ENVIRONMENTAL AND NON-CONVENTIONAL SECURITY THREAT IN SOUTH ASIA: A STUDY

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1. Introduction

India is the seventh largest country in the world with an area of 32,87,2631 sq km. The country comprises plains, mountains and seas which give India a unique geographical entity in South Asia. Since the ancient times India has been a place of cultural and religious ethos having holistic approach with nature and environment. During colonization, natural resources and bio-diversity was destroyed largely to meet the needs of growing industrialization. India is an agrarian country and feeds 17% of the world population, majority of which depend on the natural resources to meet their needs and livelihood. India is also among the first ten industrial countries in the world and one of the fastest growing economies. Thus, India's environmental problems and vulnerabilities are shaped and caused by rapid growth of industrialization, urbanization, population, poverty, transportation etc. The environmental problems are challenges and threats that affect the well being and survival of people often referred as non-traditional security threat. South Asia's prominent non-traditional security concerns are climate change, environmental degradation; water, energy and food security

During the last many years the depletion and degradation of environment has been taken seriously under ambit of various policy frameworks. India's food production is enough to feed 40% of urban population and all finite and renewable resources viz; land water and fuels are fast depleting due to over exploitation of resources by the swift growing population. This has led to an adverse environmental impact. The main environmental issues confronting India are tans-boundary environmental disputes, deforestation, ecological exploitation, land degradation, air and water pollution, contamination of coastal areas etc. Many of these problems are growing rapidly, resulting in weakening of the resilience and affecting the health, livelihood and security of the common people.

Factors Affecting Environmental Security

The South Asian region is a compact geo-ecological zone with several geographical

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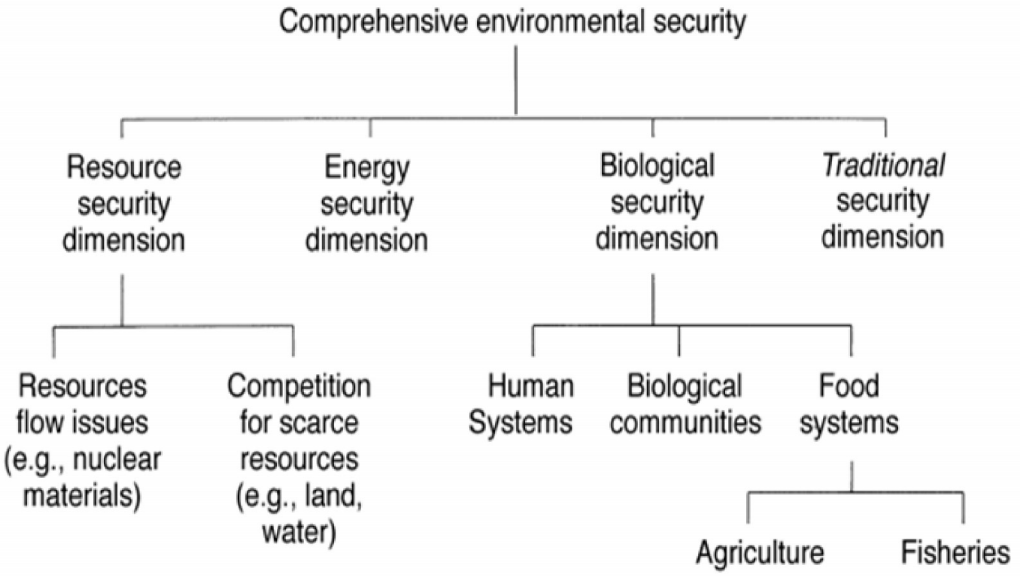
variations ranging between high Himalayan regions to maritime zones. South Asia is characterized by Indo-centricity landscape and environment. India alone holds 76 percent of the land area. Its population is three times more than the combined population of rest of the countries of the region and contains 78 percent of the total GNP of the region This kind of asymmetry in terms of size and resources is a source of numerous problems including sharing and managing resources in the region which can also translates to conflict over resource distribution The South Asian states do not synchronies with the eco-geographical region due to the artificial division of the state into different regions. India, Pakistan and Bangladesh emerged as independent countries out of one geographic unit and therefore, mutual sharing and disagreement over resources are obvious. This necessitates development of a common approach towards ES. The three major river systems of South Asia - The Indus, the Ganges and the Brahmaputra are shared by most of the countries of the region. It is, therefore, evident that they also share the hazards emanating out of these river systems. Nepal and Bhutan are land locked countries and Sri Lanka and Maldives are island countries. This asymmetrical incongruity between the states of the region accounts for many of the disputes and conflicts and therefore the very nature of South Asian region is prone to various kinds of environmental issues and problems. Various dimensions of ES are as indicated in Figure. Some of the major factors affecting ES have been analysed in the succeeding paragraphs.

Figure: Dimensions of ES



Source: Allenby (1998b)

Population Explosion

Population has a direct bearing on resources and is bound to create environmental challenges if the two are not managed. South Asia is one of the most densely populated regions of the world with a population of approximately 1798 million (2016). The region holds more than 23 percent of world's total population, while has only 3.5 percent of the total land area of the world. India holds the largest share of the population of the region with 1189 million population, Pakistan 185 million, Bangladesh 164 million, Nepal 30 million, Sri Lanka 25 million, Bhutan 4.5 million and Maldives 0.50 million The excessive pressure of population on resources causes numerous environmental problems and constraints. The increasing human population inevitably places greater demands on the natural environment, for habitat, resources and waste assimilation. Thus, the problem of environmental depletion/ scarcity and degradation are closely associated with the problem of uncontrolled population growth.

Poverty

There is a direct correlation between population, poverty and environmental degradation. Poverty conditions in South Asia can be understood by the fact that the region generates only 1.2 percent of world's total income with 32.3 percent of the total population living below poverty index. Nepal has the highest number with 37.7 percent followed by Bangladesh 36.0 percent and India 34.7 percent. In South Asia the per capita GNP is 448, average GDP growth rate has been 6.0 percent and the human development index averages at 0.60 (2015). Nearly 20 percent of the total population is without access to health services, 60 percent population are devoid of sanitation facilities and 10 percent without access to safe drinking water Besides, vast variation in income, production and consumption pattern are evident in South Asia at all spatial scales, and are reflected in distinctive shades of environmental impact.

Threat to Biodiversity

The South Asian region comprising different ecological landscape such as mountains, plains, deserts, sea coasts with diversity of flora and fauna is a region of enriched biodiversity. It has numerous varieties of plants, including that of medicinal value found in the hilly region, while the coastal region has world's best coral reef formations. The development of roads, construction of dams, fast depletion of forests, pollution of rivers, excessive exploitation of unabated natural resources have posed threats to the ecology and biodiversity of the regions. Many plant and animal species are threatened with extinction due to exploitation,

spread of disease, destruction and degradation of their habitats. In 2009, UNEP estimated that one-quarter of the world's mammal species and around one-tenth of the world's bird species faced a significant risk of total extinction Threats to biodiversity are not confined to terrestrial ecosystems; serious concerns have been raised about the future of marine and coastal wildlife as a result of the pollution, over-exploitation and acidification of ocean and seas.

Urbanization

The issue of urbanisation is directly related to that of population growth, since urbanisation occurs in response to increasing population pressures in rural areas and due to rise in concentration of economic opportunities in cities and urban centers. Urbanisation is often associated with a range of social and environmental problems including overcrowding, congestion, pollution, public health issues, shortages of drinking water, inadequate sanitation etc. Urbanisation is also related to migration of rural communities and urbanized life style which result in environmental depletion and degradation. Towards this, water pollution in the urban environment has had the severest impact on human health in South Asia in general and India in particular, and eutrophication presents one of the most serious problems to the region.

Shared Environmental Concerns in South Asian Region

The rapid economic development in the recent years has resulted in numerous shared environmental problems in the region. These include diminishing forests; altered habitats; land degradation; polluted waters and the degradation of marine and coastal resources. In prioritizing shared environmental concerns in the sub-region, the most important once have been deliberated in the paragraphs below.

Erosion and Degradation of Land

Soil erosion and land degradation in the region are largely a result of the land use practices, rapid rates of deforestation, poor irrigation & drainage practices, inadequate soil conservation, unstable slopes and overgrazing.

Table: Soil Erosion and Land Degradation in India

1. Total Geographical Area	328.7
2. Area Subject to Water and Wind Erosion	141.3
Area Degraded Through Special Problems	
3. Water Logged Area	8.5
4. Alkali Soil	3.6
5. Acid Soil	4.5
6. Saline Soil including Coastal Sandy Areas	5.5
7. Ravines and Gullies	4.0
8. Area Subject to Shifting Cultivation	4.9
9. Riverine and Torrents	2.7
Total 3 to 9	**33.7**

Source: State of Environment, 1995 MOEF& CC.

Water erosion is severe throughout the Himalayas and in India about 13 million hectares area is affected by water erosion. In the dry belt of Thar Desert (India and Pakistan), an estimated 59 million hectares of land is affected by wind erosion. It is estimated that in India alone, about 45 million tons of agricultural production is lost due to soil erosion annually Soil salinity and acidification also affect large areas of India and Bangladesh. Mining in the region, which is largely unorganised and unscientific is also known to cause land degradation with significant trans-boundary impacts. In Bhutan for instance, dolomite mining has resulted in increasing incidents of landslides and soil erosion in the adjoining Indian state of West BengalThe foothills in India, have taken the burden of landslide debris, with consequent pollution of the ground water aquifers in the region as a whole.

Deforestation and Forest Fires

Industrialization, agricultural expansion and a large dependence on forest products for meeting the energy needs have resulted in large-scale deforestation in most countries of the region.

Table: Forest Cover Estimate in India (1981-95)

Period	Total Forest Cover (Million Hectare)	Percentage of geographic Area	Percentage of Area Under	
			Dense Forest	Open Forest
1981-83	64.08	19.5	-	-
1985-87	63.88	19.4	59.1	40.2
1987-89	63.94	19.5	60.2	39.1
1989-91	63.94	19.5	60.2	39.1
1991-93	63.89	19.4	60.2	39.0
1993-95	63.34	19.3	58.0	41.3

N.B: Forest cover = Dense forest + Open forest + Mangroves forest

Source: State of Forest Reports, FSI, MOEF & CC

In an effort to increase agricultural production farmers have encroached upon forests and other environmentally fragile areas. Besides, the traditional way of clearing land for pulpwood and palm oil plantations in most of the South Asian sub-region is by fire. This activity also has a cross border impact, affecting the habitat corridors with trans-boundary air pollution comprising particulates, smoke and haze. The haze from forest fires that engulfed few of the South Asian countries in the recent past, have been observed as some of the worst episodes of air pollution in recent world history.

Water Availability and Quality

Groundwater depletion has emerged as a major concern in India, Bangladesh and Sri Lanka. It is estimated that as much as 70%-80% of the agricultural production in India depends on groundwater irrigation. In states of Rajasthan, Haryana, Punjab and Gujarat the extent of over exploitation of ground water ranges from 100%-260% as compared to the critical level of 85%. In addition, groundwater accounts for about 80 % of the domestic water supply in the rural areas and almost 50% of the urban and industrial supply. In Bangladesh, fall in water table has resulted in severe water shortages in the northern and central parts of the country. Decline in water quality as a result of untreated sewage and industrial effluents is another growing concern in the South Asian region. The total sewage treatment capacity in India is a mere 10 percent of the present waste water generation, with less than three-fourths of the municipal waste being collected and the rest draining into the river systems. In India an estimated 10,286 million liters of sewage is discharged into the Damodar river every day

Atmospheric Pollution

India has substantial reserves of coal and it would continue to use it predominantly to meet its energy demand through thermal power production. However coal based power generation, vehicular emissions and household energy use for cooking causes, which tends to be spread over large areas, resulting in acid rain and fly ash deposits in areas near the coal burning plants as well as further away. Similarly, China's energy generation is primarily coal dependent and, the trans-boundary movement of air masses does carry the emissions from China to other parts of Asia. The coal burning in India alone is estimated to generate 35-40 million tons of fly ash each year, of which only 2%-3% is utilized. Fly ash results in an increase in the suspended particulates thereby deteriorating in the air quality. The Regional Air Pollution Information and Simulation (RAINS)-model developed at the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria, provides a consistent framework for the analysis of emission reduction strategies on a continental scale. Health effects associated with different types of air pollution have been indicated in Table

Table: Health Effects Associated With Different Types of Air Pollution

Cause	Effect due to Prolonged Exposure
Lead	Affects circulatory, reproductive, nervous and renal system; suspected of lowering learning ability in children; hazardous even after exposure ends.
Particulate Matter	Fine particles may cause lung cancer; a strong correlation exists between suspended particles and infant mortality in urban areas.
Carbon Monoxide	Affects foetal growth in pregnant women and tissue development of young children; impairs perception and thinking, slows reflexes and causes drowsiness, can cause unconsciousness and death.
Sulphur Dioxide	Exacerbates asthma, bronchitis and emphysema; causes coughing and impairs lung function.
Toxic Substances	Suspected of causing cancer, reproductive problems and birth defects; benzene is known carcinogen.

Source: Asia-Pacific Environmental Outlook, UNEP.

Global Warming and Climate Change

Climate change is an important concern in Asia where climatic phenomena such as reckless monsoons, El Nino Southern Oscillation (ENSO) and tropical cyclones have

significant influence on the eco system of the earth. In the South Asian region the temperature increase as a result of climate change is estimated at 0.1° Celsius to -0.3° Celsius in the year 2010 and 0.4° Celsius to -2.0° Celsius by the year 2050, and a variation in the rainfall patterns is estimated in the range of 0%-10% in the year 2010 and 5%-50% by the year 2050. Increasing floods, typhoons, and droughts are ongoing concerns for many South Asian nations whose human settlements and economy are already affected greatly by climatic variability. Rise in sea level and increase in sea-surface temperature are the most probable major climate change related stresses on coastal ecosystems.

Table: Land Area & Population Affected in India by one Meter Sea Level Rise

State	Percentage of State Area Inundated	Percentage of the State Population Affected
Goa	4.84	7.25
Tamil Nadu	0.52	2.91
Orissa	0.81	1.76
West Bengal	1.88	2.35
Andhra Pradesh	0.19	0.93
Gujrat	0.92	1.07
Maharashtra	0.18	1.75
Andaman and Nicobar Island	0.72	NA
Karnataka	0.15	0.56
Total	**0.41**	**1.68**

Source: State of Environment, 1995, MOEF.

Coral reefs are particularly sensitive to prolonged increases in seawater temperature and increased irradiance as this has been observed to cause coral bleaching. In the South Asian region, large populations live in low-lying coastal areas or adjacent to river deltas. Coastal dwellers and inhabitants of regions near deltas are especially vulnerable to sea-level rise and associated back water flooding which are among the most immediate consequences of an increase in average global temperatures. Mangroves are the other vital coastal ecosystems that would be severely affected by climate change related increase in temperature, SLR and intrusion of saline water. In Bangladesh, for instance, there is a threat of loss in species in the Sundarbans, which is the largest continuous mangrove forest in the world. SLR is also likely to threaten the survival of a wide range of mammals, birds, amphibians, and reptiles living in the Sundarbans. A large part of the coastal area that is now protected by the Sundarbans will also be vulnerable to cyclonic storms and surges. Similarly, climate change would impact crop yields, production, storage, and

distribution and the net effect would be uncertain because of variations in the growing season, crop management, non-inclusion of possible diseases, pests and microorganisms in crop model simulations, and the vulnerability of agricultural areas to episodic environmental hazards, including floods, droughts, and cyclones. Low-income rural populations that depend on traditional agricultural systems or on marginal lands will be particularly vulnerable.

Trans-boundary Movement of Hazardous Wastes

Trans-boundary movement of hazardous wastes is emerging as a critical issue that the countries of the region have not been able to address fully. Although seven of the nine countries in South Asia have signed the Basle Convention, the region lacks a common approach to the management of hazardous wastes. Appropriate institutional and regulatory mechanism, therefore need to be put in place for the surveillance and management of hazardous wastes.

Natural Disasters

The South Asian region is vulnerable to a range of natural disasters with varying severity. This coupled with the lack of infrastructure and technological preparedness to predict and cope with natural disasters has led to a large-scale devastation on a periodic basis. In India and Bangladesh, for instance, floods and cyclones have caused widespread devastation on an annual basis, while the North-eastern Himalayan region represents the greatest seismic hazard in the Indian subcontinent. Human casualties as a result of natural disasters in the period 1960-81 are estimated at 633,000 in Bangladesh and 60,000 in India. Of this 386,200 in Bangladesh and 24,930 in India were casualties as a result of cyclones and 39,000 in Bangladesh, 14,700 in India, 2100 in Pakistan and 1500 in Nepal were casualties as a result of flooding.

South Asian region is prone to numerous kinds of natural hazards having direct curse of the environment. Similarly, the depletion of forests has serious ecological effects such as soil erosion, siltation, shrinking of water resources, etc. Floods are a common problem to countries like India, Bangladesh, Nepal and Pakistan. The annual floods causes' loss to people and property and Bangladesh alone has experienced some of the most devastating floods. It is estimated that one third of Bangladesh may be submerged by 2050, if the rate of rise of sea level remains constant at the current pace and also that one-meter rise in sea level would cover 14 percent land area of the country and thereby displacing 10 per cent of its total population. In the case of Maldives, it is said that the country is in danger of disappearing under sea after some years if the current trends prevails. The Himalayan region is highly sensitive to seismic threats and has witnessed some of the world's devastating

earthquakes. India, Bangladesh, Sri Lanka, Maldives and Pakistan are affected by cyclones, tidal waves, sea storms, costal area pollution, etc

Environmental Planning in India

To arrest increasing trend in environmental degradation, India has framed various laws for the protection of environment. The GoI has made commitments, held summits at national and international levels and plays an important role towards preservation of environment. To restrict pollution and save the environment various efforts have been taken by Government and NGO's and number of laws and policy guidelines have been instituted for conservation and protection of environment. Towards this, organisations, institutions, legislations and agreements promulgated have been deliberated in the succeeding paragraphs.

Environment (Protection) Act, 1986

To show commitment towards Stockholm Declaration of Environment 1972, this act was passed by parliament of India to fulfil the constitutional obligation towards the declaration. The environment Act was an objective for improvement and protection of environment and according to the Act the Government shall have all the power to take every measure for the purpose of protecting and improving the quality of the environment. The Act states that no person carrying on an industry, operation or process shall discharge or emit any environmental pollutant in excess of standards prescribed by the Government. Various rules including the environment (Protection) rules have also been provided with it which includes Hazardous Wastes Rules 1989, Chemical Accidents (emergency planning, preparedness and response) rules 1996, Bio-medical water rules 1998, Municipal solid wastes rules etc. This Act is very comprehensive document on environment protection and other Acts have also been interconnected with 1986 Act.

Air (Prevention and Control of Pollution)

Under Article 253 of the Constitution this Act was passed by the Indian parliament exercising its powers. The act is applicable to whole of India and envisages both central and state level boards to ensure the following:-

J To provide for the prevention, control and abatement of air pollution.

J To confer on and assign to such board powers and functions relating to prevention, control and abatement of air pollution.

J To lay down the standards to maintain the quality of the air.

Water (Prevention and Control of Pollution) Act, 1974

This act aims to provide for the prevention and control of water pollution and maintaining

or restoring of wholesomeness of water. According to this Act the State Government may alter any polluted area or take suitable action for prevention and control of area whether by way of extension or reduction of the affected spot. Where under sub section (2) the court makes an order restraining any person from polluting the water and to desist from such action, where it appears to the State board that any poisonous, noxious or polluting matter is present in any of the stream land, water bodies etc. It may carry out such operations as it may consider necessary by removing that matter from the water or land and remove or mitigate such pollution in the water. According to this Act, section (17) and (18) the fundamental objective of the state is to provide clean water to its citizens. This Act covers all changes in physical, chemical or biological properties of water.

National Environment Policy (NEP), 2006

The NEP is the first comprehensive document formulated at national level for realizing the overarching goal of sustainable development in India. It is outcome of extensive consultations with experts, Governments, industry associations, academic and research institutions, civil society, NGO's and the public. The NEP outlines the significance of a number of new and continuing initiatives for enhancing environmental conservations which requires coordinated action of diverse actors and stakeholders at all levels. For effective implementation of NEP the concerned central ministries need to formulate a coherent action plans.

NEP stipulates carrying out Environment Impact Assessment (EIA), under different categories depending on their threshold capacity and likely pollution potential. It emphasis on EIA and insist on prior environmental clearance at the central and state level for all type of projects. EIA is an important management tool for ensuring optimal use of natural resources for sustainable development. It specify conservation of resources and suggest best ways to aid conservation and to ensure that people dependent on resources reduces and instead better livelihood is obtained from conservation. It points out that environmental degradation often leads to poverty and poor health outcomes among populations. The objectives of the policy lay emphasis on sustainable use of resources.

Organisations

Ministry of Environment, Forest and Climate Change

It is the agency of the Central Government for planning, promotion, co-ordination and overseeing the implementation of India's environmental and forestry policies and programmes. Its primary concerns are implementation of policies and programmes related to conservation of India's natural resources including rivers and lakes, biodiversity, wildlife and forests ensuring

welfare of animals and prevention and abatement of pollution. It is guided by the principles of sustainable development and human well-being enhancement (MoEF 2013). The ministry also serves as nodal agency for United Nations Environmental Programme (UNEP), South Asia Co-operative Environment Programme (SACEP), International Centre for Integrated Mountain Programme (ICIMOD) and United Nations Conference on Environment and Development (UNCED).

Central Pollution Control Board (CPCB)

It is a statutory organisation, constituted in 1974 under the water Act. CPCB lays emphasis on strengthening of environmental monitoring networks, carrying out random checks of industries, review existing standards and development of new standards. The board is providing thrust to environmental surveillance work for pollution control by polluting industries in the country, restoration of environmental quality in critically polluted river, zones and aquatic resources. It plays an important role in strengthening of monitoring capabilities for water and in ensuring better water quality. It also lays policy guidelines for management of municipal solid, biomedical squanders and hazardous waste and monitoring mechanism for reducing toxic pollutants.

India's International Agreements

India is an active member of International Organisations concerning environment, her various programmes are been supervised under UNEP. India has been part of various agreements, summits and conferences aiming at protection and conservation of environment at National and International level including initiative for climate change, bio-diversity, air quality etc., which are Global in nature. India has already been part of 94 multilateral environmental agreements and is participating in International negotiations under United Nations Framework Convention on Climate Change (UNFCCC).

On the implementation of UNFCCC India is taking into account its responsibilities based on its objectives and circumstances. India is conscious about the Global challenge of climate change despites its CO2 emissions record of only 4 percent (1331.6 million tons). In 2030 India's per-capita carbon emissions will be 4 tonnes which will be lower than the Global per capita emissions (MoEFCC, GoI, 2012). The government has set a goal of reducing emission\ons intensity of its GDP by 2025 percent by 2020 in comparison with 2005 level. India also took part in the International meeting in 2012 and partnered with its neighbours Bhutan, Nepal and Bangladesh seeking cooperation to address adverse effects of climate Change through adaptation actions in four thematic areas of Water, Food, Energy and Biodiversity. In Doha conference India argued to pursue the strategy of working together

with Group of 77 and China to protect the interests of developing countries. India is the signatory of the Montreal Protocol and has already phased out production and consumption of Chlorofluoro Carbons, one of the major Ozone depleting substances in world and also committed to generate 22,000 MW of solar energy by 2020 and further making efforts towards energy and sustainability by framing different policies, assessments and regulations. Some of the achievements in environmental protection, pollution mitigation and sustainability have been with regard to forest cover which has increased by 3 million hectares between 2005 and 2007 while 'Green India Mission' aims to increase the forest cover by 5 Million hectares (MoEF&CC, GoI, 2012). Similarly, protected areas cover has increased by about 70000 hectares. Consumption of ozone depleting substances has declined. Households without access to safe drinking water have reduced from 34 percent to about 9 percent in 2009 (MoEFCC, GoI, 2012).

Goals and Targets for the Post-2015 Framework

Environmental goals and targets either emanate from splitting current Millennium Development Goals 7 (MDG7) or from linking MDG to other UNMD goals and incorporating these as objectives and actions set by nations in global agreements. This needs to be read in conjunction with various global agreements that countries have signed or accepted, including the declaration of Rio+20 Conference. These are:

K Goal 1: The integrity of natural ecosystems, wildlife populations, and biodiversity must be safeguarded by reducing and eventually eliminating resource and biodiversity loss and regenerating degraded ecosystems and populations.

K Goal 2: All people must have access to safe and adequate resources to fulfil their basic need in a way that are ecologically sustainable and culturally appropriate.

K Goal 3: All families and communities must have access to dignified livelihoods that are ecologically and culturally appropriate.

K Goal 4: All production and consumption must be ecologically sustainable and socio economically equitable, using a mix of incentives and disincentives.

K Goal 5: All infrastructure development must be ecologically sustainable and socio economically equitable.

K Goal 6: All service and welfare sectors must integrate principles and practices of ecological sustainability.

K Goal 7. Macro frameworks of economy and policy must be geared to ecological sustainability, human security and socio-economic equity.

India is on the path of sustainable development in the process of adopting the goals of sustainability, green agendas, HS etc., however it has to overcome some of the obstacles coming in the way of achieving these goals. There is need to reduce pressures on natural resources, increase in mass awareness, mitigating pollution levels and achieve sustainable growth.

The emphasis on combined use of regulatory and economic instruments by Government for improving environmental quality can be more effective if enforced efficiently. While the seriousness of the government agencies in enchanting environmental quality is strongly felt, the system is far from being perfect and problem areas for the future will still exist. If the targets of environmental sustainability and environmental protection are achieved, India can not only save the exchequer consumed by environmental degradation but it can also secure livelihoods, social sustainability, economy affected by environmental degradation.There is need to increase the number of monitoring stations, increase sewage treatment capacity and regulatory instruments requiring disciplinary approaches. India must address areas, institutions, industries and populace that contribute towards environmental pollution and natural resource degradation and integrate them in decision making system for a meaningful solution. Different proposals and moves have been designed to reach towards post-2015 framework that integrates ecological sustainability and HS. Civil society organisations, people's movements, academic tink-tanks have a crucial role towards achieving stated goals and targets.

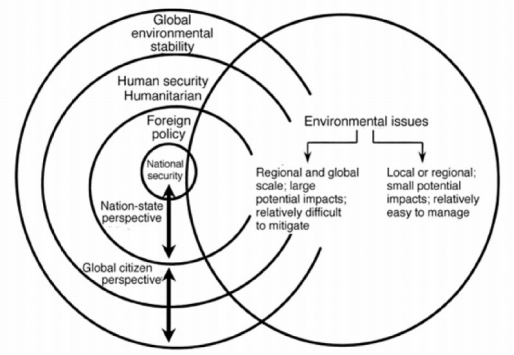
Analysis

India in the ancient times had been a place where the philosophy of peaceful coexistence with nature was prevalent and objects of nature were synthesised with religion. Even with meagre population, minimal pollution and limited pressure on natural resources, people were ethical and careful while dealing with nature. But colonisation followed by economic transformation, rising population, changing life styles etc brought exploitation of nature and natural resources.

India is now a rising economy with 17 percent of world population, majority of which depend on natural resources for their survival and livelihood. Since independence, growth of industries, populace, urbanization, transportation caused immense damage to environment in India. The environmental change/ degradation has not only affect the economy and social sustainability but also health of millions of people in India; thousands of people die annually because of exposure to pollution. India faces both traditional and non-traditional security threats including ES threats. In spite of acknowledging importance of environment

security such as food security, it has not got its due consideration by the government. However the discourse of ES is gaining space and voices are emerging to bring Environmental security in the policy dynamics and over the last many years legislations, frameworks, programmes and goals of environmental sustainability have emerged leading to seriousness towards addressing environmental issues. The intersection of environmental and security issues are as indicated in

Figure : The Intersection of Environmental and Security Issues



Source: Allenby (1998b)

Many scholars believe that present pace of growth, development and resources utilisation is unsustainable, hence there is an urgent need to look at environmental challenges and sustainability in policies.

Climate change impact the basis of Indian economy, social sustainability, undermines human development and livelihoods of millions of people by affecting agriculture, horticulture, water availability etc. If recent predictions and reports of 2014 by Inter Governmental Panel for Climate Change (IPCC) about the future repercussions of climate change is believed then like breaking of violence in India could prove true, effecting peace and stability in the region which is already facing various other threats. Hence Climate change is one of biggest challenges for India. Million are already hit by effects of climate change as droughts, rising sea level, low agrarian productivity and further escalation of environmental challenges will damage the socio-economic resilience of millions of people. Besides, climate change induced vector borne diseases are severely affecting the health of poor people living in impoverished conditions, being vulnerable to these types of diseases. The pace of retreating Himalayan glaciers will pose threat to ecology, food and water security of the region.

India has large quantity of degraded land which affects livelihood of millions. To tackle the problem, India need to strengthen her irrigation facilities, expand water availability, provide

early warning alerts, regulate market scenario, check inorganic flows and control imported & external inputs. There should be water reservoir storages in areas where water scarcity prevails and which can be rain fed.

Protection of forests including forestation, classification of protected areas, increase in forest employees, ban on toxic effluents, mass education about importance of forests and strict imposition of laws should be stressed to overcome the depletion of forests. About 600 industries that were polluting the water were closed down in China recently and India should ponder over the existence of pollutants spread in every corner of her territory. Government must regulate and check the pollutants contaminating water including monitoring of agriculture, inorganic, industrial domestic sewage etc. There should be increase in proper sewage systems, monitoring stations and pollution checking centres as their existing number is very less in comparison to their distribution and supervision of vast areas.

The rivers of India which support life of millions are been polluted beyond recognition and one of the river Ganga is dirtiest but considered one of the holiest rivers in India. Environmental ethics can be strengthened keeping in view the holiness of rivers through religious personalities. Faith (Religion) based environmental acquaintance has played a significant role in spreading environmental awareness and importance of ecology in many parts of the world for Environmentalism. In this way government must take religious institutions and personalities of all faiths together and encourage them in every possible manner to restore the life and quality of natural resources specially rivers.

India is still one of the leading green house gas emissions in the world. Brick kilns, cement factories; coal plants, other industries and sectors including transport are polluting the air quality and affecting health of millions. In order to mitigate the emissions, there is need to check the growing number of these pollution generating agencies and regulate the pollution level of existing one from time to time. Clean energy technologies though expensive should be prioritized over coal or other hazardous industry or technologies. Efficient environmental planning and management is an important need for protection of environment and biodiversity. While continuing economic growth and development Indian government must follow EIA regulations. Every major and minor project in India should be brought under EIA so that conservation measures are initiated based on the assessments of environmental health of the area. Similarly Ministry of Forests having links and coordination with international organisations like UNEP, SAEP, ICIMOD, UNCED, should invite nation members of these organisation for discussions to implement their successive policies in India. India should impart technical research, financial and other assistance from these organisations. CPCB lays emphasis on strengthening of environmental monitoring networks

and hence needs to expand its activities and increase number of monitoring stations.

While India is on path of achieving environmental sustainability, the efforts needs to be further strengthened by making laws and regulations to arrest the fast environmental degradation. There should be systematic integration of principles of sustainable development and utilisation of national resources, land and water for implementation of policies and programmes. To achieve Millennium Development goals and MDG7 target, India must acknowledge that its entire citizens should have access to dignified livelihoods that are ecologically appropriate, while making efforts to maintain integrity of natural resources

India also has some trans-boundary issues with her neighbouring countries particularly water disputes and there is a need to arrive at sustainable and mutually acceptable agreements/ resolutions. While taking any decisions on projects or construction of dams on water bodies shared by other countries, the affected country should be taken into confidence. Construction of Dam by China over Brahmaputra will affect India and Bangladesh in a big way, resulting in migration and enviromental threats. Militarisation of Siachin glacier, world's highest battle zone is not only taking toll of human lives, economy but playing a crucial part in retreating of glaciers and risking the life of millions in South Asia. Demilitarisation of Siachin glacier by India and Pakistan has been voiced by many environmental experts and security analysts. However, since it is a question of NS for India, with adversary like Pakistan who cannot be trusted, the issue of demilitarisation of Siachin glacier may not be a good idea unless resolution of other critical issues between the two countries are concurrently arrived at.

Military interests associated with environmental security are supposed to be the biggest challenge as the Armed forces may be interested in continuing the status quo due to the complexities involved in effecting the transformation. Military are the biggest single institution that affects the environment and ecological sustainability and unless there is a consensus amongst most countries of the world, the transformation of military to environment friendly ways may be a difficult preposition. Therefore, Military needs to be looked as one of the agents of environmental degradation than not just someone which plays an effective role in environmental protection. There is a need for joint and cooperative action plan with all stakeholders to protect environment and increase the resilience of environmental sustainability.

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