

Drought in Bangladesh and its adaptive measures: Part-A

Causes and Impacts of drought in Bangladesh

Drought is one of the main problems for many nations, and the severity of such issue goes big when it comes as obstacle to ensure an optimum agricultural production for a country like Bangladesh. Drought is being considered as the main cause which hampers the estimated agricultural production, here in Bangladesh over the last few decades.

Causes of drought in Bangladesh

Causes of drought are related to non-availability of surface water resources and climate variability. The direct cause of a shortage of rainfall may be because of one or more factors including large-scale downward air movement within the atmosphere or absence of available moisture in the atmosphere which suppresses rainfall. Variations in such factors involve variations in global, regional and local climate and weather. While it may be potential to indicate the direct cause of a drought event in a particular location, but it frequently is not possible to recognize an underlying cause.

Short-term episodes of drought can be related to global oceanic and atmospheric circulation features. For instance, the ENSO (El Nino/southern oscillation) phenomenon, which results from warm surface water development of the Pacific coast of the South America, influences the levels of rainfall in various areas of the earth, such as monsoon rainfall in Bangladesh. The link between rainfall and sea surface temperature has been recommended as a potential cause of long, dry regimes.

Rising levels of CO₂ and other GHGs have been recommended as causes of variations of rainfall that are characterized as climate change. There are strong evidences that climate change will change the rainfall pattern and consequently more frequent droughts are happened. Among the local-level reasons are human-induced alterations resulting from vegetation loss because of deforestation and over exploitation of resources.

Impacts of drought in Bangladesh

Every five years, Bangladesh is affected by the major country-wide droughts. However, local droughts occur regularly and affect crop production. The agricultural drought, linked to soil moisture scarcity, occurs at different stages of crop growth, development and reproduction. Monsoon failure often brings famine to the affected regions and as a result crop production reduces drastically.

Northwestern regions of Bangladesh are particularly exposed to droughts. A strong drought can cause greater than 40% damage to broadcast *aus*. During the *kharif* season, it causes significant destruction to the *t.aman* crop in approximately 2.32 million ha every year. In the *rabi* season,

about 1.2 million ha of agricultural land face droughts of different magnitudes. Apart from the agricultural loss, droughts have important effect on livestock population, land degradation, health and employment. Between 1960 and 1991, drought events occurred 19 times in Bangladesh. Very strong droughts hit the country in 1961, 1975, 1981, 1982, 1984, 1989, 1994, and 2000. Past droughts have naturally affected about 53% of the population and 47% of the country.

The associated crop production decline, lower employment opportunities and losses of assets contributed to raise household food insecurity. Consumption of food fell, along with household capability to meet food requirements on a sustainable way. Vegetables and several other pulses varieties are in short supply throughout the drought.

Droughts cause major problem in household health because its subsequent impact of decreasing food consumption leads to significant increases in illnesses. It also causes an increase in chronic energy deficiency among the agricultural workers.

Reference

Dey, N. C., M. S. Alam, A. K. Sajjan, M A. Bhuiyan, L. Ghose, Y. Ibaraki and F. Karim, 2011. Assessing Environmental and Health Impact of Drought in the Northwest Bangladesh, J. Environ. Sci. & Natural Resources, 4(2): 89-97, 2011.

Drought in Bangladesh and its adaptive measures: Part-B

Climatic extreme events and their impacts on drought-prone areas of Bangladesh

Summary of projected changes in extreme climate during the 21st century and its projected impacts on drought-prone areas of Bangladesh are given below-

Higher maximum temperature, more heat waves and hot days

- Increased incidence of illness among children, elderly, the poor
- Increased crop diseases and pest
- Increased threat of damage to both dry season and monsoon crops
- Increased energy demand and decreased energy supply reliability
- Increased heat stress and diseases in livestock

Increased summer drying and drought condition

- Decreased water resources (quality and quantity)
- Decreased crop yields
- Decreased groundwater resources because of over exploitation
- Declining surface water resources in ponds, tanks, rivers, etc.

Increased peak wind intensities and nor'westers throughout the summers

- Increased threat to human life
- Increased threat of wind-related damage
- Risk of different infectious disease epidemics

Higher minimum temperature, cold waves, and fewer cold days

- Decreased risk of destruction to many crops
- Decreased human mortality related with cold
- Increased activity of a number of diseases vectors and pest
- Increased risk to some crops such as chickpea and wheat

More intensive precipitation

- Increased soil erosion
- Increased local flood event
- Increased pressure on relief
- Increased loss of nutrients and topsoil

Increased monsoon precipitation variability

- Extended dry season and drought
- Frequent dry spells throughout the monsoon season

Increased frequency of events such as whirlwinds and hail storms

- Increased risk of damage to irrigated summer crops (*boro*)
- Wind-related damage
- Damage to different fruit trees such as jack fruit and mango

Reference

Dey, N. C., M. S. Alam, A. K. Sajjan, M A. Bhuiyan, L. Ghose, Y. Ibaraki and F. Karim, 2011. Assessing Environmental and Health Impact of Drought in the Northwest Bangladesh, J. Environ. Sci. & Natural Resources, 4(2): 89-97, 2011.

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Drought in Bangladesh and its adaptive measures: Part-C

Adaptation to Drought in Bangladesh

Anthropogenic factors and climatic conditions mutually reinforce the chronic livelihoods vulnerability of drought-prone areas in Bangladesh. Droughts strike regularly, however it is the limited local capabilities and capacities and the lack of entrance to different forms of assets which make livelihoods of people vulnerable.

To reduce increasing vulnerability to affected people, successful local adaptation should be taken and it requires multiple pathways with interrelated, well planned short and long-term measures, including:

- adjustment of existing agricultural practices – such as introduction of drought-tolerant crop varieties, adjustment of cropping patterns, better storage of fodder and seeds, dry seedbeds, alternative crop cultivation, cash crops such as jujube (*Ziziphus jujuba*) and mango;
- physical adaptive measures – for example, excavation, re-excavation of miniponds, canals, storage facilities for preserving rain water;
- strengthening local initiatives – such as self-help programs, awareness raising and capacity building for local people;
- adjusting socio-economic actions – such as market facilitation, livelihood diversification, integration of indigenous knowledge, small-scale cottage industries;
- strengthening formal institutional capacities – such as local financial institutions and disaster management committees;
- formulating strategy to catalyze development of adaptive livelihood opportunities;
- supporting better research activities– such as invention of new drought-tolerant crop varieties or improved existing crops varieties, and other adaptive and conducive technologies.
- creating advocacy and awareness on climate change.

For long-term sustainability of any type of intervention, the linkages between mainstream development and climate change adaptation need to be ensured, an enabling organizational environment must be established as well as coordination among local people, stock holders and related organization must be needed. The fundamental requirement of long-term livelihood adaptation is communication and field operations activities, coordination of agency planning, and the activities of government agencies and departments, GO agencies, NGOs and farmers.

Reference

IOP, 2009. Adaptive measures for coping with increased floods and droughts in Bangladesh, IOP Conf. Series: Earth and Environmental Science **6** (2009) 292001.