

ENVIRONMENTAL SITUATION OF INDIA & FOOD SECURITY IMPLICATIONS

Devendra K. Chauhan

Basmati Rice Research Centre

Chakroi Sher-e-Kashmir

*University of Agricultural Science and
Technology (SKUAST-J), Chatha, Jammu,
India*

Sanjeev K. Chaudhary

RHRSS, Bhaderwah

Chakroi Sher-e-Kashmir

*University of Agricultural Science and
Technology (SKUAST-J), Chatha, Jammu,
India*

Abstract

This article examines the environmental situation of India and its implications for food security in the context of non-traditional security studies. It argues that climate change, environmental degradation, water stress, sea-level rise, and declining agricultural productivity are increasingly affecting India's food systems, rural livelihoods, and national stability. The study highlights how monsoon variability, Himalayan glacier retreat, coastal vulnerability, and resource depletion threaten agricultural output and water availability, thereby intensifying food insecurity. It also discusses the broader debate on securitising environmental issues and shows that environmental change is not only an ecological concern but also a major development and security challenge. The article concludes that strengthening adaptation, sustainable resource management, and climate-resilient agriculture is essential for safeguarding India's future food security.

KeyWords:

Environmental, Climate, Water, Rural, Agricultural, Development, Ecological

Reference to this paper
should be made as follows:

Received: 16-09-2022

Approved: 22-09-2022

**Devendra K. Chauhan
Sanjeev K. Chaudhary**

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Article No.51

*RJPSS Apr.-Sept. 2022,
Vol. XLVII No. 2,
pp. 450-458*

Similarity Check: % 8

Online available at:

<https://anubooks.com/rjpss-2022-vol-xlvi-no-2/>

DOI: <https://doi.org/10.31995/rjpss.2022.v47i02.051>

Introduction

The concept of food security has been changing from traditional thinking to a non-traditional thinking one by including the environmental dimension in food security agenda. A broadening of the food security agenda that we have seen in the post-Cold War era has introduced numerous non-traditional threats to food security. Among these threats we could mention drugs, diseases (HIV/AIDS), and failed states. The environment was the major single theme to affect this broadening and received the greatest attention and produced the most intense political discussion, particularly during the 1990s. The environment and environmental security also became central to the wider non-traditional security agenda.

Environmental security is a new phenomenon that has emerged in the last few decades. Understanding of the relationship between environment and security has evolved in the last quarter of the 20th century. India is one of the fastest-growing economies of the world and will continue its rapid urbanization and economic development in the coming decades. This growth also presents challenges in the form of rising consumption and demand for energy, increasing greenhouse gas emissions, and constraints on critical natural resources such as land, water, and biodiversity. Indian environment has deteriorated remarkably in the past over six decades due to rapid decline in natural resources and severe increase in pollution levels. Depletion of forests, population growth, vehicular emissions, use of hazardous chemicals, and various other undesirable human activities are mainly responsible for this degraded scenario of environmental health in India.

The concept of security has for so long been interpreted narrowly: as security of territory from external aggression, or as protection of national interests in foreign policy or as global security from the threat of a nuclear holocaust. It has been related more to nation-states than to people. Traditional notions of human security shaped largely by the Cold War were concerned mainly with a state's ability to counter threats to territorial integrity, autonomy, and domestic political order, primarily from other states. However, such a classical formulation based on national security has been criticized on various grounds, giving rise to concepts such as cooperative security, comprehensive security, and human security.

The inclusion of environmental threat in the ambit of security has significantly expanded the scope of security. It has also cast a shadow on the existing national priorities and challenged the prevailing notions of security. There has been a slow but steady realization that environmental threats may have serious socio-economic and human costs; hence, they cause insecurity and cannot be solved by the unilateral decisions of states. In simple words, intervention, which was understood

in terms of military force earlier, has been gradually changed and countries have recognized that it could also be invaded by foreign pollutants or even by the depletion of crucial resources.

The environmental security has emerged as the primary issue on the global agenda in the post-Cold War scenario owing to its security implications. Consensus has recently been forged on the potential for long-term economic, national security, and societal damage from insecure environmental catastrophe, as well as the intense need for technological advances to deal with environment-related threats. The damage done to India's environment has been severe and affects growth and inclusion as well as being a profound loss in itself. The black soot on the Himalayas accelerates melting and absorbs, rather than reflects, heat. The destruction of forests silts the rivers, causes soil erosion, disrupts watersheds, emits carbon dioxide, and destroys biodiversity.

The environment is the most transnational of transnational issues, and its security is an important dimension of peace, national security, and human rights that is just now being understood. Environmental security is central to national security, comprising the dynamics and interconnections among the natural resource base, the social fabric of the state, and the economic engine for local and regional stability. While the precise roles of the environment in peace, conflict, destabilisation, and human insecurity may differ from situation to situation and remain debated in relation to other security and conflict variables, there are growing indications that it is increasingly an underlying cause of instability, conflict, and unrest.

Debate over Securitising Environmental Issues

Different opinions arise over securitising environmental security. Many call for including environment as one of the key aspects of security, while others argue against it on the ground that it may downgrade and distort the very sanctity of the field of security studies. The proponents of environmental security call upon the need for a holistic and multidisciplinary approach to global, regional, and local environmental problems that threaten the economic well-being of people and therefore have the potential to spur conflict. It argues in favor of expanding the scope of national security to include resource, environmental, and demographic issues, thereby bringing environmental concerns to the high table of priority issues where security has traditionally had a seat.

Barry Buzan observed that national security problems need to be understood from a systemic security perspective where economic, social, and environmental security can be as important as political and military security. Allenby linked environmental security with national security and argued that environmental issues have been moved up from ancillary to strategic domains.

On the other hand, Marc A. Levy offered an early critical account of environmental security enquiry by contesting the value of connecting environmental issues with security concerns from a policy perspective. Daniel Deudney also opposed considering environmental degradation as a reference object of international security, warning that such a linkage may lead to militarisation of environmental issues and diversion from real environmental problems.

Environmental Security as a Key Aspect of National Security

Environmental security has made a recent entry into the non-traditional paradigm of security. It represents a significant departure from traditional approaches to study. The traditional concept of security surrounded defending territory and political integrity of a country. The state was responsible for defending its sovereignty and integrity and armed forces were assigned to this duty. Today, environmental security is treated as a component of national security.

Considering the environment as a threat to individual, national, or global security has created a new agenda in the discourse of security studies. The increasing scope of international security now readily includes environmental degradation, global warming, and climate change. These issues have extended human understanding of environmental change, conflict, and vulnerability and explored the roles of conservation and sustainable development in promoting peace, stability, and human security.

Environmental Degradation: Causes and Impacts

One of the most critical issues concerning a nation's security in the 21st century is environmental degradation, particularly climate change and its impact. Environmental degradation is a major causal factor in enhancing and perpetuating poverty, particularly among the rural poor, when such degradation impacts soil fertility, quantity and quality of water, air quality, forests, wildlife, and fisheries. Climate change has assumed critical importance to world security in the last few decades.

Global warming due to climate change has been predicted to have a cascading effect, wherein increasing temperatures facilitate more frequent cyclones and storms in tropical regions and the melting of polar ice caps, leading to rising sea levels and possible submergence of low-lying areas and island nations. Rising temperatures also have the capacity to foster the spread of communicable diseases such as malaria and cholera.

Agriculture and Food Security

Climate change is projected to have significant impacts on conditions affecting agriculture, including temperature, precipitation, and glacial runoff. It affects agriculture in more ways than one. It can affect crop yield as well as the

types of crops that can be grown in certain areas by impacting agricultural inputs such as water for irrigation, amounts of solar radiation that affect plant growth, as well as the prevalence of pests.

Rise in temperatures caused by increasing greenhouse gases is likely to affect crops differently from region to region. For example, moderate warming is expected to benefit crop yields in temperate regions, while in lower latitudes, especially seasonally dry tropics, even moderate temperature increases are likely to have negative impacts for major cereal crops. Warming above 3°C is expected to have a negative effect on production in all regions. Climate change may therefore affect food security directly through agricultural production losses and indirectly through water stress, migration, and price shocks.

Impacts on Indian Agriculture

Agriculture is the mainstay of the Indian economy and provides food and livelihood security to a substantial section of the Indian population. The impact of climate change as witnessed in recent times has immense potential to adversely affect agriculture in this country in a variety of ways. A large part of the arable land in India is rain-fed; the productivity of agriculture depends on rainfall and its pattern. Agriculture will be adversely affected not only by an increase or decrease in the overall amounts of rainfall but also by shifts in the timing of the rainfall. Any change in rainfall patterns poses a serious threat to agriculture, and therefore to the economy and food security.

Summer rainfall accounts for almost 70 per cent of the total annual rainfall over India and is crucial to Indian agriculture. However, studies predict decline in summer rainfall by the 2050s. Semi-arid regions of western India are expected to receive higher than normal rainfall as temperatures soar, while central India will experience a decrease in winter rainfall by the 2050s. Such changes can reduce yields and increase vulnerability of food systems.

Water Stress and Water Insecurity

Lack of access to water is a perturbing issue, particularly in developing countries. Climate change is expected to exacerbate current stresses on water resources. Spreading water scarcity is contributing to food insecurity and heightened competition for water both within and between countries.

Increase in temperature due to climate change has been widespread over the globe. Warming has resulted in decline in mountain glaciers and snow cover in both hemispheres and is projected to accelerate throughout the 21st century. This will in turn lead to reducing water availability, hydropower potential, and seasonal flow of rivers in regions supplied by meltwater from major mountain ranges where

more than one-sixth of the world population currently lives. By the 2050s freshwater availability in Central, South, East, and South-East Asia, particularly in large river basins, is projected to decrease.

Impacts on India's Water Situation

India stands to face major challenges on many fronts in so far as the impact of climate change is concerned. Water security is one of the most important threats in this regard. Water resources will come under increasing pressure in the Indian subcontinent due to the changing climate. The Himalayan glaciers are a source of fresh water for perennial rivers, in particular the Indus, Ganga, and Brahmaputra river systems.

In recent decades, the Himalayan region seems to have undergone substantial changes as a result of extensive land use, leading to frequent hydrological disasters, enhanced sedimentation, and pollution of lakes. Available records suggest that the Gangotri glacier is retreating about 28 m per year. Any further warming is likely to increase the melting of glaciers more rapidly than the accumulation. Glacial melt is expected to increase under changed climate conditions, which would lead to increased summer flows in some river systems for a few decades, followed by a reduction in flow as the glaciers disappear.

Rise in Sea Levels

Sea-level rise under warming is inevitable. Sea-level rise is both due to thermal expansion as well as melting of ice sheets. Satellite observations since the early 1990s show that sea level has been rising at a rate of around 3 mm per year. IPCC predicts that sea levels could rise rapidly with accelerated ice sheet disintegration. Global temperature increases could result in millions of people being displaced through flooding. Warming seas will also fuel more intense tropical storms. People living in coastal and delta regions face acute vulnerabilities.

Impacts on Coastal States in India

The coastal states of Maharashtra, Goa, and Gujarat face a grave risk from sea-level rise, which could flood land, including agricultural land, and cause damage to coastal infrastructure and other property. Goa may be especially vulnerable. Mumbai's northern suburbs and other populated coastal areas are also vulnerable to land loss and increased flooding due to sea-level rise. Flooding will displace people from the coasts and put greater pressure on civic amenities and rapid urbanisation. Sea water percolation due to inundations can diminish freshwater supplies, making water scarcer.

The states along the coasts such as Odisha will experience worse cyclones. Many species living along the coastline are also threatened. Coral reefs in Indian biosphere reserves are saline sensitive, and the rising sea level threatens their

existence. This affects not only coral reefs but also phytoplankton, fish stocks, and human lives dependent on them.

Socioeconomic Consequences and Migration

Environmental degradation can lead to economic decline, population displacement, and domestic differences. Decrease in agricultural production, insufficient supplies of basic goods, and problems regarding industrial production and transport are among the economic effects. Environmental refugees may be caused by desertification, sea-level rise, hurricanes, and floods.

Such pressures can aggravate ethnic divides, social divides, organized crime, and guerrilla movements. In this way, environmental stress becomes a food-security and national-security concern at the same time.

Measures to Resolve the Serious Challenge

India cannot take the issue concerning climate change and energy security lightly owing to its serious national security implications. The climate change and energy security demands India to take up certain measures that would help meet the increasing energy demand and at the same time reduce emission of greenhouse gases. India is focusing on energy efficiency improvements, renewable and clean energy forms, power sector reforms, cleaner fuels, and ecological protection.

India has also dedicated resources to solar power infrastructure and supports climate mitigation and adaptation through technology and finance. The efforts needed to address the climate change problem include mitigation of greenhouse gas emissions on one hand and building of adaptive capacities on the other in developing countries to cope with adverse impacts on various sectors of society and economy.

India's Response to Climate Change

National Environment Policy, 2006 outlines essential elements of India's response to climate change. These include adherence to the principle of common but differentiated responsibility and respective capabilities, identification of key vulnerabilities of India to climate change, assessment of adaptation needs, and encouragement to the Indian industry to participate in the Clean Development Mechanism.

India has also submitted national communications to the UNFCCC and continues to frame climate policy around vulnerability in water resources, forests, coastal areas, agriculture, and health. India's strategy for addressing climate change is reflected in many of its social and economic development programmes.

Conclusion

The environmental damage is already threatening livelihoods, and unless there is strong action the damage will intensify. There is much that can be done through good policy and better governance, from conserving water to better agricultural extension services.

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