

# Combating climate change: Agenda for Bangladesh

There is no doubt that climate change is taking place and its consequential impacts are becoming visible in different forms. It is immensely important for a resource scarce country like Bangladesh to examine and understand the pattern, dynamics, scale of influence/impact of certain problems before deploying interventions.

TAHWIDUL ISLAM

CLIMATE change issues in Bangladesh are generally viewed as the way issues are perceived at global scales. The activities and action plans those are currently in progress in Bangladesh are deeply influenced by the estimates and model predictions produced by IPCC. The most recent IPCC Fourth Assessment Report (IPCC AR4, 2007) states that climate is indeed changing and mentioned that this change took place over the decades as a result of human activities.

The changes those have been taking place at regional scale or at global level have strong connections with the occurrence of natural hazards at local levels such as floods, cyclones and drought, specially in our part of the globe. Therefore, relying upon global estimates of climate change should be considered necessary and is justified. However, we also need to be aware and careful about the recent developments and confusions taking place on related issues at international forums. Especially the outcomes of Copenhagen meeting and recent emergence of misconceptions and wrongdoings in the climate change related assessments should be taken seriously by the government of Bangladesh.

It is pertinent to mention in this regard that CoP 15 meeting held in Copenhagen in December 2009 rarely brought fruits that the countries like Bangladesh wanted to see, specially in terms of endorsing firm commitments on adaptation funding. Moreover, the confusions recently turned up with model estimations at Hadley Centre (based in East Anglia University, UK) and recent removal of widely used global temperature rise Hockey Stick graph from the latest Climate Change Compendium of the UNEP made

a big knock on the accuracy of global scale assessments and appropriateness to quote in local contexts.

And lastly, recent acknowledgement of conducting mistake in sea level rise estimations by the UN Secretary General regarding glacier melt hypothesis in the Himalayan region may cause parties like Bangladesh to be more careful (please know more from Swedish Geologist and Physicist, former Chairman of the prestigious INQUA International Commission on Sea Level Change about the IPCC's errors).

We need to understand the adverse local impacts of climate change in terms of the disturbance in morphological processes, biophysical systems and on socio-economic conditions. Clear understanding about these issues, the consequences of their breakdown (i.e. the physical and social systems and processes) on human life and livelihoods would be necessary to develop future direction for Bangladesh in regards to the implementation of climate change related action plans.

We also need to be careful in developing directions for climate change adaptation and mitigation because not all the impacts are the sole results of climate change, rather different development activities as a combined effect make a community vulnerable by destabilising the physical, social, economic characteristics of the society. These overlapping phenomena and their aggregated impacts need to be discerned properly to identify what is responsible for what. This distinction will help to delve for the correct approach for tackling climate change threats.

Based on the above background, this article attempts to set certain agenda so that climate change issues could be examined as contingent to local circumstances

which could later guide to produce future directives for Bangladesh to combat the impacts.

## Understanding local context of climate change

IPCC received climatic data in estimating global temperature increase from weather stations which were able to maintain the criteria such as (i) the weather station should have been engaged in gathering weather data at least for 130 years, (ii) data should be recorded through maintaining scientific procedure. Only few weather stations from different parts of the world were able to meet those criteria, especially which were established in developing countries. No weather stations from Bangladesh qualify for those criteria. Therefore, the way IPCC model results are produced may be appropriate to ascertain climate change for global scale but may not be properly suitable for understanding local pattern of change. IPCC results also indicate that change in the climatic variables is not always linear; nor always mean increase. Therefore, it can be said that deriving straight-forward conclusion about change would be difficult, at least at local levels, without focusing on local data to understand the local pattern of change.

A study, undertaken by this author and appeared as a book, shows that summer average temperature for Sylhet has slightly increased while for Dinajpur station, the 30-year trend line shows temperature decrease. Even Bangladesh Climate Change Strategy and Action Plan (BCCSAP) expressed its concern by mentioning "...we are still uncertain about the timing and exact magnitude of the likely impacts of climate change". It is also necessary to understand the effect of sea level rise in our coastal areas within the context of our geo-physical and tectonic processes including tidal basin dynamics, dynamics of 600 million ton sediment load that our country annually receives, runoff and river morphological processes, the size of the river basin and so on before making any inference.

In this respect, there is a need to set off major research initiatives (not sporadic efforts) that may develop a likely climate change scenario based on local climatic variables and other pertinent parameters.

## Assessing factors and processes responsible for impacts

Some of the natural disasters in Bangladesh are the results of combined outcomes of many different human interventions and may be the effects of climate change. For example, all the water inundation events may not be attributed to climate change; rather unplanned development activities are sometimes responsible for flood hazards, water logging. Similarly, shrimp cultivation, withdrawal of water by the upstream neighbouring countries and sea level rise all may collectively contribute to salinity problems in the coastal areas of Bangladesh. In this respect, the different origins of certain events that have identical consequential signs (e.g. floods or water-logging) may need to identify properly so that contribution of climate change on that event could be ascertained. This distinction may help design future directives for the country to deal with major and minor factors responsible for making the communities susceptible to adversities.

## Determining achievement indicators of adaptation interventions

The National Adaptation Plan of Action (NAPA), the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) gives a long list of programmes under six thematic sectors to be implemented in order to develop capacity of the individuals, community and institutions so that they can cope with the climate change uncertainties. BCCSAP clearly demonstrates, the thrust of the strategy should be based on sustainable development, poverty reduction and increased well being of the vulnerable groups. It indicates that the strategic action plan aims to develop overall capacity of the community that is sustainable, and secure a wider impact in the society. Disaster management by enhancing community resilience is also echoed in the Hyogo Framework of Action 2005-2015 and also in the National Plan for Disaster Management 2007-2015 of Bangladesh.

However, the BCCSAP did not mention what would be the quantifiable indicators by which achievement of implementing interventions to reduce climate change impacts could be determined. It also did



Cyclones can be more devastating and frequent with change of climate.

not mention whether any Environmental Impact Assessment (EIA) or Social Impact Assessment (SIA) is required or not before deploying any adaptation interventions. In this regard, there is a need to develop indicators that will be useful to crosscheck the progress of climate change adaptation activities and put those assessment indicators in the future directions to address climate change impacts.

## Identifying appropriate mitigation options

Mitigation options are generally less prioritized in the climate change initiatives in Bangladesh since her contribution to green house gas emission is negligible although industrialized world is pointing at methane (one of major green house gases) production in the rain-fed agriculture systems in the developing countries. Despite all the arguments, Bangladesh might need to plan for several options for mitigating climate change, at least at local levels; emphasis on energy efficiency in the form of renewable energy development, large scale tree plantation projects, and appropriate urban waste management for the reduction of methane gas would be suitable as climate change mitigation.

Large scale tree plantation may help to

develop microclimatic conditions in an area by lowering temperature, instigating rainfall, helping groundwater recharge by intercepting rainwater, prevent soil erosion, act as wind breaks and so on. In addition to these direct impacts, there are many off spin benefits of vegetation coverage in an area such as, soil formation, habitat maintenance for different species and to keep biodiversity rich. These benefits, in turn, may act as the base of climate change adaptation.

There is no doubt that climate change is taking place and its consequential impacts are becoming visible in different forms. It is immensely important for a resource scarce country like Bangladesh to examine and understand the pattern, dynamics, scale of influence/impact of certain problems before deploying interventions. Impacts of the proposed interventions on environment and society also need to be scrutinized to make sure that the actions are sustainable and right for the local environment and communities. Inappropriate actions may make the situation worse or gap in understanding may deter us employing alternative actions which may be more effective to address the problem.

Tahwidul Islam (PhD) is Associate Professor, Department of Geography and Environment, Jahangirnagar University, Email: tahwidju@yahoo.com

# Alien invasive species disrupting native biodiversity

Some crops become locally extinct with increasing levels of lantana cover. Lantana interferes agricultural harvesting and reduces the economic viability of certain crops. Pet animals become ill after ingesting lantana. The dense thickets of lantana affect bird breeding by impeding flight.



The invasion of Lantana in the understorey of Madhupur National Park (photo taken by the writer in 2007)

DR. MD. MIZANUR RAHMAN

LANTANA is a native evergreen shrub to tropical America. It is now a major weed in many regions of the Palaeotropics where it invades natural and agricultural ecosystems. The plants can grow individually in clumps or as dense thickets, crowding out more desirable species. It may grow up to 6 ft high and may spread to 8 ft as a climber with the help of a support. Leaves and stems are rough, hairy and secrete an unpleasant odour like cat pee when crushed. In the tropics lantana is a non-stop bloomer. Flower colour ranges from white to yellow, orange to red, pink to rose in unlimited combinations. In addition, the flower colour usually changes with the change of age.

Its prolific all-year flowering allows rapid dispersal, and the seeds are spread fairly long distances by birds. Lantana is very easy and fast growing species adapted to most soil types. It is also very drought and salt resistant and seldom bothered by pests or disease. It needs low water content to grow and can be used in xeriscapes. It is also happy with both humid and hot weather. In temperate regions lantana is used as hedge plant, which adds vibrant long-lasting colour to the garden. The gardeners in cold climates enjoy this tropical plant as an annual shrub for its fast growing and quick flowering characters. It is invading and disrupting native plant communities in different parts of the world.

## Invasion on forest biodiversity

Our natural forests are characterised by intensive land-use and high levels of habitat destruction or fragmentation

of nearby plants.

## Invasion on agricultural biodiversity

Fodder crops, pulse crops, medicinal crops, cereals and ornamental plants are also highly susceptible to lantana invasion. Some crops become locally extinct with increasing levels of lantana cover. Lantana interferes agricultural harvesting and reduces the economic viability of certain crops. The soil has a lower capacity to absorb water in dense stands of lantana than in grass cover, increasing run-off and therefore soil erosion. Lantana leaf extracts causes inhibitory effect on germination, root and shoot elongation and development of lateral roots of major agricultural crops of Bangladesh (Ahmed et al. 2007). It affects economic viability of tea, coconut and cotton (Holm et al. 1977). Lantana harbours several serious pests of agricultural crops.

## Impacts on animals

Pet animals become ill after ingesting lantana. The dense thickets of lantana affect bird breeding by impeding flight. Its leaves and seeds contain triterpenoids, which cause poisoning of a number of animals including cattle, buffalo, sheep and goats (Sharma et al. 1988). Poisoning mainly occurs in newly introduced young animals without access to other fodder (Sharma 1994). Green fruits are poisonous to humans and can cause death. Malarial mosquitoes shelter in bushes and are the cause of serious health problem.

## Management

- Introducing desirable trees to shade out regeneration of lantana
- Gap filling by of rose trees pioneer and early successional species
- Afforestation and reforestation by native and natural species
- Facilitating natural regeneration in degraded forests
- Promoting natural succession in the degraded and denuded forests
- Stopping further clear felling and illegal logging
- Protecting natural regenerations (seedling, sapling and juvenile trees) from cutting
- Mechanical
  - Digging out lantana thickets
  - Burning of the thickets
- Chemical
  - Foliar applications of 2,4-D, MCPA, dicamba, triclopyr, Glyphosate and picloram effective on plants less than 2m tall
  - Basal application for larger plants
- Biological
  - The following insects can be used as bio-control agents: lace bug, lantana leafminer, lantana leaf beetle, lantana seed fly, leaf-chewing moth and lantana defoliator
  - The pathogenic fungi *Prospodium tuberculatum*, *Puccinia lantanæ* and *Ceratobasidium lantanæ-camaræ* can be considered for use as biological control agents

Dr. Md. Mizanur Rahman, a biodiversity specialist is Assistant Commissioner, Jhalakathi Collectorate, E-mail: mizan\_perjo@yahoo.com

# Reducing vulnerability to water-related disasters

## SAARC can play an important role

It is envisioned that the model structure of SARCOF is an applicable tool to bring the forecasters and users together in the greater GBM basin areas. Moreover, SARCOF model handles climate information (wet/dry), and flood is essentially a component of total climate system in the GBM basin systems.

DR. MD. RASHED CHOWDHURY

IN the recently concluded SAARC (the South Asian Association for Regional Cooperation) Summit in Thimphu, the SAARC leaders called for focus to be laid upon water management and conservation and development of cooperative projects at regional level in terms of exchange of best practices and knowledge, capacity building and transfer of eco-friendly technologies. Also the Convention on Cooperation on Environment aims at promoting regional cooperation in preserving the environment and mitigating the impacts of the climate change (The Daily Star, April 30). This is a promising start and I am focusing my attention on how "SAARC can play an important role in reducing vulnerability to water-related disasters".

The SAARC can undoubtedly help reduce vulnerability to water-related disasters - particularly those arising from basin-wide heavy rainfall, excessive runoff, and flooding. Several scientific findings have quantified that the stream flows of the three mighty rivers in Bangladesh are highly correlated to the rainfall in the upper catchments in India with typically a lag of about one to three months. The stream-flows in Bangladesh could be fairly estimated for one to three months in advance -- especially for the Ganges and Brahmaputra rivers -- by employing simple correlation, if rainfall data from further upper catchments in India are available on a real time and continuous basis.

Therefore, hydro-meteorological information exchange between the courtiers along the Indo-Gangetic basins is essential for developing a knowledge base for evaluating the potential implications of water resources management in the greater Ganges-Brahmaputra-Meghna (GBM) basins in South Asia.

At present, unfortunately, with reference to the sharing of information among the riparian countries, the water experts in one country had surprisingly little access to information from the other co-basin countries. Thus, some operational mechanism is needed for wider sharing of meteorological and hydrological information between the countries concerned. The SAARC can play a proactive role to foster a closer regional cooperation by forming an instrumental regional climate outlook forum to enhance the capability of exchanging water-related information in the three river basin areas. One successful example of similar regional cooperation can be quoted as the "Southern Africa Regional Climate Outlook Forum" (SARCOF). This is an

international initiative with stronger orientation to users. Some insights of SARCOF are presented in the following section:

## Consensus Forecast: An Example of the Southern Africa Regional Climate Outlook Forum (SARCOF)

The SARCOF process first operated prior to the 1997/98 wet seasons in southern Africa. The process consists of an annual programme of three meetings, with the first meeting held in September prior to the onset of the wet season. The principal participants to the Forum are delegations from the National Meteorological and Hydrological Services (NMHS) of the Southern Africa Development Community (SADC) region, which have the ultimate responsibility to disseminate the forecast product to their user communities. Within a workshop format, technical and discussion sessions are held on global and regional climate dynamics, forecast methodologies and seasonal forecast presentations.

Based on the predictions provided by each of the forecast groups for different homogeneous zones of the region, a consensus forecast is achieved through discussions among the participating climate communities. For each zone rainfall forecasts for the coming season are expressed as probabilities of occurrence of rainfall in three tercile classes, average, below average, and above average rainfall. This probabilistic product is then distributed to users. In December, a mid-season correction is held. Again,



Occurrence of flood is likely to increase under climate change impact.

through a process of consensus an assessment of the early season forecast is made. This assists in the update of Forum forecasts for the remaining main wet season period.

Finally a post-season meeting is held in April or May in which extensive validation of the Forum product is conducted and the process is debated within the context of user feedback. This allows the aims and methods of the process to be related directly to the requirements of a range of users. An important component of the process is the capacity building exercises in which training on climate science and seasonal forecasting methodologies is provided by international and national experts through technical sessions at the Forum meetings.

Although initially experimental, the SARCOF process is continuing each year and has been adopted worldwide as a model for seasonal forecasting. Regional Climate Outlook Fora are currently operating for other regions including south and central America, small island countries in Pacific (Pacific Regional Integrated Science and Assessment), and other parts of Africa and South-east Asia.

It is envisioned that the model structure of SARCOF is an applicable tool to bring the forecasters and users together in the greater GBM basin areas. Moreover, SARCOF model handles climate information (wet/dry), and flood is essentially a component of total climate system in the GBM basin systems (e.g., here in Bangladesh the focus is on the combined effect of rainfall and run-off). Additionally, the socio-economic setting in the SAARC countries is presumably agrarian; this also makes South Asia a potential candidate region that can benefit from the experience of SARCOF model.

Dr. Rashed Chowdhury is the Principal Research Scientist of the Pacific ENSO Applications Climate Center at the University of Hawaii (USA). He is primarily responsible for developing ENSO-based climate forecasts for the small island countries in the U.S.-affiliated Pacific islands. (Email: rashed@hawaii.edu).