

# **Climate Change Impact on Food Sovereignty in Bangladesh**

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Presented by

S. Jahangir Hasan Masum and M M Mahbub Hasan  
Coastal Development Partnership (CDP)

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# ***Climate Change Impact on Food Sovereignty in Bangladesh***

**S. Jahangir Hasan Masum<sup>1</sup> and M M Mahbub Hasan<sup>2</sup>**

**Abstract:** Climate change will have a massive impact on food production and may jeopardize food security in many regions. Food Security is an integrated part of Food Sovereignty. Climate change will also influence the availability of water for human consumption and for food production. All the previous Intergovernmental Panel on Climate Change (IPCC) impact assessments recognized Bangladesh as one of the most susceptible to the negative impacts of climate change. Given the contribution of agriculture to the livelihoods of general people of the country and its dependence on climate regime, any significant change in climate regime can have far reaching impacts on the overall socio-economic system of Bangladesh. It is important to devise viable strategies and pro-poor policy approaches by integrating climate change, Food Sovereignty & Agriculture for reducing climate change vulnerability. In general, food sovereignty critically requires promotion of food availability (e.g. agricultural diversification of agriculture production and food processing and storage infrastructure, pro-poor market mechanism, continual food access (income diversity, prices, employment creation, control of assets and resources), and reducing risk (improve coping mechanism, better risk management, adequate disaster shelters, household and community focused flood-proofed facilities development). Hence, risk-reduction focused strategies are needed to reduce the climate change threat on food sovereignty. Information about climate change is vital for both individuals and institutions because better information systems can greatly assist decision-making at all levels. People-centered Information Management & Surveillance System (PIMS) to monitor the climate-change induced vulnerability on Food Sovereignty and Agriculture could be a viable option to identify the early warning of the climate change induced vulnerability on food sovereignty. Climate change, Food Sovereignty and Agriculture encompass multidimensional policy issues of human well-being, environmental management and good governance. Consequently, any strategy to address food sovereignty & sustainable agriculture integrating climate change should consider livelihood as an integral component. Ecosystem approach to Agriculture and Food sovereignty is needed to include in the national policies and action plans to reduce climate change vulnerability over food sovereignty.

## **Introduction**

Any broad environmental change like climate change can be a significant factor that undermines human well-being and marginalized people are likely to be vulnerable for such environmental change (McCarthy et al., 2001<sup>1</sup>, Matthew, 2001<sup>2</sup> and Najam, 2003<sup>3</sup>). Climate change is a global problem that affects us all. But communities in developing countries are likely to suffer most from the negative impacts of climate change<sup>4</sup>. Climate change presents significant threats to achieving all of the Millennium Development Goals, particularly those related to eliminating poverty and hunger and promoting environmental sustainability<sup>5</sup>. According to the FAO 2006 State of Food Insecurity in the World report, the number of hungry people in the world is growing at a rate of four million a year.

The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as: “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods”. In other words, the FCCC uses the term Climate Change to mean only those changes that are brought about by human activities. An analysis of temperature records shows that the Earth has warmed an average of 0.5°C over the past 100 years. The warming is real and significant though its intensity has varied from decade to decade, from region to region and from season to season. One of the

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<sup>1</sup> McCarthy, J., Canziani, O., Leary, N., Dokken, D. and White, K. (Eds). 2001. *Climate Change 2001: Impacts, Adaptation & Vulnerability*. Cambridge University Press: Cambridge.

<sup>2</sup> Matthew, R. 2001. 'Environmental Stress and Human Security in Northern Pakistan', *Environmental Change and Security Project Report 7*: 21-35

<sup>3</sup> Najam, A. 2003. 'The Human Dimensions of Environmental Insecurity: Some Insights from South Asia', *Environmental Change and Security Project Report 9*: 59-74

<sup>4</sup> Jarraud, M (2003) *Climate change and global energy needs: A 21st century perspective*, World Meteorological Organization in Renewable Energy 2003, World Renewable Energy Network (affiliated to UNESCO), Sovereign Publications Ltd., London.

<sup>5</sup> <http://www.undp.org/climatechange/adap01.htm>

most effective ways of estimating our future climate is to use powerful computer simulations of past and present climates.

Food sovereignty is the right of peoples to define their own food and agriculture; to protect and regulate domestic agricultural production and trade in order to achieve sustainable development objectives; to determine the extent to which they want to be self reliant; to restrict the dumping of products in their markets. Food sovereignty does not negate trade, but rather, it promotes the formulation of trade policies and practices. Food security can not be ensured by few corporations who are increasingly monopolizing food production and food chain, and 'right' to food does not mean that State will purchase any kind of food, including GM food, and can dump on the poor in the name of 'rights'. So, narrow 'right' base approach has the imminent danger of providing an alibi to create effective demand for transnational food corporations. This is the reason why we demand 'food sovereignty' and not merely 'food security'. Food Security is an integrated part of Food Sovereignty. The concept of food security aims to ensure the right of every individual to have access to adequate food according to their culture.

At the World Food Summit in 1996, food security is defined as meaning "that food is available at all times, that all persons have means of access to it, that it is nutritionally adequate in terms of quantity, quality, and variety, and that it is acceptable within the given culture<sup>6</sup>." On the other hand, the concept of Food Sovereignty aims to ensure peoples right to produce their own food, right to decide the way their food will be produced, distributed and exchanged.

### Food Sovereignty in Bangladesh

Bangladesh has an area of 14.43 millions hectares of land of which 3.75 million hectares (26.0%) covers housing, water bodies, roads etc and forest covers 2.25 m ha (15.6%). Agriculture remains the most important sector of Bangladeshi economy, contributing 19.6 percent to the national GDP and providing employment for 66 percent of the population (Bangladesh Bureau of Statistic 2003). Agriculture sector contributed to about 22% of total GDP, out of which crop sector shared 73%. The net area available for crop production is 7.96 m ha (55.2%). Out of the total net-cropped area 36% is single cropped, 51% double cropped and 13% triple cropped. The total cropped area comes to 14 millions hectares making a cropping intensity of 177%. The land use pattern of the country indicates within 5 years (2001 to 2005), 510,000 Acres of Total Cropped Area has been reduced. However the cropping intensity remains 176.9 to 177.0.

Land Use ('000' ACRE) in Bangladesh					
Type	Year				
	2000-01	2001-02	2002-03	2003-04	2004-05
Forest	6491	6365	6418	6418	6420
Not Available Cultivation	8427	8676	8676	8685	8724
Culturable waste	794	799	799	764	663
Current fallow	987	1005	957	975	1159
Net Cropped Area	19970	19824	19845	19845	19703
Total Cropped Area	35335	35076	35126	35129	34845

Source : Agriculture Statistics Wing, BBS.

About 85% of the population who are living in the rural areas of Bangladesh are mostly small, marginal and landless farmers and fully depended on agriculture. Farms are usually very small due to heavily increasing population, unwieldy land ownership, and inheritance regulations. Half of the population now

<sup>6</sup> Food and Agriculture Organization (FAO) of the United Nations. Elements for possible inclusion in a draft Declaration and Plan of Action on Universal Food Security. Rome: United Nations, 1995.

lives below the absolute poverty line as measured by the minimum calorie intake of 2122 kcal/day. On the same basis approximately one fourth of the population consuming less than 1805 kcal/day, are the hard-core poor. Moreover, the diet is not balanced as 85% of the calorie and 60% of the protein intake is derived from cereals.

### **Climate Change and Food Sovereignty in Bangladesh Context**

Climate change will have a massive impact on food production and may jeopardize food security in many regions. Warmer temperatures will affect crops and crop production, changes in rainfall patterns will be as important. Climate change will also influence the availability of water for human consumption and for food production. Loss of land through sea level rise and other consequences like erosion caused by wind and water will also affect the agriculture production. All the previous Intergovernmental Panel on Climate Change (IPCC) impact assessments recognized Bangladesh as one of the most susceptible to the negative impacts of climate change. It is anticipated that the consequences of climate change will increase livelihood insecurity, malnutrition, unemployment, lack of safe drinking water and water-borne diseases in Bangladesh and about one third of the population would be vulnerable to climate change and sea level rise. According to IUCN, the case of Bangladesh is unique in the climate change context as this country will eventually face the multidimensional appearance of climate change such as flood, cyclone, sea level rise, drainage congestions, salinity, drought etc. UNDP's Comprehensive Disaster Management Program (CDMP) lists climate change as a serious component of Bangladesh's vulnerability to natural hazards.

An analysis of the relative effects of flood and drought on rice production between 1969-70 and 1983-84 shows that drought is more devastating than floods to aggregate production (World Bank, 2000)<sup>7</sup>. Approximately 20 percent of the country and millions of people experiences normal annual flooding. A 67 cm sea level rise could inundate all of the Sundarbans. Even a 25 cm sea level rise would result in a 40% mangrove loss (Smith, Rahman, & Mirza. 1998)<sup>8</sup>. The Food and Agriculture Organisation (FAO) has estimated that climate change could cost 65 developing countries about 280 million tons in lost cereal production, equivalent to about 16 percent of agricultural output<sup>9</sup>. Across the developing world, climate change could potentially reduce the amount of rain-fed land by 11 percent by 2080. A United States Department of Agriculture study indicates that initially staple crop yields may rise but, as temperature increases beyond 1.2 degrees, yields will begin to decrease<sup>10</sup>. According to UNFPA's report "State of the World Population-2005", Bangladesh's population is about 141.8 million and projected to grow to 242.9 million by the year 2050. Given the contribution of agriculture to the livelihoods of general people of the country and its dependence on climate regime, any significant change in climate regime can have far reaching impacts on the overall socio-economic system of Bangladesh. The majority of the rural population in Bangladesh is directly involved in food production through only 0.07 hectares of agricultural land per capita. This envisages the capacity of the farmers of Bangladesh for utilizing land resources and their contribution for reducing food insecurity. The production of rice, which can be harvested 2 or even 3 times a year, reached 19.9 million metric tons in 1998-99. The production of wheat reached about 2 million metric tons in 1998-99. Both crops play an important role in achieving self-sufficiency in food production. Regarding this situation climate, change impact might be greater than our anticipation on food sovereignty.

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<sup>7</sup> World Bank, Bangladesh Agriculture in the 21 st Century, World Bank Publication, 2000

<sup>8</sup> Smith, J.B., A. Rahman, and M.Q. Mirza. 1998. Considering Adaptation to Climate Change in the Sustainable Development of Bangladesh. Report to The World Bank by Stratus Consulting Inc. Boulder, CO.

<sup>9</sup> <http://www.planetark.com/dailynewsstory.cfm/newsid/31554/story.htm>

<sup>10</sup> <http://www.ers.usda.gov/publications/aib765/aib765-8.pdf>

A series of privatization and deregulation policies were implemented beginning from the 1980s, a significant decade in the history of agriculture in Bangladesh. Since then, Transnational Corporations (TNCs) are increasingly exerting their control over the food system which has important implication for food security, the present agricultural policies as well as the policy makers at the national and international institutions are still promoting them, ignoring the food sovereignty of the global common. In the context of prevailing scenario of agriculture, farmers' right over their seeds is a burning issue. Before the so called green revolution, which started in early 1960s; the farmers of Bangladesh were self sufficient for their seeds. They used to preserved seeds of varies crops in their houses and mainly the female were engaged in seed preservation activities. About 12500 varieties of rice developed by the farmers through thousands of years of agricultural practice in Bangladesh have been available to the small-scale farmers before the invasion of hybrid & GM seed. Multinational companies have already captured the whole sector of food and agriculture, which ultimately caused serious suffering to the farmers losing their own seed varieties. Now farmers in Bangladesh are under pressure to use hybrid seeds and gradually avoid the local traditional seed varieties.

The prevailing scenario clearly manifests that day by day more and more farmers are being deprived of their right to preserve and use local and indigenous varieties of seeds. In the global context, only ten big multinational corporations control about 40% of world seed market that which indicates that the food security of the planet is more-and-more controlled by only few multinational corporations. It will not be long before when these corporations will capture the whole seed market of Bangladesh. Therefore, it is important to promote farmers' rights to seed and empower the rural communities so that they can protect their own livelihoods.

### **Recommended Strategies and policy approaches for integrating climate change, Food Sovereignty & Agriculture**

Climate change will disproportionately affect the world's poor, approximately two thirds of whom are women.<sup>11</sup> Women and children are most vulnerable to hunger related deaths and illness which would be indirectly exacerbated by climate change through increasing food and water shortages. The lack of scientific information and its critical understanding as well as social perception regarding climate change imposes a major challenge for people at all levels from making the critical decisions that are necessary to adapt. It is important to devise viable strategies and pro-poor policy approaches by integrating climate change, Food Sovereignty & Agriculture for reducing climate change vulnerability. However, without social and technical data about the nature of climate change, a decision for choosing the viable strategies to mitigate climate change impact is often difficult.

**Risk-reduction focused strategies is needed to reduce the climate change threat on food sovereignty:** In general, food sovereignty critically requires promotion of food availability (e.g. diversification of agriculture production and food processing and storage infrastructure, pro-poor market mechanism, continual food access (income diversity, prices, employment creation, control of assets and resources), and reducing risk (improve coping mechanism, better risk management, adequate disaster shelters, household and community focused flood-proofed facilities development). Hence, the linkage between climate change and food sovereignty requires risk-reduction focused strategies. It is essential to have climate adaptation planning in such a way that conserves and sustains the ecosystems and support the poor and ensures food security for the growing population. For climate sensitive regions, the policy should take into account the unique natural characteristics of the region.

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<sup>11</sup>Friends of the Earth Australia, 2003, "Changing the future of the world's poor?" [http://www.foe.org.au/download/future\\_poor.pdf](http://www.foe.org.au/download/future_poor.pdf)

**Disaster should be recognized as chronic signature of climate change on the Food Sovereignty:**

Disasters can threaten all the necessary conditions for Food sovereignty: they reduce the availability of food by damaging food stocks, destroying crops and homestead gardens, killing livestock and isolating communities from market centers; they reduce access to food by causing food prices and unemployment to rise so households cannot afford to buy the food they need; they damage sanitary facilities and sources of clean water, causing epidemics of infectious diseases such as diarrhea; and they disrupt routine health services and cause serious disturbance to everyday life so mothers are unable to find time to care for their young children. One study has documented that there is a strong association between poverty (income levels) and environmental problems related with pollution, water and sanitation, solid waste and the risk of disasters, e.g. floods<sup>12</sup>. Research in South Asia has also revealed that people with sufficient assets can protect themselves physically and socially from the impact of a cyclone or flood even if physical defense barriers are absent or fail<sup>13</sup>. Large-scale disasters such as floods and cyclones intensify household food insecurity and increase the prevalence of chronic energy deficiency and micronutrient deficiencies among poor.

**Ecosystem approach to Agriculture and Food sovereignty may reduce climate change vulnerability:**

Food sovereignty ensures that the rights to use and manage lands, territories, waters, seeds, livestock and biodiversity are in the hands of those of us who produce food. Bangladesh, like some other Asian and African countries is very rich in biodiversity and it is clear that developed countries and their multinational companies have done and are doing their best to capture the biological diversity of our country and of developing countries in Asia and Africa. They are stealing our genetic resources of by using the opportunity of ignorance, unconsciousness, technological weakness and poverty of these countries. It must be stopped immediately. The use of patented seeds, plants and genetically modified animals would make small farmers dependent on the corporations that own the patents. This will change fundamentally the way agriculture is practiced in least developed and developing countries like Bangladesh by facilitating the growth of agri-business and the decline of small farms and biodiversity.

Recent research shows that 40 percent of the food in biodiversity-rich areas comes from uncultivated food sources. Despite such richness in biodiversity, the policy-makers since sixties have been implementing high-input industrial system of food production and systematically destroyed the environmental, ecological and biodiversity base of farming systems that took hundreds of years to develop. While biodiversity-based production systems are destroyed monoculture has been promoted. As farmers have become dependent on the market for about all their agricultural inputs; the risks associated with crop production have drastically increased; biodiversity has become degraded; environments have been polluted; and human and animal health are under a great threat of hazards. Although the effectiveness of these technologies is still under scrutiny by various groups, it is evident that primarily these inputs are costly. Moreover, most ironically farmers are losing their own knowledge and resources. This is impossible to solve unless paradigm of high-input industrial agriculture is changed into biodiversity-based advanced production system that is increasingly recognized internationally as ecosystem approach to agriculture. The ingenuity of the biodiversity-based farming practices should be recognized and further developed on the basis of the recent advance in biological sciences. Further industrialization of the agriculture will erase what we have at present in the form of uncultivated food sources and will destroy the very fundamental base of food and life support systems.

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<sup>12</sup> Smith D, Timberlake M 2002: "Global Cities" and "Globalization" in East Asia: Empirical Realities and Conceptual Questions. University of California. Paper 02-09. <http://repositories.cdlib.org/csd/02-09>

<sup>13</sup> Winchester, P. (2000). Cyclone mitigation, resource allocation and postdisaster reconstruction in South India: lessons from two decades of research. *Disasters* 24, 18-37.

**People-centered Information Management & Surveillance System (PIMS) to monitor the climate-change induced vulnerability on Food Sovereignty and Agriculture:** Information about climate change is vital for both individuals and institutions because better information systems can greatly assist decision-making at all levels. Information is useful only if it is available, if the users have access to it, in the appropriate form and language – i.e., if it is communicated, if it circulates among the various users with appropriate facilities, if it is exchanged (Mundy and Sultan, 2001<sup>14</sup>) and a well-constructed indicator which is developed through participatory process can embed most of these characteristics, if not all. The empowerment of any group depends on its capacity to generate and use knowledge, and to share it on an equal basis with other groups (Siochru, 2001<sup>15</sup>). People-centered Information Management & Surveillance (PIMS) is an integrated system of surveillance and vulnerability analysis tool which could offer rapid detection and timely predictions of the causes and consequences of changes in climate that affect people's capacity to sustain livelihood. In PIMS acquisition; review, modification; dissemination and application of experience or knowledge, information and data are considered as an ongoing mode. PIMS aims to reduce the 'one-way' flow of information from a scientific, information-rich center to a remote information poor community through a continuous communication and information sharing process. It is possible to devise a GIS supported PIMS. However, if PIMS to be used as an effective tool for early warning, it must incorporate both quantitative and qualitative aspects of data collection, analysis and interpretation. PIMSS can offer better way of sharing information management responsibilities, more efficient use of the information and facilitate better knowledge transfer. However, if PIMS to be used as an effective tool for early warning, it must incorporate both quantitative and qualitative aspects of data collection, analysis and interpretation.

<b>Strategies for People-centered Information Management &amp; Surveillance (PIMS)</b>	
<b>Key problem</b>	<b>Strategy</b>
<i>Lack of awareness about climate change &amp; food sovereignty</i>	mass media communication, cultural activities and advocacy
<i>Lack of understanding about the context of the extent, causes and impact of climate change</i>	Participatory Action Research, Spreading information in local language with an interesting way, using examples from local context. Involvement of the influential local groups or individuals as partners in the process.
<i>Lack of understanding about how to cope with the climate change</i>	information sharing and/or discussion with people to identify solutions Provide capacity development assistance, if necessary. Follow up to maintain actions or lessons learned

**Household-focused Food-based strategies should receive more attention to cope with climate change:** People respond to any environmental changes in many ways, though their responses often primarily reflected in changes in food related behavior & consumption and health status. Therefore, any deterioration in nutritional status can be an early indicator of people's hardship to achieve food sovereignty. Home gardening enables households to consume micronutrient rich non-cereal foods more frequently, to diversify their diet and thereby to increase the quality of their diet. Vegetables and fruits are often the only affordable source of micronutrients in the family diet of poor households. The production of fruits and vegetables provides the household with direct access to important nutrients that may not be readily available or within their economic reach. Homestead food production also provides a source of income for poor women, which is used to buy other foods. Integration of animal husbandry/poultry into existing home gardening programs using locally available resources is simple to implement and cost effective.

<sup>14</sup> Mundy, P. and Sultan, J. 2001: *Information Revolutions: How information and communication management is changing the lives of rural people*. Wageningen, Netherlands: Technical Centre for Agricultural and Rural Cooperation (ACP-EC) (CTA).

<sup>15</sup> Siochrú, S. 2001: *From Knowledge Management to Knowledge Empowerment*. Paper produced as part of the IFAD/ENRAP Project (Electronic Networking for Rural Asia Pacific Project) January 2001. Dublin: Nexus.

## Conclusion

Climate change, Food Sovereignty and Agriculture encompass multidimensional policy issues of human well-being, environmental management and good governance. It is not just farmers whose livelihoods are at risk from climate change, but also those whose livelihoods depend on agricultural production such as suppliers of inputs, people who work in transporting and processing agricultural commodities, people who work as extension officers, and people who work in agricultural lending services. Consequently, any strategy to address food sovereignty & sustainable agriculture integrating climate change should consider livelihood as an integral component. Where natural and human-created disasters and conflict-recovery situations arises, food sovereignty might acts as a form of “insurance” that strengthens local recovery efforts and mitigates negative impacts. Ecosystem approach to Agriculture and Food sovereignty is needed to include in the national policies and action plans to reduce climate change vulnerability over food sovereignty.

The experience of Coastal Development Partnership (CDP) in Bangladesh has revealed that if traditional knowledge on livelihood survival mechanism, practices and innovations of a region which is vulnerable to climate change is properly mapped, many untapped livelihood options could be identified, extended and popularized as sustainable livelihood option. However, such initiative requires the collaborative effort to work with the local community, not merely providing service delivery to the targeted beneficiaries. It is essential to have climate adaptation planning in such a way that conserves and sustains the ecosystems and support the poor and ensures food for the growing population. It has to be noted that any climate change vulnerability reduction effort through food sovereignty and sustainable agriculture will directly contribute on Eradicating extreme poverty and hunger, reduction of child mortality (MDGs 1 & 4); Improving maternal health (MDG 5); Ensuring environmental sustainability (MDG 7).

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1. Executive Director of Coastal Development Partnership (CDP), IUCN CEC member for South Asia and Convener of Asia Pacific Network for Food Sovereignty (APNFS)-Bangladesh Chapter, Email: [masumcdp@yahoo.com](mailto:masumcdp@yahoo.com).
  2. Partnership Coordinator of Coastal Development Partnership (CDP) and Member Secretary of Better Coastal Livelihood Partnership (BECOLPO), Email: [cdpmahbub@yahoo.com](mailto:cdpmahbub@yahoo.com).

*Coastal Development Partnership (CDP) is human rights focused not-for-profit, and public interest serving research and advocacy organization in Bangladesh. CDP is one of the pioneer environmental activist organization for integrating multidimensional issues like livelihood, biodiversity, knowledge management, environmental governance and human rights with progressive activism towards global significance. CDP) considers her organizational role as a progressive voyage that is always in solidarity with the unprivileged & discriminated humankind. Each people-centered action of CDP through Research, Advocacy, Capacity Building and Knowledge Management either directly or indirectly aims at reducing or eliminating threat to climate change, biodiversity and ecosystem, thus to the sustainability of natural resource base for both the present and the future generations. CDP was instituted on January 01, 1997 as a coordinating secretariat for a network of NGOs trying to relieve the sufferings of the people of the waterlogged areas falling under the Coastal Embankment Project (CEP) in the southwest coastal region of Bangladesh. [www.cdpsbd.org](http://www.cdpsbd.org)*