International Journal of Social Research and Development
www.socialsciencejournal.net
Online ISSN: 2664-8709, Print ISSN: 2664-8695
Received: 26-02-2021; Accepted: 15-03-2021; Published: 30-03-2021
Volume 3, Issue 1, 2021, Page No. 36-40

Climate change and human security: Food security

Ashwani Sharma
Associate Professor, Department of Political Science, Satyawati College, University of Delhi, New Delhi, India

Abstract
Global Environment is one of the central themes in global politics. Degradation of the global environment is linked to the models of economic growth and development. Efforts at the international level have focused on integrating sustainable development paradigm in the contemporary models of economic growth and development. Amongst the range of environmental issues, climate change is the most important issue as it poses the biggest threat to humanity. The concept of security widened in the 1990s to include human security. Climate change poses challenge to many aspects of human security, particularly food security. The climate change adversely impacts agricultural production and consequently food security. Achieving food security in the developing countries in the context of climate change, increasing population, increasing per capita consumption of food, and changes in dietary habits is indeed a serious challenge. There is a clear North-South dimension in food security. The Northern countries have more than enough food to feed their population with high calories diet. The Southern countries have insufficient availability of food supply. Almost all the malnourished people of the world live in the Southern countries. Climate change is likely to aggravate food insecurity in the South and also lead to higher imports of food from the North.

Keywords: climate change and human security, climate change and food security, North-South dimension in food security. Climate change and food security in India

Introduction

Environmentalism signifying concern with the environmental is not new [1]. The modern-day or the contemporary environmentalism began in the 1960s and has since been increasing in salience. Global environment is now high on the international agenda and is considered as one the three important issues in global politics together with security and economic issues. These three issues are inextricably interlinked. The contemporary models of economic growth based on intensive industrialization is leading to further environmental degradation and this in turn negatively impacts development. The environmental degradation impacts security as well. The ending of the cold war provided space and opportunity to widen the concept of security to include human security alongside military security. Inter-state disputes on fresh water supplies from shared rivers are increasing, and the degradation of the environment is negatively impacting many aspects of human security. The climate change and its impact on one such aspect of human security, the food security, will be examined.

The contemporary phase of global environmentalism began in the western world. The only way the Northern countries could accord salience to global environment in global politics was to approach the United Nations to hold an international conference on global environment to raise consciousness of the people across the world as well as to make the governments focus on the issue as of serious concern. The process of according salience to global environment began with the acceptance of United Nations General Assembly (UNGA) in 1968 to convene the first United Nations Conference on Human Environment (UNCHE). At that time, most of the Southern countries had acquired political independence and had joined the United Nations and constituted majority in the UNGA. Having achieved independence, the priority of these countries was economic growth and development. In order to resolve the North-South conflict, the concerns of the developing countries had to be accommodated to build a much-needed consensus for the conference. Therefore, environment came to be perceived in a wider context of development as linkages were established between poverty and environmental degradation. Thus, environment and development became the central theme of the conference.

The global environment as an issue in global politics was side-lined because of the global economic recession in the 1970s and the beginning of the second cold war. It re-emerged with increased salience in the 1980s and lead to the establishment of the World Commission on Environment and Development, popularly known as the Brundtland Commission. The report of the commission anchored a new paradigm of *sustainable development* and provided an enduring definition by stating "Sustainable development is development that meets the demand of the present without compromising the ability of the future generations to meet their own needs" [2]. The ending of the cold war and intensification of the contemporary phase of globalization provided an opportunity to hold the largest UN conference on global environment, the UN Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil. The importance attached to the conference was also reflected in the emotional acronym used for the conference: the

'Earth Summit'. The substantive outcomes of the conference were the *Agenda 21* and the conventions on climate change and preservation of biodiversity. The Earth Summit helped in raising the profile of environmental issues in global politics.

To sustain the efforts of according increasing salience to global environmental issues in global politics, the World Summit on Sustainable Development was held in 2002 in Johannesburg. In the context of sustainable development, the summit laid emphasis on eradication of poverty, progress in providing clean water, sanitation, and improvements in agricultural practices. And ten years later, Rio + 20 Conference was held in Brazil. The conference focussed on setting the sustainable development goals for the future. However, the global financial crisis which was triggered by the subprime crisis in 2008 in the US engulfed the entire world with the developed countries worst affected. Hence, the conference did not attract the attention it deserved.

While the UN took the lead in bringing the environmental issues into the mainstream of global politics, there were other factors also which contributed to raising the consciousness of people and the profile of environmental issues. The publication of Rachel Carson's persuasive book 'Silent Spring' in 1962 [3] revealing the negative impacts of industrialization on natural environment motivated scientists to research the issue of environmental degradation, particularly causes of the degradation, the extent of damage to the environment, and the likely future scenario. New scientific understanding of global environmental issues has since been evolving. The epistemic community also played an important role in public understanding of global environmental issues. Epistemic community refers to scientific 'experts who share common values and information and who are working together loosely to improve scientific and public understanding of an issue [4]'. The emergence of environmental social movements and their exponential increase across the world contributed significantly in increasing public awareness. Media also played an important role in raising the profile of environmental issues.

The global environmental issues are spread over a wide range of issue areas. They include transboundary air pollution, ozone depletion, climate change, international toxic waste trade, toxic chemicals, whaling, international trade in endangered species, biodiversity loss, fisheries depletion and desertification. The focus of contemporary global environmental politics is climate change as it is perceived by analysts as the most important problem that is confronting humanity. The issue of climate change is inextricably linked to the contemporary processes of economic growth and development, and attempts are made to anchor sustainable development paradigm in growth models.

Climate Change and its Implications

Climate change had been a debatable issue amongst the scientific community until the late 1980s when persuasive scientific knowledge emerged to build international consensus on the issue. The anthropogenic emissions were identified as the main source of global warming. And these anthropogenic emissions are green-house gases (GHGs) that are emitted into the atmosphere due to human activities and include carbon dioxide, methane, nitrous oxide and water vapours [5]. The dominant component of GHGs is carbon dioxide (CO_2). GHGs help in the retention of the heat radiated by the Sun and increases the surface temperature of the Earth. Certain amount of GHGs in the atmosphere are essential for life on the Earth as they protect earth's surface from solar radiation [6]. Beyond that level, the production of GHGs leads to increase in the global mean temperature. The main source of carbon dioxide is the atmosphere is burning of fossil fuels that produce carbon dioxide. Fossil fuels include oil, gas, coal and wood and have been used for industrialization, energy production and transportation. There is clear scientific evidence that the production of GHGs has been increasing in the atmosphere at a faster rate since the industrial revolution in the eighteenth century. The scientific evidence suggests that more carbon dioxide has been released into the atmosphere in the last hundred years than in the previous thousand years. In addition, the increasing population accompanied by increasing agricultural production has also led to more production and release of methane in the atmosphere. The scientific evidence that emerged since the late 1980s has unambiguously established that these recent increases in the concentrations of CHGs in the atmosphere have already led to rise in global temperature. The average global temperature has already increased by 1 degree Celsius since 1880 [7]. This global warming has caused a significant warming of the ocean, a rise in sea level by 20 centimetres, melting of the artic sea ice by 40 percent, and a range of extreme weather conditions [8]. The global mean temperature is expected to increase further between 2 and 4 degrees centigrade by 2100 [9]. The actual rate of increase of carbon dioxide emissions in the atmosphere would determine the increase in global mean temperature. With a low rate of increase in carbon emissions, the rise in global mean temperature can be limited to 2 degrees centigrade. Conversely, if the increase in carbon emissions is high, then the global mean temperature could increase by as much as 4 degrees centigrade.

The gradual increase in average global temperature over a sustained period of time has had an adverse impact on the ecological system such as long-term changes in humidity, clouds and rainfall. And this has increased the frequency of the incidence of heavy rainfall in most land areas of the world in the past fifty years and is expected to increase further with the rise in global mean temperature [10]. The long-term changes in the climate have also led to increase in other extreme weather conditions such as droughts and cyclones. Importantly, these climate change induced extreme climatic conditions have the potential of impacting the agricultural production adversely, regionally as well as globally. The important issue that comes up in this context is whether we would be able to feed the extra two million people on the Earth by 2050 in a scenario of rapidly changing climate [11]. In addition, global warming also has the potential of creating water stress across the world. The increasing population and the rising per capita consumption of water will impact the availability of water. As the agricultural sector, the main source of livelihood for the majority of the population in the developing countries, consumes most of the freshwater withdrawal and any climate change induced water stress will adversely impact the food production.

Human Security

The ideational origins of the concept of human security lie in Mehboob ul Haq and Amartya Sen's dissatisfaction with the traditional conceptualization of development as a derivative of economic growth. The concept of human security is people centric rather than state-centric. The focus is on how to make human life better, more secure, safe, and meaningful.

The first distinct articulation of human security appeared in the Human Development Report published by the United Nations Development Programme (UNDP) in 1994 [12]. The report identified seven areas that enfolded human security. "*First,* it refers to economic security. Every human being should have assured basic income from productive and remunerative work, and if not so, then there should be publicly financed safety net. *Second,* the focus is on food security. All the people should be ensured of basic food with physical and economic access at all times. *Third,* there should be a guarantee of a minimum protection of all the people from disease and unhealthy lifestyle. *Fourth,* environmental security has to ensured. There should be protection of people from the short- and long-term effects of nature, man made threats in nature, and deterioration of the natural environment. *Fifth,* personal security of all individuals should be ensured from physical violence. This includes violence from state, external states, violent individuals, domestic abuse, and predatory adults, *Sixth,* community security is to be assured. People should be safeguarded from the loss of traditional relationships and values, and from sectarian and ethnic violence. *Seventh,* political security has to be ensured so that people live in a society that honours their basic human rights, and individuals and groups are free from government attempts to exercise control over ideas and information. [13]"

The core of human security was encapsulated by the United Nations Human Security Commission in 2003 as 'objective of human security is to safeguard the vital core of all human values in ways that enhance human freedoms and human fulfilment' [14]. The conceptualisation of human security has been criticised by the policy makers for being too wide, fluid and imprecise and poses problems for policy formulation and implementation. This is particularly true in relation to prioritization of one aspect over the other as the developing countries have limited resources.

Although the conceptualization of human security is wide, *it does not include issues* that have increased in salience at the global level and are vital to human life. For example, the issue of *water security*. Though the conceptualization of human security does mention access to clean drinking water but the wider serious issue of the conceptualization water security is not dealt with. The two issues of water security and food are inextricably interlinked as any shortfall in fresh water supply would impact agriculture adversely and consequently food security as well.

Climate Change and Food Security

The contemporary conceptualization of food security has been evolving since the 1970s. The World Food Conference held on 15-16 in 1974 defined 'food security' as the "availability at all times of adequate, nourishing, diverse, balanced and moderate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices" [15]. It is evident from the definition that the emphasis was on 'food supplies' and consequently on increasing food production and stabilising food prices so that all could afford basic food stuff. As the world food production increased and food prices stabilized considerably, rearticulation of the definition of food security marked a shift in emphasis. The First Food Summit organized by the Food and Agriculture Organization (FAO) in Rome in November, 1996 rearticulated the definition and declared that "food security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life" [16]. The emphasis clearly shifted from 'availability' to 'access' to food. Later in 2006, the FAO identified four fundamental aspects of food security as "availability, access, utilization, and stability" [17]. These four fundamental aspects of food security were reiterated by the second World Food Summit in 2009 [18].

The North-South dimension or the developed countries versus developing countries dimension is central to the context of food security. The developing countries have about 80 percent of the world's population but insufficient 'availability' of food and people suffer from 'access' to nutritional food. Almost all the food-insecure people live in the South. This is so despite the fact that there is enough food production in the world to feed the growing population.

There has been a significant increase in the population of the world: from 2.5 billion in 1950 to the current estimates of about 7.7 billion. Along with increasing population, the irrigated area doubled and the water withdrawal increased by three times. The increase in agricultural productivity has been mainly due to new crop varieties, use of fertilizers, and additional irrigated land area. The increased food production eased the global food prices. Although food insecurity decreased but not to the desired level. According to an estimate of 2003, 850 million people across the world were food-insecure and of these 60 percent lived in Sub-Sahara and South Asia [19].

There have been extraordinary changes in the ecosystem since in the last many decades. And according to the Millennium Ecosystem Assessment Report [20], much of the changes have been caused by agriculture. The progress in agricultural has to some extent adversely affected the ecosystem. The use of biological pest control, increase in methane production as a result of increase in the paddy production, loss of biodiversity due to changes in microclimate, and the flood retention capacity have had unfavourable impacts on the ecosystem.

There have been certain developments in the past decades which relate to availability of food and food security. First, there has been a shift in the dietary habits of the population. There is a steady increase in the consumption of food that consists of fruits, vegetables, and livestock products. Inclusion of these food products in the diet provides people with better nutrition and decreases the number of undernourished. Second, the global food production has been increasing. The global food supply increased from 2,400 kilocalories per capita in 1970 to 2,800 kilocalories per capita in 2000. This clearly suggests that sufficient food was being produced to feed the growing population. The main reason for the increase in world food production has been the rising land and water productivity. Third, despite sufficient food for all, the number of malnourished people remain around 850 million. Although the daily per capita food supply in South Asia increased to 2,400 kilocalories and that of Sub-Saharan Africa to 2,200 kilocalories, it is below the world average of 2,888 kilocalories per person. In contrast, this is far below that of the developed countries where the daily food availability is as high as 3,450 kilocalories. Fourth, the increased consumption of fish and meat is increasing pressure on agriculture and industrial livestock production. This in turn has resulted in more pressure on water resources and the environment. Fifth, groundwater levels are declining fast in the densely populated areas of the developing countries (South) such as North Africa, North China, India, and

Mexico due to overexploitation. Fifth, increasing urbanization is altering the pattern of food consumption and consequently the pattern of demand for agricultural products [21].

The projections suggests that the food and feed crop demand would grow significantly in the next thirty years [22]. How much the demand would grow will depend on population growth and dietary changes. Currently, many developing countries are importing food from the developed countries, and this trend is likely to be reinforced in the coming years as most of the future increase in population is likely to be in the developing countries.

A brief reference to the likely impact of climate change on food security in India would help us understand the issue better. Indian agriculture depends mostly on the summer rainfall; though winter monsoon rainfall has a good impact on rabi crop in general. Climate change induced increased frequency of extreme weather events such as floods, droughts, and cyclones linked to storm surges have the potential of causing a decline in agricultural production in India. There are two broad climate-induced effects on Indian agriculture which impact productivity negatively: first, changes in temperature, precipitation, and carbon dioxide (CO_2) concentrations, and second, changes in soils, distribution and frequency of infestation by pests and diseases. The Indian agriculture is vulnerable to climate change not only in the context of its direct impact on the affected plants but also on the ability of the socio-economic system and institutions to deal with the changes in yields and changes in frequency of droughts and floods. The adaptive ability of the Indian farmers to climate change is circumcised by the lack of complementary inputs and the institutional support system [23].

Certain modelling studies indicate that a 2^0 C rise in temperature is likely to lead to a 17% decline in wheat production in India; and it is going to be substantially higher if the temperature increases beyond 2^0 C. Climate change would negatively impact the production of wheat and other rabi crops particularly due to uncertainties in rainfall. In addition, kharif cultivation may become a risky proposal for farmers due to climate induced increases in pests [24].

In the context of rising population, increasing per capita consumption of food, India needs to increase its food production to attain the goal of universal food security. The negative impact of climate change on food production is likely to seriously affect the attainment of this goal.

Conclusion

The foregoing analysis strongly suggests that there is an underlying North-South dimension on the issue of food security. The Northern countries have more than sufficient food production to feed their population with high calories diet. The Southern countries not only have a lower per capita availability of kilocalories of diet compared to the Northern countries, they also have almost all the malnourished population of the world. Climate Change will have an adverse impact on the ecosystem in general and agricultural food production in particular; and this can pose serious problems for the requirement of adequate food supplies for the increasing population, increase in per capita consumption, and changes in dietary patterns. Food production is also likely to be adversely affected by the water stress that the world is facing. The water stress is likely to increase further with climate change In the developing countries, about eighty percent of the fresh water supplies are used in the agricultural sector. Therefore, it is the interplay of many factors that would affect food security in the developing world.

The way forward to achieve food security in the developing world is to evolve strategies for improvements in food-waste management and increasing agricultural production. It is a well-known fact that thirty percent of the world food production gets wasted. Therefore, food supply infrastructure has to be improved. The agricultural food production can be increased by improving rainfed agriculture. Importantly, productivity in the rain-fed areas has to be increased through enhanced management of soil moisture, supplementary irrigation, and small water storages. In addition, crop area under irrigation has to be increased. It would indeed be a difficult task to achieve universal food security (considered a human right and part of the UN Millennium Development Goals of 2000) in the developing countries.

References

1. Guha, Ramachandra. Environmentalism. New Delhi: Oxford University Press, 2000.
2. Brundtland GH *et al*. Our Common Future: Report of the World Commission on Environment and Development. Oxford: Oxford University Press, 1987, 43.
3. Carson R. Silent Spring. Boston: Houghton Mifflin, 1962.
4. Speth James Gustave, Haas Peter M. Global Environmental Governance. Washington, D. C: Island Press, 2006, 91-92.
5. Sharma Ashwani. Climate Change and Poverty Alleviation. International Journal of Social Research and Development,2021:3(1):33.
6. Ibid.
7. IPCC, Climate Change 2013: Physical Science Basic Contribution of Working Group I to Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, 2014. Available online on IPCC website.
8. Muslin Mark. Climate Change. Oxford: Oxford University Press, 2014, 29-45.
9. Intergovernmental Panel Climate Change (IPCC) Report, 2007. Available online on IPCC website.
10. Sharma, Ashwani. Op. cit., 34.
11. Muslin, Mark. Op. cit, 90.
12. UNDP (United Nations Development Program). United Nations Human Development Report. New York: Oxford University Press, 1994.
13. Ibid. Also see Sharma, Ashwani. Climate Change and Human Security: Water Security. International Journal of Humanities and Social Sciences, 7(4), 70.
14. United Nations Commission on Human Security. Human Security Now: Protecting and Empowering People. New York: United Nations, 2003.
15. FAO. The World Food Conference. 5-6 November. Available online on the official website of FAO, 1974.
16. FAO First World Food Summit, November 1996. Rome Declaration on Food Security and World Food Summit Plan of Action.
17. FAO Agricultural and Development Economics Division, 2006.
18. FAO Declaration of the World Food Summit on Food Security, 2009.
19. Roy, Ghosh MK. Water Resources. New Delhi: MedTec, 105.

20. UN Millennium Assessment Report. Ecosystems and Human Well-being: Synthesis. Washington D. C: Island Press, 2005.
21. Roy, Ghosh MK. op. cit., 123-24.
22. Ibid, 124.
23. Dash, Sushil Kumar. Climate Change. New Delhi: Cambridge University Press India, 131.
24. Ibid, 131.