupont (1998); Porter (1995); Kaplan (1994); Homer-Dixon (1991); Lipschutz & Holdren (1990); Brown (1977), but there have been little efforts so far to consolidate these findings into single canvas so that potential conflict situations could be predicted and remedial measures applied to these hotspots.

The predominant issues that are likely to increase environmental stress and influence regional security in the near future include, among others:

- Increased incidence of eco-migration and increases in the number environmental refugees
- Resource Scarcity and conflicts regarding the fair distribution of shared natural resources at the local and regional levels
- Formation of regional trading blocks and trade regimes and the introduction of environment related non-tariff barriers and attendant conflicts
- Local and regional impacts of Global Climatic Changes and attendant issues such as rise of sea level, increased incidence of extreme weather, etc. leading to large scale migration.
- Emergence of extreme forms of eco-activism such as eco-terrorism

- Population Growth and Urbanization and resultant breakdowns in national capacity to manage them in a sustainable manner.
- Conflicts arising from trans-boundary pollution due to trade, manufacture, usage of goods or services or disposal patterns of hazardous wastes
- Environmental Degradation leading to civil unrest and political upheavals. Conversely military action may also cause an increase in environmental stress and scarcity.
- Conflicts over potential environmental impacts of weapons testing.

The above list is by no means comprehensive. Several other actions of governments and individuals can lead to unsustainable outcomes and pose threats to local, regional and global security. This study will attempt to identify these issues and map them against the geographical, social, cultural and political backgrounds of the countries in the Asian region. This proposal is rooted in the now well-established body of opinion that environmental issues have a strong potential to stimulate conflict at the local, regional, national and global levels. Therefore mapping the same on a regional basis can be a useful tool for predicting conflicts in time for initiating preventive actions.

2. THE CONTEXT OF THE PROBLEM AND PRIOR STUDIES

Issues related to environmental security have received considerable attention in the recent past particularly in the post cold war era (Bernard-Muenier,) Environmental security has been defined as “acute sub-national or international conflict in which there is a substantial probability of violence or the prospect of serious political and social instability stemming directly, or indirectly from human activities which reduce the earth’s capacity to sustain life.” (Dupont, 1997). Threats to environmental security may arise both from the present events as well as expected events or from the causal relations that exist between environmental degradation and conflict. For instance, environmental degradation can cause violent conflict and violent conflict in turn may exacerbate environmental degradation taking a country or region into a vicious downward spiral. It can also intensify ongoing conflicts (Kokken, 1996).

From a narrow national point of view environmental security and sovereignty may be intertwined in several ways. These include regional or local environmental change causing an adverse impact on a nation’s environmental space; promotion of international trade which creates unequal outcomes (negative) for some participants and the adoption of internal policies which are environmentally unsustainable (Perelet, 1991). However environmental problems often cut across political borders creating potential for conflicts as well as cooperation. It is interesting to note that solutions often call for measures across borders, with the areas of interest being eco-regions (Byres 1991) rather than nation states. Some of these issues are briefly examined in the following sections.

Eco-Migration and Environmental Refugees

Environmental Refugees are people who have been displaced from their homelands because of potential environmental hazards or due to loss of livelihood resulting from change in resource

control and access regimes, increasing resource scarcity conditions such as droughts, desertification, climate change or deforestation or other natural disasters. (Stranks, 1997; Leiderman, 1996). The number of environmental refugees has been estimated to be in the region of 25 million as compared to the 18 million officially recognized refugees arising from political, religious and ethnic strife (Myers, 1994). It is certain that these numbers are likely to grow rapidly in the coming years due to increased environmental degradation and climatic changes. The problem is particularly acute in the regions of Sub Saharan Africa where each day roughly 5000 people find themselves obliged to abandon their homelands for environmental reasons. At the current trends the total number of environmental refugees are estimated to increase to about 50 million by the year 2000.

Where there is a lack of migration opportunity, competition for resource control and appropriation is intensified leading to a breakdown of the already weakened administrative structures and finally to a breakdown of civil society. Many developing countries, particularly some regions of Sub Saharan Africa are already experiencing this. (For instance Malawi, which has provided sanctuary to over 800,000 Mozambicans fleeing from drought, agricultural failure and civil war, has a per capita GNP of \$230). In Asia, such migration from the impoverished to relatively affluent regions is likely to trigger a xenophobic backlash and turn into internal security problems for the national governments. The escalating tension between Bangladesh and India on the issue illegal immigration is a case in point. Population growth, land scarcity and a cycle of droughts have triggered the emigration of over 10 million refugees from Bangladesh into India further stressing an already stretched administrative and ecosystem in India leading to considerable resentment and tension at the local level. The World Resources Institute estimates that these emigrants along with their progeny could number up to 20 million. The civil strife in the state of Assam has also been attributed to the migration from Bangladesh (Dabelko, G.D, 1999; Hassan, 1991).

Resource Scarcities and Resource Sharing

While resource scarcity is not the most important cause of conflicts today, its effects can not be ignored any more. "It will not be possible for the community of nations to achieve any of its major goals not peace, not environmental protection, not human rights or democratization, not fertility reduction, not social integration, except in the context of sustainable development that leads to human security"(Human Development Report, 1994). Resource scarcity conditions often in a complex interplay with other social, economic and political contexts lead to new conflicts or exacerbate existing ones.

Environmental decline and the associated resource scarcity threaten global peace by increasing environmental stress and thus increasing competition for appropriating the available resources. Reidulf's (1991) study of the situation in Somalia reveals that an increase in environmental stress and food shortages can lead to social tension, social disruption and armed conflict. Sachs (1995) describes a number of instances wherein environmental degradation and the consequent community or individual uprisings and protests have caused social and political turmoil in countries such as Brazil, Nairobi, Cambodia and Greece. For instance, the Ogoni tribe of Nigeria is an example of marginalised communities that have been organizing themselves to demand compensation for lost livelihood opportunities as well as other

environmental and social impacts arising as a consequence of environmentally insensitive exploitation of natural resources such as timber and oil leading to social and political upheavals in Nigeria. Clearly, as exploitation of natural resources exceed their replacement rates, shortages are likely to be created, provoking confrontation in civil society for access rights to the same (Ullman, 1993).

Potential for conflicts also increase when the proceeds from the exploitation are not adequately shared or when the exploitation itself exacerbates environmental stress and reduces the economic well being of other dependant groups. Examples of such uprisings include the conflict between Ogoni, the Nigerian government and Shell Petroleum.

The problem of resource sharing across political and geographical boundaries is also likely to become acute in many regions of the world. Two areas where this is likely to be felt acutely are in fresh water exploitation and marine fisheries. With just 3% of the earth's water resources being suitable for consumption the sharing of freshwater can turn out to be a potential source of conflict between the riparian states (Fallenmark, 1986). Examples of such conflicts are the disputes on water sharing between India and Pakistan (La Jolla & Lowi) Ganges between Bangladesh and India, the sharing of river Jordan between Israel, Jordan, Lebanon and Syria, the sharing of Euphrates between Turkey and Syria, and the sharing of Nile between Egypt, Ethiopia and Sudan. These problems remain intractable in the absence of international cooperation. More recent studies have also shown that inequities in natural resources endowments and hydrological conditions will remain a potential cause for future conflicts (Gleick, 1993).

Coupled with issue of general environmental degradation is the issue of food security. Over exploitation of the marine resources by industrial fleets have seriously depleted fish stocks where nearly one billion people in 40 developing countries rely on fish as their main source of protein. The Asian region has a long history of conflicts between neighboring countries (examples, India and Sri Lanka, India and Pakistan) over fishing practices and rights. Food security of many developing countries has also been threatened due to other environmental problems. For example, acid rain problems have become acute in SouthEast China, northeast India, Thailand and Republic of Korea, which are near or downwind from major industrial centres. In India, wheat yields have been cut by half in many areas close to large sources of sulphur dioxide emissions (UNDP, 1998).

It is also important to note that local water scarcity can be more devastating than food shortages because it is more difficult and expensive to trade among regions than agricultural produces (World Resources, 1998). Further in the case of resources such as water the resource allocation decisions may themselves have important environmental impacts (La Jolla & Lowi, 1999). They note that disputes over access to water resources are rarely simple allocation issues but have severe implications for the quality of the resources itself and sometimes, for associated resources such as land as well.

Urbanization and Population Pressures

The exploding population in countries such as China and India may become a major source of

security risk to countries in the Asia-Pacific region. “ High levels of unemployment spawn political discontent, social dislocation and create economic distortions, because states with accelerating populations find it more difficult to eliminate income inequalities and to sustain economic growth rates which are sufficiently high to soak up excess labour. People pressure and environmental degradation are also responsible for large scale, population movements, both within states and across state borders. The unregulated flows of people are set to become a significant source of conflict in many parts of the developing world” (Dupont, 1997).

Climate Change and Threats to Global Security

The IPCC review of 1995 indicated that there is a strong potential for occurrence of serious climate changes including extreme weather patterns such as draughts, floods and increased temperatures, which in turn will impact primary and secondary food production cycles. Besides creating instances of severe water sharing issues, potential for sea level increases, which may submerge low-level regions, changes in precipitation altering rivers flows and hydroelectric powers etc. For example, the Indian Ocean nation of Maldives is threatened with submergence due to global warming. A two-meter rise in sea level could submerge most of Maldives' tiny islands. Even a one-meter surge in the sea level a storm surge would be catastrophic and possibly fatal to the nation.

Some of the other major impacts of global warming could be increased incidents of extreme weather patterns, increased droughts, disruption/intensification of monsoon systems, intensification of typhoons and sea level rise and storm surges (Myers, 1994). These are likely to affect the low lying areas of Bangladesh, Maldives, Nile Delta and the Chinese coastal zone. In Bangladesh over 20 million people were affected by the flooding of the low-lying delta regions in 1998. The exodus, resulting from these changes could significantly alter the political and social equations in the region.

International Trade Regimes

While the relations between that global peace and trade regimes are not immediately apparent, it need to be recognized that a trade wars have already erupted between various countries over the interpretation and enforcement of international policies/agreements particularly with reference to the environmental issues. Many developing countries perceive environmental legislation being used as non-tariff trade barriers by the developed nations. Such tensions are increasingly likely to develop among countries in the Asian region who rely heavily on the exports of environmentally sensitive goods such as chemicals, textiles.

Military and Political Upheavals

Military/Political upheavals refer to the "conscious and systematic destruction of environment as an instrument of war, or the destruction of environment as an instrument of genocide" (Stranks, 1997). The most prominent example in the Asian region is the destruction of Tigris marshes in Iraq to eliminate Marsh Arabs a clear example of military strategy as an instrument of environmental destruction. Weapons testing activities, particularly, nuclear, biological or chemical weapons also may lead to considerable environmental fall out as well as increase instability in the region. These issues become particularly important against the context of

unstable equilibrium that exists between India, China and Pakistan and Iraq, Iran and other countries in the Middle East.

Trade and Disposal of Hazardous Wastes

This is likely to become a source of conflict in the future as the Taiwanese experience indicates. Taiwan's decision to export its hazardous nuclear waste to North Korea for disposal provoked considerable protests from its neighbors. Also, there is a possibility of the third world becoming a dumping ground for the wastes from developed nations world due to cheaper reprocessing, recycling or disposal costs. However, such trade, even when within the framework of Basel convention is increasingly monitored by special interest groups and can lead to violent protests or sabotage against the exporters.

Eco-Activism

As environmental problems become more intractable the involvement of special interest groups and individuals, who oppose unsustainable development and related activities have increased. At the extreme end of this spectrum are those who seek to resolve environmental concerns through violent protests as exemplified in the case of the Unabomber in the United States. While this ideology driven 'armed revolt' against environmental degradation has been a rather recent phenomenon, it has greatly contributed to the deteriorating security situation worldwide. States in the Asian region will also need to factor in the activities of these disparate individuals/organisations into their internal security plans.

3. RESEARCH METHODOLOGY

This paper is an interim output in an ongoing research. We propose to use a multi stage methodology comprising case survey and intensive case study (Yin, 1984) methods is proposed. In the first stage, a case survey study, we would use available documentation and responses to questionnaire survey among environmentalists, decision makers in industry and government, academics and other researchers in the Asian and European regions to identify potential sustainability-security issues. This would be complemented by detailed interviews with selected respondents. Secondary data would also be collected through related studies that have been carried out by NGOs and other agencies in the region. In the second stage, intensive case studies of a few local initiatives in the region will be carried out.

The following research questions are being examined:

- Identification of predominant environmental issues, which are likely to impact national and regional sustainability and in turn have implications for global security.
- Identification of the roles of national governments as well as trade policies, which have influenced the above process?
- Which states in the region are likely to experience increased environmental risks and can the magnitude of these risks be measured/estimated?
- What intervening variables; institutions/technologies and market mechanisms may be used to address and mitigate environmental security issues.

4. EUROPEAN CASE STUDY: POST KOSOVO CONFLICT ENVIRONMENTAL SECURITY ISSUES¹

The Balkan Region composed of Federal Republic of Yugoslavia (FRY), Bosnia-Herzegovina and Croatia is known for its volatile powder keg. Many believe that the Region's unstable stance can be hinted on disputes over resources, ancient hatreds, or meddling by Great Powers. Recently, the Region was battered by a political and social turmoil as terribly seen in the Kosovo conflict in March-June 1999. While the immediate social concerns and consequences of this conflict have greatly impacted the Region, public opinion on the consequences for the environment was significantly raised. The fear of widespread ecological damage and destruction in the FRY and other neighboring countries has mounted a serious environmental challenge to all concerned.

The Kosovo conflict has a broad scope of impacts. The exodus of huge numbers of refugees from Kosovo to Albania and the Former Yugoslav Republic of Macedonia particularly manifested this, although these countries were not prepared for the scale of the influx. Likewise, Bulgaria and Romania which are downstream along the Danube River feared the effects of transboundary pollution from the destroyed industrial facilities in FRY. The bombings and explosions that blazed oil refineries, oil storage depots, and chemical factories that lasted for many days have created an unprecedented pollution over wide areas. On the other hand, reports of leakage of dangerous chemicals to air, land and water were feared and highlighted in the international media. Importantly, the destruction of living quarters, villages, roads and bridges, utility infrastructures such as water supply and waste systems added to the scaled up human settlements problems. With these pronounced environmental and human settlement problems, various organizations, notably the NATO, United Nations bodies such as UNEP and UNCHS (Habitat) have made some important efforts to tackle the problems accordingly. The establishment of the Balkans Task Force (BTF) has played a pivotal role in leading the task of urgently carrying out detailed assessment of the environmental and human settlements impacts of the Kosovo conflict. BTF was a joint initiative between UNEP and UNCHS (Habitat) which was composed of 60 experts drawn from a wide range of different backgrounds and expertise. The BTF process of assessment has also included inputs from six UN agencies and departments, 19 countries and 26 NGOs and scientific institutions. The report of the BTF published later in 1999 highlighted the linkage between environmental pollution and human welfare. According to Klaus Töpfer, UN Under-Secretary General, the report also demonstrated the need for further efforts and effective planning in conflict management.

The BTF Principal Assessment Findings and Recommendations

The Joint UNEP/UNCHS (Habitat) BTF organized five Technical Missions to the FRY. The missions took place at various period from July to October 1999 with the cooperation of the local authorities and with the assistance of the United Nations Liaison Office in Belgrade (capital of FRY) and United Nations Mission in Kosovo (UNMIK). The issues addressed by each mission were as follows:

Date of Mission	TECHNICAL ISSUE UNDER CONSIDERATION
July – October	Consequences of the conflict for human settlements and the environment in Kosovo
19 – 27 July	Environmental consequences of air strikes on industrial sites
16 – 19 August	Possible use of depleted uranium in Kosovo (preliminary fact finding mission)
21 – 28 August	Environmental consequences of the conflict on the Danube River (complementary mission organized in close cooperation with International Commission for the protection of Danube River, ICPDR)
7 – 13 September	Consequences of the conflict on biodiversity in protected areas

Source: UNEP/UNCHS Report on Kosovo Conflict (1999).

Each of the missions was composed of international team of independent technical specialists, supported by BTF and UNEP/UNCHS (Habitat) staff. In addition, an independent Desk Assessment Group was assigned to address the issue of depleted uranium, building on the work of the preliminary fact-finding mission. Depleted uranium is a waste product of the process used to enrich natural uranium ore for use in nuclear reactors and nuclear weapons. DU is used in cruise missiles nose cones and armour tanks. During the Kosovo conflict, there were regular media reports that DU has been used in military operations and consequently the concerns of possible post-conflict risk to human health and environment are significantly raised. The Desk Assessment Group worked during August and September.

From then and after a series of careful studies, investigations, field visits, expert consultations, field and laboratory testing and stakeholders meetings in the various sites in Yugoslavia, detailed mission reports have been compiled and analyzed. The findings were topically summarized in the proceeding discussion. For better reference of the indicated locations, maps are provided as annexes of this paper.

Principal environmental hot spots

The BTF found environmental hot spots in four areas namely: Pancevo, Kragujevac, Novi Sad and Bor. In all of these locations, serious environmental issues were identified and require urgent action. For Pancevo, the main concerns are: serious leakage of 1,2-dichloroethane (EDC) and mercury; burning of vinyl chloride monomer (VCM) forming dioxins; burning of 80,000 tonnes of oil and oil products releasing sulphur dioxide and other noxious gases; high concentration of EDC found in water of canal running into the Danube; and high concentrations of mercury and petroleum products in the canal sediments. For Kragujevac, the main concerns are: high levels of PCBs and dioxins on paint shop floor at Zastava factory (formerly one of the biggest industrial facilities in the Region); high levels of PCBs around power plant transformers; contaminated water tanks; inadequate storage and treatment of toxic waste; and PCBs detected in Lepenica river. In Novi Sad, the main concerns are: risk that groundwater polluted with petrochemicals from oil refinery could enter drinking water wells; and general concern over siting of wells close to refinery. In Bor, the concerns are on: severe air pollution from sulphur dioxide emissions; evidence of chronic environmental damage from copper mine, and localized PCB contamination at transformer station.

In addition to these hot spots, the BTF made other alarming observations about the environment. However, some of these problems have built up over a period of many years, and taking action would demand further investigation. These problems do not result from the recent war, but from years of environmental neglect. For example: the sediment on the bed of Danube river is contaminated by toxic pollutants from 1960s, 1970s and 1980s, while pollution of the Timok river (a Danube tributary) near Bor, has been a long-standing source of disagreement between Bulgaria and Federal Republic of Yugoslavia.

Industrial sites assessment

Evidently, the bombing and explosions during the Kosovo conflicts has caused widespread physical damages particularly the badly hit industrial sites and complexes in various locations of FRY. Among the industrial sites assessed were Baric, Kraljevo, Nis, Novi Beograd, Obrenovac Region, Prahovo, Pristina and even the Iron Gate Dam and Reservoir in Djerdap. Generally, industries (e.g. plastic, PVC film, polyurethane, foam, fixtures, fittings, etc.) and important industrial facilities such as; power lines, power stations, oil depots, pumping stations, electrical transformers, oil and gasoline storage tanks were destroyed with fire and explosions which resulted to unprecedented pollution to air, land and water (groundwater and the river Danube).

Environmental impacts of the conflict on the Danube River

Since most of the key industrial facilities targeted during the air strikes are located either alongside the Danube River (e.g. Novi Sad, Pancevo), along major tributaries such as Sava (e.g. Baric), or on smaller tributaries such as the Lepenica and Morava (e.g. Kragujevac), there were fears that large quantities of hazardous substances could have entered the Danube system, posing risks for people in Yugoslavia and downstream in Bulgaria and Romania, through drinking contaminated water or eating contaminated fish.

There is no empirical evidence of an ecological catastrophe for the Danube as a result of the air strikes during the Kosovo conflict. However, there are some serious hot spots where contamination by hazardous substances released during the air strikes poses risks for human health and the aquatic environment. There is evidence of long-term chronic pollution of the Danube in the FRY. Part of this pollution stems from other Danube countries, but inadequate treatment and storage of hazardous waste products within the FRY is also a significant source of contamination.

Depleted uranium

During and after the Kosovo conflict, there were regular media reports that depleted uranium (DU) had been used in military operations by NATO. Consequently, there are serious concerns among the people of Serbia and Kosovo regarding the possible post-conflict risks of DU to human health and the environment. However, in spite of the attempts of the BTF, it was not possible to obtain official confirmation on this issue, or a map of the areas which might possible have been hit by this type of weapon – either from NATO (and the member states) or from Yugoslavian authorities. This issue needs further consideration since the investigation

carried out by expert group desk assessment was only on fact-finding about the validity and suspicions that depleted uranium was used during the conflict.

Consequences of the conflict on biodiversity

During and immediately after the conflict, media reports, non-governmental (NGO) web-sites and official statements by the Yugoslavian authorities regularly referred to serious damage inflicted by air strikes in protected areas. For example, according to a Yugoslav news agency, the Serbian Ministry of Environmental Protection said that the damage inflicted to ecosystems and habitats of endangered species (in Kopaonik National Park) was irreparable. Other national parks such as Fruska Gora, Zlatibor, and a lake - Skadar lake in Montenegro were also disturbed and, to some extent, destroyed due to air strikes causing explosions and fires.

The physical damage from the air strikes is significant within the limited areas, but have relatively minor importance when seen in relation to the overall size of the protected areas and the ecosystems which surround the hit sites. Fires started by the air strikes were localized, and nothing approaching a significant forest fire was seen. Unexploded ordnance is both an immediate safety issue and possible long term constraints to future tourism in and around protected areas. A decrease in tourism could reduce income for conservation management activities, as well as threaten the livelihoods of local people involved in traditional harvesting and use of natural resources.

Social, economic and administrative disruption are likely to cause an increase of pressure on natural resources, both inside and outside protected areas (e.g. increase use of wood for cooking and heating, due to loss of electricity supplies). Tourism and the income it generates will also be reduced, though, it should be recalled that development of skiing infrastructure in Kopaonik had been reported as a conservation problem. Experience from reconstruction activities in other Balkan countries show that future reconstruction in Yugoslavia will place heavy demands on raw materials (e.g. gravel, rock, wood products, water). The Federal authorities responsible for telecommunication facilities within protected areas formerly paid rent to the protected areas concerned (though reportedly not for facilities located in Montenegro).

Special considerations in relation to human settlements and Kosovo

The conflict has seriously affected human settlement conditions in both the Republic of Serbia and the Province of Kosovo. To some extent, settlements were also affected in neighboring Albania and the Former Yugoslav Republic of Macedonia, mainly through the over-use and deterioration of infrastructures and services caused by the influx of refugees from Kosovo. While the most visible effects of the conflict were the destruction of houses, public buildings and infrastructure facilities, there were equally dramatic and perhaps more long lasting effects on the institutional systems responsible for the administration of human settlements and environment, especially in the province of Kosovo.

The destruction of housing and the complete disruption of public utilities such as water supplies and wastewater disposal systems contributed to the rapid deterioration of living

conditions in the area of the conflict. Furthermore, due to the exodus of Serbs from the Province, Kosovo lost practically all of its experienced personnel from local authorities and utilities. The Province is presently confronted with the challenge of rebuilding a minimum system of local administration to undertake emergency activities and move towards environmentally sustainable development.

The BTF report put forward some salient recommendations that stressed on the urgent actions to mitigate the effects of the most serious identified problems, to halt further degradation of the state of the environment, and to diminish the risks to human health. BTF immediate recommendations for all the identified environmental hot-spots generally fall in any of the following considerations:

- Detailed groundwater studies and monitoring of drinking water should be conducted to determine whether pollution has contaminated sources of drinking water.
- Surface soil contaminated with heavy oil, PCBs, heavy metals and other hazardous substances should be given remedial treatment and, if necessary, removed from all industrial sites and securely stored.
- A detailed waste disposal plan should be developed and implemented for every site, and for FRY as a whole. Immediate action should be taken for the secure storage of hazardous waste (including medical waste), even if facilities for final treatment or disposal are not yet available.
- Monitoring of air, water, soil, agricultural products and human health, as well as communication of the results of such monitoring to the public around all industrial hot spots should be continued and, if necessary, increased.

BTF strongly pointed out that it is important to ensure the safety of the environment and the clean up the sites immediately in order to avoid risks to human health and long-term ecological damage. Of prime recommended actions include, among other works, cleaning of the canal leading to Danube in Pancevo, cleaning of mercury from the ground in Pancevo, decontaminating of dioxin and PCB hot spots in Kragujevac, ensuring the safety of drinking water in Novi Sad, and reducing sulphur dioxide emissions from the copper mine in Bor.

Specific short and long term recommendations for each hot-spots are primarily focused on clean up and careful handling of contamination. For the Danube River, continuous monitoring should be ensured in all its reaches. Significant long-term efforts should be made to reduce both acute, point-source pollution and chronic pollution from industrial and urban effluent through investment in appropriate production and waste management processes.

The recommendations for immediate action to deal with depleted uranium are considered of prime importance. Obtaining information from NATO confirming how and where DU was used during the Kosovo conflict is necessary. This is a prerequisite for verifying initial risk assessments, making necessary measurements, and taking precautionary actions.

Immediate recommendations for biodiversity include the clearance of unexploded ordnance remaining in the protected areas and implementation of measures to issue warning and restrict

access to certain areas. There is an urgent need to rebuild the nature conservation infrastructure and management system in Kosovo; as a first step, efforts should be made to recover all relevant information on biodiversity in the province. Management plans should be prepared and implemented for each of the damaged sites and long term monitoring of the impacts of the conflict on protected areas should be conducted.

With the evident widespread physical destruction, human settlements priorities is on the top list priorities. Medium-term housing rehabilitation strategies should be developed in close consultation with local stakeholders. Such strategies should enable the recovery of local capacities in the construction industry, building materials production and operation of financial system. Likewise, efforts towards institutional rebuilding and physical reconstruction will have to take environmental considerations into account. The strengthening of the environmental institutions will generate benefits for the economy as well as the environment, at regional, national and local scales. Moreover, some important long-term institution and capacity building recommendations such as; participation of FRY into regional and international processes, capacity building of environmental administrations, private sector participation, and partnerships with other agencies for better environmental management, are recommended as a move towards full restoration and sustainability.

5.0 NEED FOR FURTHER STUDY IN THE ASIAN AND EUROPEAN REGIONS

As explained in the earlier sections of this paper, the threats are cited above are by no means the only ones. Also, newer threats are emerging in the region constantly, clearly highlighting the need for initiating remedial measures.

In the context of Europe, the findings and recommendations of the BTF are important basis to develop a new planning and management approaches for the environment and human settlement security in FRY in particular and the Balkan Region in general. The post-conflict damages, destruction, pollution, contamination and the needs for new administrative and policy regime will serve as the point of departure for further study and investigation. If restoration and sustainability should be attained in the conflict-damaged region like the Balkan Region, a new security approach at national, regional and international levels must be established. As an important constituent of the European Community, the Balkan Region needs to reshape itself to be fully integrated in the framework of the Community's pursuit of peace, development and healthy environment. The BTF initiatives have laid down the ground for further investigation that are useful for policy and decision-makers to manage post conflict environment and social issues effectively. Hence, prospects for study that would continue on this ground focusing on economic development and environmental security would be of prime importance.

The example of India and Nepal is another good case which illustrates the need for interweaving economic and environmental issues through cooperative international approaches to defuse security threats. For instance, floods swamp many parts of eastern India every year with 1998 widely regarded as being the worst in the last century. The floods are particularly acute when there are high rains in the hilly regions of India's neighbor, Nepal

where the rivers originate. As building dams on the Gangetic plains would be expensive, the solution calls for Nepal to dam these rivers closer to their source. This could provide cheap power to India as well as check the severity of the floods. However the investments for these will need to be made by India since Nepal does not suffer from either of the above problems. (Gupta, 1998)

As noted earlier, the solutions call for regional cooperation. For instance, following years of short sighted agricultural and water policies the Aral Sea had lost half its area by 1991 and most of the water flowing into the sea was salt laden. However the specific agreements on water sharing between the five riparian states of Kazakstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan) attempt to address the root cause of the environmental degradation of the basin (World Bank, 1997). The complex connections between security development and environmental pressures necessitate greater international cooperation and the creation of bilateral and multilateral assistance. There is also an acute need for strengthening the national capacities for managing environmental problems. (Carius & Andreas, 1997) Environmental security also offers a more fruitful basis for cooperation among nations than military security because it is both a positive and inclusive concept regulating and nurturing more stable and cooperative relationships among nations (Renner, 1989).

At the conclusion of the study we expect to:

- Outline the critical environmental issues that would act as triggers for environmental insecurity in the Asian region and their potential impacts
- Identify potential hotspots in the Asian region and its implications for global security. This will most likely be presented as a series of maps identifying the potential for environment-security issues on the lines of figure 1 (but more detailed). Or for instance a water resource map which will identify the resource sharing patterns in the region and potential for conflicts.
- Identify potential areas of cooperation to mitigate environmental stress and insecurity.
- Identify factors that may exacerbate inter and intra-regional environment related tensions leading conflicts and threats to peace.
- Document specific experiences of environmentally related tension and conflict with particular focus on local solutions which have positive implications for sustainability as well as regional security. The researchers will not attempt to justify the positions of the project affected, the governments or the companies involved. It will however record the experiences of the affected constituents and record their perceptions and attempt to examine how their differing perceptions have contributed to increase in inter-constituency tensions and led to a gradual breakdown of civil society and national or regional security.

We propose to use this project as a forum to jumpstart a more collaborative effort between institutions in Asia, Africa, Europe and the United States to develop similar maps for the world as whole.

Notes:

1. This portion of the paper is extracted from UNEP/UNCHS Report on the Kosovo Conflict: Consequences for the Environment and Human Settlements. 1999.

REFERENCES

Bernard-Meunier, Marie. *Forward to the proceedings of the Seminar on Environmental Security*, 1997.

Carius, A, Andreas K. *Complexification of Environmental Security*, University of Pittsburgh. Center for West European Studies, 1997.

Dabelko, G.D. *The Environmental Factor*, The Wilson Quarterly, Washington, Autumn. 1999.

Dupont, A. *Regional Environmental Trends and Security in the Asia-Pacific Region*, <http://www.acdss.gov.au/confrence/1997/97region.htm>. 1997.

Dupont, A. *The Environment and Security: What are the Linkages*. Canberra: Strategic and Defense Studies Centre Research School of Pacific and Asian Studies at the Australian National University. 1998.

Fallenmark, M. *Fresh Waters as a Factor in Strategic Policy and Action*, in Global Resources and International Conflict: Environmental Factors in Strategic Policy and Action, ed. Arthur H. Westing. Oxford: Oxford University Press: pp. 85-113, 1986.

Gleick, P. H. "Water and Conflict: Fresh Water Resources and International Security." International Security 18: pp. 79-112. 1993.

Gupta, Sharad. *To Stem the Spate: Start from Nepal*, Indian Express, September 15, Hyderabad, p.11, 1998.

Hassan, S., *Environmental Issues and Security in South Asia*, Adelphi Papers. 1991.

Homer-Dixon, Thomas, 1991. *On the Threshold: Environmental Changes as Causes of Acute Conflict*. *International Security*, Vol. 16, No.2, pp. 76-116. Fall 1991.

<http://www.dfail-maeci.gc.ca/english/foreignp/dfait/commentary/1997/refugees.htm>

Human Development Report. The World Bank and Oxford University Press, NY. 1998.

Human Development Report. The World Bank and Oxford University Press, NY. 1994.

Kaplan, R. *The Coming Anarchy*, Atlantic Monthly, 273(2), 44-73. 1994.

Kasperson, Roger. Global Environmental Hazards: Political Issues in Societal Responses. In *Reordering the World, Geopolitical Perspectives on the 21st Century*, G. Demko and W. Wood, eds. Boulder CO: Westview Press. 1994.

Kokken, Karin. *Environmental Security , The Concept*, Report from the Norwegian Student Pugwash Seminar, University of Oslo. 1996.

Leiderman, S.M. *Learning to Recognize Environmental Refugees*: Statement prepared for Symposium No. 316: "Environmental Refugees: Anticipation, Intervention, Restoration" presented during the 1996 annual Meeting of the American Association for Advancement of Science, Baltimore, Maryland. 1996.

Lipschutz, R. D., and John P. Holdren. *Crossing Borders: Resource Flows, the Global Environment, and International Security*. Bulletin of Peace Proposals 2: pp. 121-33. 1990.

La Jolla & Miriam R Lowi. *Water and Conflict in the Middle East and South Asia: Are Environmental Issues and security Issues Interlinked?*, Journal of Environment and Development, December. 1999.

Myers, N. *Environmental Refugees: A Crisis in the Making*, People and the Planet, Vol. 3, No.4. 1994.

Myers, Norman and Jennifer Kent.. *Environmental Exodus – An Emergent Crisis in the Global Arena*. Washington DC: Climate Institute, 1995.

Myers, Norman. *Environmental Refugees*, <http://gerio.org/ASPEN/science/eoc94/EOC2/EOC-2.html>, 1994.

Percival, Valerie. *Empirical Findings from Recent Research*, Proceedings of the Seminar on Environmental Security. 1994.

Reidulf K.M. *Environmentally Induced Conflicts?: A Discussion Based on Studies for the Horn of Africa*. Bulletin of Peace Proposals 22 (1991): pp.175-88. 1991.

Renner, M. *Fighting for Survival: Environmental Decline, Social Conflict, and the New Age of Insecurity*, Washington: World Watch Institute. 1996.

Renner, M. *Forging Environmental Alliances*, World watch 36, Nov-Dec, p. 16, 1989.

Sachs, A., *Eco-Justice: Linking Human Rights and the Environment*, World Watch Paper, 127, <http://www.worldwatch.org/pubs/paper/127.html>

Stranks, R.T. *Policy Commentary: Environmental Refugees?*, 1997.

Ullman,R. *Redefining Security*. International Security 8(1), 129-153.1983.

UNEP. *UNEP/UNCHS Report on the Kosovo Conflict: Consequences for the Environment and Human Settlements*. 1999.

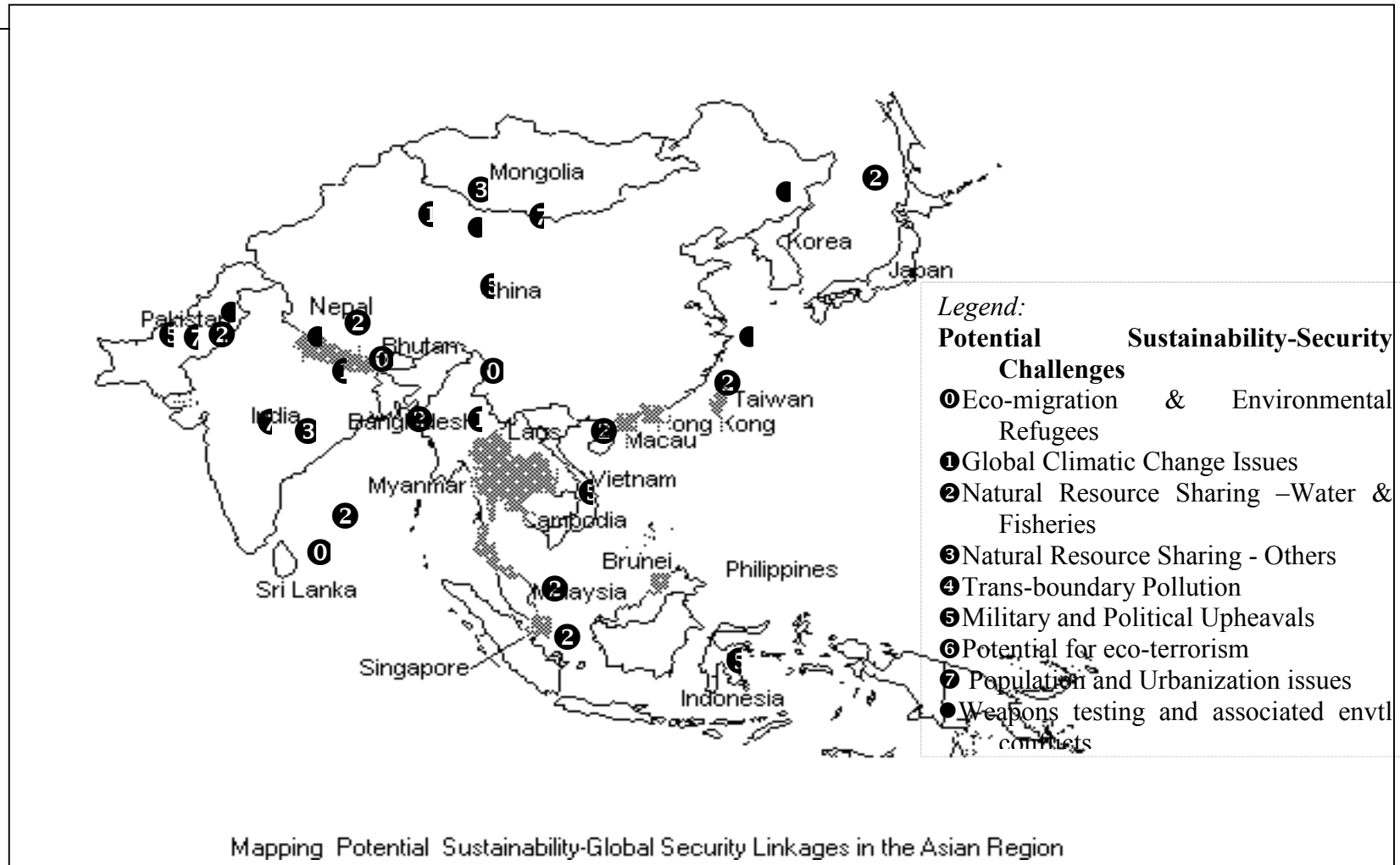
Unknown (Undated) *Environmental Refugees: A Crisis in the Making*, http://www.oneworld.org/textver/patp/pp_eco_refugees.html)

Westing, A. *Global Resources and International Conflict*. 1986

Wood, B.W. *Eco-Migration ; Linkages Between Environmental Change and Migration*. Office of the Geographer and Global Issues, US Department of State, <http://www.newschool.edu/icmec/ood.htm>. 1995.

World Bank. *The World Bank Group and the Global Environmental Facility*, Environment Department, Dissemination Notes, No. 55, April 1997.

World Resources Institute. *1998-99- World Resources: A Guide to Global Environment*, World Resources Institute, Washington. 1998.



Depleted uranium is a waste product of the process used to enrich natural uranium ore for use in nuclear reactors and nuclear weapons. DU is used in cruise missiles nose cones and armour tanks. During the Kosovo conflict, there were regular media reports that DU has been used in military operations and consequently the concerns of possible post-conflict risk to human health and environment are significantly raised.