Environmental Stresses and their Security Implications for South Asia

Uttam Kumar Sinha

Abstract

In discussing the dynamics of contemporary conflicts, scholars, over the last decade, have focused on the 'interconnectivity' between environmental factors and violent conflict—for example between migration and environmental mismanagement, debt and violence and between ethnic conflict and resource disputes. Such an approach corresponds to the post-Cold War reexamination and redefinition of security in more comprehensive conceptual terms. Environmental cooperation is seen in this new environment as a non-threatening vehicle of engagement and a useful confidence building mechanism among states. One of the positive outcomes has been the growing legitimacy for military-to-military cooperation in environmental protection and the meaningful and practicable role militaries can play in overcoming some of the environmental challenges in South Asia.

Introduction

The Panglossian Principle[1] states that unless it can be demonstrated that something is wrong, it can be assumed all is well. That all is not well has become an influential line of environmentalism. Indeed, in retrospect, the impact of the political, economic and social forces on the biosphere has been an unprecedented feature of the preceding century. It is clear that human activity has changed Earth's sustainability in ways unlike that of any other era and not for the better.[2] Faced with the realities of global environmental problems that are either 'shared between' or 'common to' states, governments have been pressured to abandon narrow state-centric approaches in favor of more collective and comprehensive policies to meet the challenges of an environmentally destabilized world.

With the end of the Cold War, the rapid changes in the international system that followed, and the steady ascendancy of environmental

Strategic Analysis, Vol. 30, No. 3, Jul-Sep 2006

problems in the security discourse, a valid question has been raised: Of what value is security and what it takes to achieve it?[3] Security, simply put, means safety from dangers. The ubiquity of environmental concerns and the propensity to create enormous damage has enabled it to find space in the traditional security framework in which state and stability remains the prime object to be secured.[4] Indeed, as the paper suggests, there are compelling reasons for security specialists and policymakers to include environmental issues in their analytical framework.

Professor Ramaswamy Iyer has condensed the debate over the security implications of environmental scarcity into two propositions which are particularly relevant for South Asia:

i. pressure on some vital natural resources such as water is likely to become more and more severe;

ii. competing claims over scarce natural resources could lead to tensions and conflicts both within and between countries.[5]

Scholars have examined the relationship between the environment, especially resource scarcity, and violent conflict – the 'scarcity model'.[6] Thomas Homer-Dixon's work underlines the relationship between the environment and conflict as an interactive and complex one and that environmental stresses and strains can be important contributors to conflict even if causally distant. In particular, he posits that environmental scarcity has insidious and cumulative social impacts, such as population movement, economic decline, and the weakening of states, which can contribute to subnational violence.[7] Homer-Dixon further suggests that environmental decline has the potential to exacerbate existing disputes between the rich and poor countries (analysed in this paper as 'developed countries' Vs 'developing countries') as well as between rich and poor peoples in what he describes as 'relative deprivation conflicts'.[8] Alan Dupont shifts the debate from the 'environmental-induced conflicts' to what constitutes 'environmental security' by focusing on environmental warfare "the explicit targeting of an adversary's resources or physical environment aimed at degrading or destroying the capacity to prosecute war" and the use of defence forces to monitor environmental changes and to assist in protecting the environment.[9]

South Asia: Environmental Threat Overview

In South Asia the geopolitical landscape is neither static nor linear while

political tensions have impeded regional cooperation in many spheres including the environment. The region's volatile geopolitical situation and high degree of mutual mistrust plus the potential for environmental degradation to trigger events means environmental factors could become a major cause of instability and a threat to regional security.

South Asia comprises of eight developing countries with India, the largest, sharing borders with five of them. All except the island nations of Sri Lanka and Maldives share land borders with India. Nepal and Bhutan are landlocked. The region has several major interstate rivers plus a common sea coastline extending from Pakistan in the west to Bangladesh in the east. This geographic contiguity is fractured by geopolitical rivalries and security concerns between the different political units, whose political systems run from a well established and deeply rooted democracy in India to a fledgling one in Bangladesh and uncertainty in Nepal through monarchy in Bhutan to authoritarianism in Pakistan. Internally, tribal combustion and ethnic rivalry frequently test the region's multiethnic societies.

The attention demanded by increasing internal problems and conflicting political, economic and social interests between countries confine environmental issues and problems primarily to the realm of 'low politics'. This, as mentioned earlier, is also because the complexity of environmental issues and the intricate linkages between development, population, poverty, ethnic conflict and mass migration to the natural environment are often indirect or difficult to grasp. Yet, the fundamentals cannot be ignored. South Asia is the world region with the highest population growth rate, the largest number of poor, an alarmingly shrinking resource base and rampant societal strife – all of which make it extremely vulnerable to environmentally-induced instability and conflict. This is further compounded by the fact that respective state's institutional mechanisms have not adequately responded to the high level of ecological vulnerability in the region.[10] Following are some of the major environmental-induced security implications:

Population Pressure

One of the main drivers behind environmental scarcity in South Asia is population growth. The region is among the most densely populated in the world. India, Pakistan and Bangladesh are among the world's 10

most populous countries. India's current population is 1.08 billion and by 2050 it is predicted to overtake China as the world's most populous country.[11] Bangladesh with a population of 141 million will have twice that number by 2050. Pakistan's current population of 159 million will reach 295 million by 2050.[12]

In the South Asian region problems associated with population growth and demographic factors are explicitly mentioned in official policies (although the direct impacts of population on the environment are often underplayed).

India, for example, considers development a major priority that will ultimately lead to a decrease in population growth rates. Bangladesh makes the connection between environment, population and development more explicitly: "Links exist between population, poverty and the environment. High population growth rates lead to more intense use of resources, exacerbating existing scarcities and over-exploitation."[13] In contrast Pakistan has been somewhat less explicit calling: "Accelerating economic and demographic pressures are one of the three factors identified as responsible for the emergence of environmental problems."[14]

The region's population growth will have a direct bearing on its renewable resource systems such as forests, land, and water as well as on energy demand. Increase in energy consumption will require more burning of fossil fuels, which in turn will increase greenhouse gas emissions leading to global warming. South Asian states are particular in underplaying the role of population growth vis-à-vis development and economic growth. Estimates suggest that population growth worldwide will account for 35-50 per cent of future emissions growth.[15] South Asian countries are reluctant to bring attention to their rising populations lest they be forced to cut back emissions (and therefore slow economic development).

All of South Asia's major renewable resource systems are being subjected to significant pressures. A survey of deforestation, land degradation, and water shortage/degradation indicates a high level of stress on the region's renewable ecosystems.

- *Deforestation*

Deforestation and global warming are directly related. Since trees are 50 per cent carbon, it is estimated that 25-30 per cent of greenhouse gases released each year is caused by deforestation.[16] Expansion of farmlands in

order to feed the growing population inevitably leads to increasing encroachment on forests and on marginal lands. Excessive cutting of wood for timber production also adds to the depletion of forest resources. Areas with the most extensive degradation, already, include the cultivated Himalayan belt in India and Nepal, the Western Ghats of India and watershed areas of Sri Lanka. According to the FAO (Food and Agriculture Organization) Forest Resources Assessment 2005, the six countries of South Asia (excluding Maldives) together account for the loss of more than half a million hectares of forest annually between 1990 and 2000.[17] Alarmingly, the FAO predicts that at existing rates Bangladesh and Pakistan will completely lose their forest by 2011 and 2015 respectively.[18]

- *Land Degradation*

In the case of Bangladesh and Bhutan, per capita unit land resources are well below the world average of 0.26 hectares.[19] Population increase and unsustainable agricultural practices are primary contributors to land shortage and land degradation. In India, for example, intensive agriculture has degraded 125 million hectares of land owing to monoculture, salinity and water logging with a result many fertile lands are now wastelands.[20]

- *Water*

Fortunately, none of the countries of South Asia are yet in the "water stress" stage (i.e., between 600-1000 person per flow unit [p/fu; 1 fu=1 million cubic meters]).[21] However, quantitative supply problems are increasing. Estimates indicate that India will enter the 'stress zone' by 2025 and Pakistan and Sri Lanka shortly after 2025.[22] Water scarcity due to ground water depletion is already a major problem in India. To complicate matters water quality is also deteriorating. For example, 80 per cent of the 14 perennial rivers in India are polluted. Organic pollutants from industrial activities are a major cause of degradation of water quality throughout the region. India, for instance, is the third biggest emitter of organic water pollutants with 1,651,250 kg/day.[23]

Global Warming and Its Impact

Not only are regional renewable ecosystems under pressure but South Asia is also facing daunting challenges related to climate change. The UN-sponsored Intergovernmental panel on Climate Change (IPCC) in its report (March 2001) which was later endorsed by the World Meteorological

Organization (WMO) indicated clearly that human activities are altering the chemical composition of the atmosphere through build-up of 'greenhouse gases'—primarily carbon dioxide, methane and nitrous oxide—because of which global temperature is rising. Scientific evidence indicates that the Dokriani Barnak and the Gangotri Glacier in the Garhwal Himalayas (source of major rivers) are retreating at an alarming rate.[24] Scientists predict the loss of all central and eastern Himalayan glaciers by 2035.[25] High temperatures recorded in Nepal illustrate the extreme sensitivity of mountain regions to climate change. This also includes the Tibet plateau, which has recorded the warmest decade in 1,000 years.[26]

The IPCC findings clearly indicate that the impacts of climate change for the countries in the tropics and sub-tropics would be far worse than those in the temperate zone. Countries in South Asia have, therefore, much to worry about. For example, rising ocean levels have flooded about 18,500 acres of mangrove forest during the past three decades in Bangladesh.[27] Some of the impacts of global warming and the potential trigger-off effects are:

- *Sea Level Rise*

The IPCC estimates that sea-level will rise 9 to 88 cm by the year 2100 with a 50 per cent probability of sea-level rising to 45 cm.[28] In Bangladesh—with a population of 125 million on a land area of 1,444,000 sq km – 7 million people live below the 1 metre contour.[29] In the monsoon season (June to September) one-third of the land is submerged in water. This would mean a significant displacement of people internally and externally. India could face severe internal problems in case of a large-scale migration if such a situation arises. Given the fact that India's own coastal population will be exposed to the consequences of sea level rise, the problem would be that much more intense.

- *Human Health*

Changes in climate and weather 'may' factor into some disease outbreaks. Studies have shown that climate variation can affect the life cycle of many 'pathogens and disease carrying insects'. Health hazards as a result of warmer climates will see an increase in infectious diseases spread by mosquitoes and other insects. Such 'vector borne' diseases include malaria, dengue fever, yellow fever and encephalitis. For a country like India, given its inadequate health system with an abysmal 0.9 per cent of GDP on public health expenditure and 51 physicians per 100,000 people[30],

health prevention as a priority will impose an enormous strain on the exchequer. Researchers have determined a robust relationship between El Nino events and the prevalence of cholera in Bangladesh, thus proving a strong case for the climate-health link.[31]

- *Food Production*

The region's economy is heavily reliant on climate-sensitive sectors such as agriculture and forestry. The impacts of climate change on potential rice production, as studied by the International Rice Research Institute and the US Environmental Protection Agency, indicate that increasing temperatures may decrease rice potential yield up to 7.4 per cent per degree increase in temperature.[32] In Asia the estimate of rice yield decline is 3.8 per cent.[33] The changes in rainfall pattern and distribution owing to climate change can lead to shifting of agricultural lands and may also force intensive cultivation of marginal lands and further deforestation.

The abovementioned effects of global warming may intensify the impact of already serious environmental problems and if certain thresholds are crossed, global warming could create new and rapidly unfolding security challenges. For instance, several recent US studies investigate the possibility of rapid climate change scenarios that would have even more intense security ramifications than the IPCC warming models. Abrupt climate change could directly impact military operations (such as anti-submarine warfare, logistics, and electronic warfare operations).[34]

Security Implications: Some Broad Observations

Since conflict is a process, environmental issues such as competition for scarce resources or degradation of critical renewable eco-systems can add a new dimension to social or ethno-political disputes.[35] Development, poverty alleviation and sustainable management of the changing environment largely depend upon the region's social stability and peace while, on the other hand, failure to protect the environment can undermine efforts to alleviate poverty and sustain development. Some of the important security implications for India and South Asia will now be examined in several categories:

Civil Society Vs State

Although the state negotiates, signs and ratifies environmental

agreements, there are, nonetheless, potential limitations to its legitimacy and authority.[36] As states in the region will find it increasingly difficult to cope with mounting environmental issues, non-state actors (such as NGOs) will play a greater role. In effect, state authority will be challenged by more decentralized and less bureaucratic approaches and actors. Failure to resolve issues between state and civil society or between various sub-state actors could contribute to conflict or instability.

Owing to different political systems and the local extent of degradation both state and non-state responses to environmental problems and the potential for conflict and instability will vary from country to country. For example, in terms of early identification and prioritisation of environmental problems or in assessing responses that require greater public participation, democratic countries should be able to respond better than non-democratic ones. India's democratic structure for instance will tend to be more accommodative than less democratic countries, which may suppress environmental movements or have less ability to respond to looming environmental challenges. The case of India's forest resources illustrates this point.

The institution of the joint forest management (JFM), as a result of the National Forest Policy (1988), is focused on rural and tribal people and considers their intrinsic relationship with the forest. JFM is regarded by civil society as a positive step in the larger process of decentralisation that protects the forests which both safeguards the interest of the state (because forests are an important source of revenue) as well as looking out for the welfare of local communities. Although disputes still exist, the JFM has gone a long way in helping establish a regime of property rights between the state and the marginalised populations.[37]

On the other hand, Nepal's lopsided development plans and appropriation of resources by a few over the many is regarded as a significant factor in the Maoist uprising. In the Rapti Zone in the Midwestern hills, where the 'People's War' movement began is a good example. Foreign aid projects aimed at "attacking poverty and preventing a communist uprising" unintentionally reinforced existing feudal structures. Meanwhile the virtual absence of land reforms deprived and aggrieved the rural poor allowing the Maoists to portray themselves as crusaders for equality and justice.[38] The armed uprising that began in 1996 is bound to impact on the bio-diversity and wildlife conservation efforts in

Nepal. Telling signs are already emerging. Reports indicate that since the insurgency, local villagers, caught in the cross fire between army personnel and Maoist rebels, have been smuggling timber across to Tibet and India for their sustenance.[39]

In Pakistan, environmental stresses such as air and water pollution, and deforestation are combining with population growth, external geopolitical and historical forces, and local martial traditions to "produce a system of reinforcing negative relationships" that is "exaggerating violence and insecurity".[40] "Insecurity enhances the appeal of blame casting critiques and the promises of political extremists"[41] while elsewhere tensions are mounting over water scarcity and social injustice. Successive droughts including the longest drought on record between 1999-2001 has already affected 2.2 million people and 16 million livestock.

Increasing water shortages relative to population growth and demand are putting the Indus Basin irrigation and drainage system in danger of collapse. The possibility for transition to a more effective, efficient and environmentally sound system exists.[42]

However there are several major obstacles to progress on this front including ones of civil society versus state. These include disempowerment of local knowledge at the expense of elitist national-level engineering mindsets, fragmented administrative jurisdictions, linguistic differences between water professionals/bureaucrats and farmers, inequalities between semi-feudal landlords and small farmers, corruption in a low-trust rural milieu "prone to vendettas and violence".[43]

South Versus North

The unequal relationship between the rich industrialized 'north' countries and the developing 'south' countries remains at the centre of a continued 'north-south' divide. The divide is stark in the realm of environmental issues. South Asian developing countries, in particular India, will continue to be suspicious of developed countries' motives but will simultaneously engage in active negotiations. Smaller developing countries like Nepal, Bangladesh and Bhutan will remain vulnerable to 'north' countries' use of aid or trade as tools for controlling environmental policies. For example in the case of global warming, these countries will be a part of the CDM (Clean Development Mechanism). Limited carbon quotas allowed

would mean limited industrialization. Importantly it means selling "carbon rights" to big countries like the US and Canada.

India has woken up to the fact that the 'north' countries have always taken the lead in setting the environmental agenda and implementing treaties. India will now attempt to intervene at the start of the negotiations so that action frameworks are more broad-based and widely acceptable for the developing 'south' countries. The process and findings of the IPCC is a case in point. All member nations – majority of them from the developing world—actively participated on the prospect of climate change and its impact. In fact, India tabled the first draft of the Framework Convention on Climate Change (FCCC). Far from being a Western-driven agenda, the issue, to say the least, presents a serious threat to the whole world. A proactive environmental diplomacy can be expected from India in the future and to this effect a greater drive for setting up a comprehensive institutional mechanism will go a long way in demonstrating India's leadership ability in the developing world.

Energy

South Asia is a net importer of energy. India, for example, consumes roughly 3 per cent of the world's total energy. Nearly 30 per cent of India's energy needs are met by oil and more than 60 per cent of that oil is imported. Continued economic development and population growth are driving energy demand in the region faster than it can produce. For India, the shortfall means it will increasingly look to foreign sources of energy supplies transported through ships and land pipelines. The need to transport energy, however, is seen by many in India as a security vulnerability. The debate over the Iranian gas pipeline through Pakistan illustrates this point. First, *jihadi* elements in Pakistan could sabotage and disrupt the pipelines. Second, the military government in Pakistan could easily 'turn the tap off' in the event of political tension.[44] Such security concerns can very easily override economic benefits. In addition to seeking secure access to fossil fuels a drive towards increasing renewable and clean energy sources due to environmental concerns cannot be overlooked. This drive could contribute to geopolitical realignments and even new cooperative as well as competitive political relationships in the region. For example, in order to meet the massive increase in energy demand, a 'common energy grid' with integrated electricity system immediately places high value and utility

on river waters that crisscross the subcontinent in terms of being harnessed for hydroelectricity.

Migration

Large-scale migration in South Asia has continued unabated for over five decades. The brunt has been faced by India. Figures indicate that India now has about 15 million Bangladeshis, 2.2 million Nepalese, 70,000 Sri Lankan Tamils and about 100 thousand Tibetans.[45] Given the political, social, economic, ethnic and communal tensions associated with migration there will be considerable effort as well as a challenge on the part of India to manage its borders. Implying thereby "…coordination and concerted action by political leadership and administrative, diplomatic, security, intelligence, legal, regulatory and economic agencies of the country to secure our frontiers and sub-serve the best interests of the country…"[46]

For example, environmental disruption and economic dislocation has become a significant contributor to cross-border migration from Bangladesh to India.[47] Bangladesh is a land scarce country. Rapid population growth, declining cultivable land and unequal distribution of land resources has induced large-scale migration and will continue to do so in the future.[48] Initially movements of people from Bangladesh were confined to the neighboring Indian states of Assam, Tripura and West Bengal. Now the migrants are moving further afield to far-off states like Tamil Nadu, Maharastra, Gujarat and Delhi. The combined influx of Hindu minorities (due to repression) and Muslims (in search of space) has changed the demographic profile of Northeast India.[49]

Insurgencies in both Tripura and Assam are directly related to the uncontrolled illegal immigration combined with marginalization of the indigenous communities. In Tripura, the indigenous population has fallen from a high of 70 per cent in 1947 to a mere 27 per cent of population today.[50] This is partly the result of an influx of nearly 50,000 Chakma refugees (themselves afflicted by a series of natural disasters between 1970-1991, landlessness, soil erosion and resource competition with lowland migrants), which according to many tribes has had negative socioeconomic ramifications and has led to an increase in revolutionary activity against both the government and local administration.[51] The tribals accuse the federal government of neglecting the local economy and doing little to stop outsiders from exploiting the region's rich timber and mineral wealth.[52]

These group-versus-group conflicts have international as well as internal implications. Issues of migration, refugee repatriation, and alleged state support for insurgent groups (within each other's territories) have become a point of tension between India and Bangladesh. For example, in early 2003, Bangladesh accused India of backing a mob which attacked ethnic Bangladeshis along the Lalmonirhat frontier while India increased troops along the Bangladeshi border following the arrest of 213 Bengali-speaking individuals alleged to have illegally crossed into Indian territory.

Role of Military

Given the wide range of environmental security related threats confronting South Asia, one must ask how are regional militaries responding to the threat and whether or not these responses are appropriate and consistent with trends elsewhere in the world. There has been a growing debate on whether the role of military is suitable for environmental protection or not. Arguments in favour point towards a precautionary role for the military vis-à-vis environmental issues, such as monitoring, environmental data collection and disaster relief. Certain 'traditional coercive tasks' on behalf of the international community against environmental renegades or as a means to force recalcitrant states to comply with laws have been suggested, implying that environmental problems can come within the purview of the UN Security Council with its mandate for maintaining international peace and security.[53]

The end of the Cold War has given rise to many 'hot wars' in the form of intra-state conflict. Of the 110 armed conflicts during 1989-1999, 103 were intra-state, spanning 67 countries with the main victims being civilians.[54] In such scenarios, conflict prevention and management of crisis form the tools of peaceful co-existence. The military have the skills, the technical capabilities, the infrastructure, and logistical assets that can contribute to the building of peace. The attributes of their primary role in safeguarding national borders and preserving internal security and peace correspond in similar ways to international peacekeeping missions as well as disaster relief operations. The same can be applied to ecological protection and restoration. Often in developing countries that have limited funds, the militaries have unique capacities in terms of manpower, technical expertise (e.g. civil engineering, meteorology, firefighting) and equipment (e.g. aircraft, heavy vehicles, oceanographic research vessels). There is

therefore, a case to evolve a strategy based on 'flexible and selective engagement' of regional militaries.[55]

International Examples

Important initiatives on the effective use of military in protecting the environment can be seen worldwide. NATO in its headquarters at Brussels (1998) has created a Euro-Atlantic Disaster Coordination Center, as part of cooperation in the field of disaster relief.[56] NATO's Committee on the Challenges of Modern Society (CCMS) frequently sponsors both civilian and military sector studies on environmental issues. One such programme titled "Pilot Study on Reuse of Former Defense Lands" looked into the "pollution management challenges such lands often pose."[57] Likewise, the US European Command at Stuttgart (1993) initiated military-to-military cooperation on environmental issues with Russia and former Eastern European countries.[58]

Military forces are well positioned and equipped to contribute to environmental monitoring and early warning. Military patrols are in a sense environmental 'eyes and ears'. In order to be doubly effective, it is imperative that forces should plan and prepare to monitor and report environmental events as part of training and operating field manual. Equally important is the provision of satellite monitoring. While issues of security and secrecy will remain a constant thorn in sharing information, there is nonetheless considerable scope particularly where military and civilian satellite technology have a common baseline such as aerial photography, basic satellite imagery and various sensors. In this context, MoUs relating to military-to-military cooperation in the field of environment should be a key feature at the inter-state level. This would result in sharing of important data on air quality, hydrological data on rivers, marine pollution, etc. Such 'essentially non-contested' information exchange can help create an environmental security database.

South Asian Regional Cooperation

The South Asian region has some well-established regional institutional mechanisms addressing environmental concerns, particularly the South Asian Association for Regional Cooperation and the South Asia Cooperative Environment Programme. These, however, need to be further strengthened through research and development and exchange of information so as to

map environmental-induced conflicts and take remedial measures. Beyond regional arrangements, there exists the US Department of State's Regional Environmental Office (REO)[59] in Kathmandu which promotes environmental cooperation in South Asia as a means to secure stability from environmental-induced conflict.[60] The Kathmandu 'hub' through collaborative efforts with government agencies, international organization, NGOs, private sector and civil society is already working in areas like: Water resources, bio diversity and CITES implementation with additional areas of interest in ozone depleting substance, Montreal Protocol implementation, system on water quality and renewable energy resources.[61] That the Indian Ministry of Environment and Forests signed a MoU with the US EPA covering a wide range of issues: Environmental governance, air and water quality management, management of toxic chemicals and hazardous waste, is a positive development.[62] Likewise, an MoU with China has been signed, facilitating India to receive from China hydrological data on the flow of rivers through the latter's territory.[63] In both these cases the role of military-to-military cooperation can be envisioned.

China's strategy of 'Move south, water north' may soon focus on tapping the waters of the Tsangpo in Tibet (called Brahmaputra in India). The intended dam site at Yalunzangbu Daxiagu is critical for India, for near this point the river enters India's state of Arunachal Pradesh. China's intention is to generate 30,000 MW of electricity and later to divert the water to Tibet.[64]

Such a plan will affect the flow of Brahmaputra downstream and could cause enormous problems not only to India but Bangladesh as well. However, India, Bangladesh, Nepal and Bhutan along with China can together reap the benefits of electricity generated but for that much would depend upon proper survey, monitoring and environmental impact assessment. The militaries of China and India – given their understanding of the locale, their manpower and logistic capabilities, can constructively engage along with civilian experts in sharing information and creating an agreement for fruitful cooperation.

While the traditional role of the military has been to protect and secure the border as well as maintain internal peace and security, new dimensions like international peace-keeping missions, disaster relief and more recently protecting and restoring the environment are emerging as an essential part of its overall role. It is evidently clear that the military by virtue of its

organizational structure, mobility and technical skills is adequately geared to doing a great deal of work in environmental protection and to that effect there is a strong thrust to environmental awareness at both the training stage and higher level formations. At a coordination level, the Army HQ has an Eco-Cell under the Quarter Master General Branch. This is replicated at the Command-level and lower formations as well. The Ministry of Environment and Forests specifies projects and allots funds to the army to carry out restoration activities. The Territorial Army (TA) commonly known as Citizens' Army has three 'ecological task force' battalions working with good effect on afforestation programmes. The greening of the Mussoorie hills, scarred over years of mining work, is a noteworthy example. The units have now spread over other areas – J&K, Rajasthan and Pittorgarh district in the newly formed state of Uttaranchal. In the light of TA's increasing role in assisting the civilian administration the KP Singh Deo Committee has recommended increasing its strength from the existing 40,085 to about 100,000 by 2007.[65] The idea is to utilize ex-servicemen – about 60,000 servicemen retire every year – who are a valuable source of trained, disciplined and motivated manpower. This increase in manpower strength will help set-up one eco-battalion of 1700 personnel in each state of the Indian Union.

Conclusion

In South Asia environmental-induced conflicts are not independent and isolated occurrences but instead are part of broader regional conflicts based on territorial dispute, cross-border migration, differing security perception and ethnic and religious animosity in which environmental issues can become additional sources of sub-national or inter-state conflict. The problems are compelling enough to initiate counter views on state-centric proprietorship of security. First, the traditional security framework, as the complex linkages of environmental issues to conflict indicate, is antithetical to environmental security. Second, in the traditional security understanding, the protection of territorial integrity is primarily based on the threat from an enemy 'other'. In the case of the environment, the threat comes from the imbalances in the ecosystem. Third, in the traditional security approach, actors' participation and contribution to enhancing the understanding of security is limited, whereas mapping environmental threats and seeking remedies to prevent them requires a broad-based participation.

There is a growing recognition among militaries the world over to the altered context in which security is now located. And as national security becomes increasingly inclusive, the military will have to refashion and re-tool itself so as to respond effectively as an instrument of state efficacy. In the emerging strategic systemic it will be prudent to fuse military resources to non-traditional tasks like the protection of the environment. As an 'engagement vehicle', environmental issues have the potential to bring together militaries of countries that otherwise are unwilling or antagonistic to ideas of cooperation and collective action.

References/End Notes

1 From Dr Pangloss, the overly optimistic but foolish character in Voltaire's Candide.

2 Lorraine Elliot, "Keynote Address," in C. Phinney and K. Butts (eds.) *Regional Asia Pacific Defence Environmental Workshop*, Center for Strategic Leadership, Darwin, Australia, 1998. Critics of decentred security argue that because proving the causal link has been difficult, therefore the environment should be left to 'protection' rather than 'securitisation'. Daniel Deudney argues that turning the environment into an object of national security risks under-mining the positive forms of global environmental thinking and cooperation that have been emerging in recent years. See, "Environment and Security: Muddled thinking", *Bulletin of the Atomic Scientist,* April 1991, pp. 22-28.

3 Ibid., p.94

4 Geoffrey D Dabelko, "The Environment and Conflict in the Third World: Examining Linkages, Context and Policy", at http://www.bsos.umd.edu/harrison/papers/paper 12 htm (Accessed on September 15, 2002)

5 Ramaswamy Iyer, "A Framework for Thinking about Environmental Change in Asia," paper presented at *Environmental Change and Regional Security Conference*, APCSS, Honolulu, September 1997.

6 The scarcity-conflict model is fast becoming conventional wisdom in foreign policy and environmental circles, structured by the likes of Stephen Libiszewski and Homer-Dixon and popularized and sensationalized by writers like Michael Renner, "Ending Violent Conflict", *Worldwatch* Paper No.146, 1999, and Robert Kaplan, "The Coming Anarchy", *Atlantic Monthly*, February 1994, pp.44-76. Kaplan proclaimed the environment as the most important national security issue of the 21st century.

7 Thomas F Homer-Dixon, "Environmental Scarcities and Violent Conflict: Evidence from Cases", *International Security*, 19(1), 1994, p.6

8 Thomas F Homer-Dixon, "On the Threshold: Environmental Changes as Causes of Acute Conflict", *International Security*, 16(2), 1991, p. 109

[9] Alan Dupont, *The Environment and Security in Pacific Asia*, Adelphi Paper 319, Oxford University Press, Oxford, 1998, pp. 41-73

[10] Geoffrey D Dabelko, "Environment and Conflict: Background and Analytical Framework", at http://www.usaid.gov/pubs/confprev/jun2000/dalbelko.html (Accessed on September 21, 2002)

[11] Population Reference Bureau, 2004 *World Population Data Sheet*, p.1. See http://www.prb.org/pdf04/04WorldDataSheet_Eng.pdf (Accessed on September 30, 2002)

[12] Ibid, p.1.

[13] Alain Marcoux, Population Change-Natural Resources-Environment Linkages in Central Asia and South Asia, FAO Population Program Service, August 1996, at http://www.un.org/popin/fao/centasia/faotext 1.htm (Accessed on October 1, 2002)

[14] Ibid

[15] http://www.planetwire.org/details/1422 (Accessed on October 1, 2002)

[16] FAO News, September 6, 2006, at http://www.fao.org/newsroom/en/news/2006/1000385/index.html. (Accessed September 8, 2006)

[17] See: http://www.un.org/popin/fao/centasia/faotext3.htm (Accessed on October 1, 2002)

[18] Ibid

[19] http://www.fao.org/docrep/V4360E/V4360E02.htm#Background%20to%20the%20South%20Asia%20region (Accessed on October 1, 2002)

[20] Ibid

[21] http://www.the-south-asian.com/data-south_asian.htm Also see http://www.unesco.org/science/waterday2000/water_use_in_the_world.htm (Accessed on October 1, 2002)

[22] D. Seckler, U. Amarasinghe, D. Molden, R. de Silva , and R. Barker, "World Water Demand and Supply, 1990-2025: Scenario and Issues", Research Report 19, International Water Management Institute, Colombo, 1998.

[23] *World Resources 2002-2004*, World Resource Institute, Washington, DC, 2003, pp. 141-143

[24] http://www.climatehotmap.org. (Accessed on October 15, 2005).

[25] Ibid

[26] Ibid

[27] no. 23

[28] "IPCC Third Assessment Report", 2001 at http://www.ipcc.ch/pub/un/syreng/spm.pdf (Accessed on September 2, 2002)

[29] www.the-south-asian.com/Data-South_asian.htm (Accessed on October 3, 2002)

[30] *Human Development Report 2004*, UNDP, Oxford University Press, New Delhi, 2004, p. 158

[31] no. 26

[32] www.epa.com and www.fao.com (Accessed on September 7, 2005)

[33] Ibid

[34] Richard Pittenger and Robert Gagosian, "Global Warming Could Have a Chilling Effect on Military," *Defense Horizons,* National Defense University, October 2003. Also see Peter Schwartz and Dong Randall, *An Abrupt Climate Change Scenario and Its Implications for United States National Security*, Office of Net Assessments (US DoD), October 2003.

[35] See Shin-Wha Lee, "Emerging Threats to International Security: Environment, Refugees and Conflict", *Journal of International Area Studies,* 8 (1), 2001, pp 73-90.

[36] See Ronnie D Lipschutz, "Reconstructing World Politics: The Emergence of Global Civil Society", *Millennium* 21 (Winter) 1992, pp 389-420

[37] See Arnab Kumar Hazra, "History of Conflict over Forests in India: A Market Based Resolution", Julian L Simon Center for Policy Research, April 2002, at www.libertyindia.org (Accessed on March 18, 2003).

[38] Kristoffel Lieten, "Nepal: Maoist Insurgency Against Lopsided Development", at http://www.conflict-prevention.net/dev/ECCP/ECCPSurveys_v0_10.nsf/0/529EC7295EF0BDB1C1256C5200464330?opendocument (Accessed on September 27, 2005)

[39] Ramyata Limbu, "Red threatens green", *Nepali Times* September 20-26, 2002, at http://www.nepalitimes.com/issue112/nation_1.htm (Accessed on October 10, 2005)

[40] Richard Matthew, "Environmental Stress and Human Security in Northern Pakistan," *Environmental Change and Security Project Report*, No. 7, Summer 2001, pp. 21-35.

[41] Ibid.

[42] Syed Ayub Qutub and James E. Nickum, "Civil Society and Water Management in the Indus Basin," *Regional Development Dialogue* 23 (1), Spring 2002, p.112.

[43] Ibid.

[44] See Uttam Kumar Sinha, "Time to lubricate Indo-Pak ties", *The Pioneer,* New Delhi, July 2, 2000

[45] N.S. Jamwal, "Border Management: Internal and External Dimensions", IDSA Fellows Seminar, New Delhi, July 20, 2002.

[46] Recommendations of the Group of Ministers, Government of India. No.1 p.58

[47] Sarfaraz Alam, "Environmentally Induced Migration from Bangladesh to India", *Strategic Analysis,* 27 (3), July-September 2003, p 422

[48] Homer-Dixon has identified two patterns of uneven social distribution of resources leading to environmental crisis. One, resource capture, i.e. economic

marginalisation; and the other spatial, i.e., ecological marginalisation. Both are inter-linked. Resource capture occurs when decline in quality and quantity of renewable resources along with increase in population growth creates competition within society and the powerful shift resource distribution in their favour. Ecological marginalisation occurs when the unequal resource distribution impels displacement of people to ecological fragile areas such as hill tracts, coastal regions, riverbanks etc. See: "Environmental Scarcities and Violent Conflict", *International Security*, 11 (1), p 8

[49] http://www.thesouthasian.org/archives/000113.html (Accessed on May 7, 2003)

[50] Ibid

[51] Narottam Gaan, *Environment and National Security The South Asian Experience*, South Asian Publishers Limited, Denver, 2000, p. 183.

[52] Crispin Tickell, "The inevitability of environmental security", in Gwyn Prins (ed.), *Threats Without Enemies,* Earthscan, London, 1993, p 23

[53] For further details see Peter Wallensteen and Margareta Sollenberg, *States in Armed Conflict 1999,* Department of Peace and Conflict Studies, Uppsala University, 2000

[54] The phrase forms the part of the National Military Strategy of the United States of America, 1995.

[55] http://www.nato.int/docu/review/1998/9803-01.htm (Accessed on March 3, 2002)

[56] http//www.nato.int/ccms/pilot/meeting/defense95.htm (Accessed on March 3, 2002)

[57] Ibid

[58] Since 1997, the US Department of State's Environmental Diplomacy Programme has mandated US Embassies and Bureaus to develop regional environmental policies to enhance US national interest. To coordinate the effort, the State Department established 'Environmental Hubs' in important regional countries — initially 6 and now 12 (Addis Ababa, Amman, Ankara, Bangkok, Brasilia, Budapest, Copenhagen, Gaborone, Kathmandu, Libreville, San Jose and Tashkent) — not only as an institutional mechanism to promote regional cooperation on environmental issues but also as a 'value added' to the regional combatant commanders 'Theatre Engagement Plan'. For more on Environmental Hubs and DoS and DoD coordination effort on environmental issues see http://osiris.cso.uiuc.edu/de nix/Public/News/OSD/EQ01/eq arc01_dec.pdf (Accessed on June 18, 2003)

[59] Among the institutional mechanisms for regional cooperation on the environment, the most significant one is SACEP (South Asia Cooperative Environment Programme), established in 1982 under the aegis of the United Nations. Its membership consists of nine countries: seven member nations of SAARC (South Asian Association for Regional Cooperation), Afghanistan, and Iran. SACEP's Council, consisting of the ministers of environment and forests in member-countries, meets once in two years. Its secretariat is in Colombo, Sri

Lanka. The organization implements projects funded by the UN and other multilateral or bilateral agencies.

[60] For further details see Jay Pal Shrestha, "US Environmental Initiatives in South Asia", June 10, 2002 at http://www.awb.org/Documents/Events/2002/RETA5936/Environment/Shrestha_US_Environmental_initiatives.pdf. (Accessed on October 12, 2002)

[61] Full text of the MoU signed on January 16 2001 is available at http://www.epa.gov/oia/regions/Asia/india/mou.html (Accessed on October 10, 2002)

[62] The MoU was signed on January 14, 2002 by the Ministry of Water Resources. See http://wrmin.nic.in/events/yr2002/jan2002.htm (Accessed on October 10, 2002)

[63] P.K. Gautam, "Sino-Indian Areas of Environmental Cooperation and Concerns", at http://www.ipcs.org/china_east_asia_articles2.jsp? (Accessed on January 17, 2006)

[64] *The Hindu*, New Delhi, April 23, 2002.

Uttam Kumar Sinha is Research Fellow at IDSA.