

Climate Change Threat Agricultural production and Food Security in Bangladesh

Impact of climate change on crop production raises questions about ability to adaptation to achieve food security in Bangladesh because of the uneven allocation or distribution of resources and damages of crops due to recurrent climatic incidents of floods, drought and salinity. The children and women among the marginal people and poor are the major victims to it who are trying to adapt naturally to such impacts but vulnerability to natural disasters and limited resources hindering them to solve their problem and food security. The marginal people and poor are expected to suffer most mainly by salinity and flood in Bangladesh.

Climate change impact on Food Security

Significant alterations in climatic variables will affect food security and agricultural production through their adverse impacts on all components of local, national and global food systems. More intense and more frequent extreme weather events such as flood and droughts, increasing abnormalities in rainy season patterns and rising sea levels are already having instant impacts on food production, incidence of food emergencies, food distribution infrastructure, human health and livelihood assets and opportunities, in both urban and rural areas of Bangladesh. Impacts of gradual changes in average rainfall and temperatures are likely to be disruptive in Bangladesh, whether negative and positive, and may include:

- Degradation of ecosystem functioning and loss of biodiversity of natural habitats,
- Changes in land suitability for different varieties of crops and pasture,
- Loss of cultivable land due to associated salinity and increased aridity, rise in sea level and groundwater depletion,
- Changes in the productivity, community composition and distribution of marine resources,
- Changes in the productivity and health of forests,
- Changes in the good quality water sources for inland fish, livestock and crop production,
- Changes in the vectors and incidence of different types of diseases and pests,
- International and internal migration and
- Changes in health risks among people.

Impact of Temperature

Every crop has a minimum and maximum temperature limit for their reproductive and vegetative growth. When temperature exceeded the upper limit or falls below the range, crop production changes drastically. A study found that 1 °C increase in pick temperature at reproductive, vegetative and ripening stages decrease Aman-1 rice production by 17.28 and 53.06 tons respectively in Bangladesh. The prospect of growing potato and wheat would be severely impaired with the temperature change (by 2°C and 4°C). Production loss may exceed 50% of the achievable yields.

Impact of rainfall

Rainfall is one of the most important climatic variables for crop production. Every crop has critical stages when it requires water for their development and growth. Moreover, excessive rainfall may create water logging condition and flooding that also destroys the crop production. It was found by a study that rainfall increase in 1mm decreased the production *Aman* rice by 0.292, 0.230 and 0.036 ton respectively.

Impact of Sea Level Rise

Sea level rise affects crop production in three ways, i.e., by flooding, by increasing cyclone frequency and by salinity intrusion. Combined effects of these factors decrease crop production in the coastal zone at a large extent. Salinity intrusion caused by sea level rise will reduce agricultural production by soil degradation and unavailability of fresh water (MoEF, 2011). Salinity also reduces the germination rate and terminative energy of some plants.

In addition, sea level rise submerged many areas which are already reported by scientist. As a result, damage of yields production will be more severe in future. About 1/3 of Bangladesh is influenced by tides of the Bay of Bengal.

Impact of Flood

Flood has most harmful effect on agricultural production of Bangladesh. The flood of 1988 caused reduction of crop production by 45% (Karim et al., 1996). Prolonged floods delay *Aman* plantation, which cause significant loss of *Aman* production, as monitored during the 1998 flood. Loss of Boro2 rice crop production from flash floods has turned into a regular event in the *Haor* areas of Bangladesh over the recent years.

Impact of Cyclone

According to the Department of Agricultural Extension of Bangladesh, loss in rice production is found 1.23 million tons during the cyclone of SIDR in 2007, with 535,707 tons in four severely affected districts, 555,997 tons in 9 badly affected districts and 203,600 tons in 17 moderately affected districts in Bangladesh.

Impact of Drought

Drought mostly affects in the post-monsoon and pre-monsoon periods in Bangladesh. Bangladesh has suffered approximately 20 drought conditions during the last 50 years. The drought condition in the recent decades in North-Western Bangladesh had led to a loss of rice production of about 3.5 million tons in the 1990s. In every five years, Bangladesh is affected by big country-wide droughts. However, local droughts occur most often and affect the life cycles of crop. The agricultural drought which related to soil moisture deficiency happens at different stages of the crop growth and development. Monsoon failure often brings reduction of yield and

creates famine to the affected regions. Northwestern regions of Bangladesh are particularly vulnerable to the droughts. A severe drought can create more than 40% damage to the broadcast *Aus* (FAO, 2007).

It is clear that many pathways by which climate change will affect food availability, utilization and accessibility. Climate induced changes both manmade and natural in crop production will likely affect the income levels of the poor and marginal people as well as increase food prices and negatively affect food security in Bangladesh.

Reference

1. FAO, 2007. *Climate Variability and Change: Adaptation to Drought in Bangladesh*. Pp 66
2. Karim, Z., Hussain, S.G. and Ahmed, M., 1996. *Assessing impacts of climate variations on food grain production in Bangladesh: Water, Air, and Soil Pollution*, 92:53-62.
3. Masum, S. J. H. and Hasan M M M., 2009. *Climate Change Impact on Food Sovereignty in Bangladesh*. Retrieved 07/10/2013 from <http://www.climatefrontlines.org/sites/default/files/Climate%20Change%20impact%20on%20Food%20Sovereignty%20in%20Bangladesh.pdf>
4. MoEF, 2011. *Climate Change and Agriculture in Bangladesh: Information Brief*. Ministry of Environment and Forests, Government of the People's Republic of Bangladesh.