

BANGLADESH COUNTRY PAPER

Mahfuzul Huq
Chairman, SRAVAN
(Society for Relief Avoidance and Vigilance Against Natural Disaster)

Summary

Bangladesh IGBP, "SRAVAN", and many other research organizations have chosen their environmental research projects so that while relating to the core projects of IGBP, they lead to significant socio-economic benefits. The environmental disasters that have become almost annual events in Bangladesh are floods, cyclones, land erosion, deforestation etc., all of which, it is feared, will be greatly enhanced by global warming and sea level rise (SLR). The importance of SLR has been focused by a recent seminar (IOC - UNEP) on SLR held in Dhaka and the formation of an International Task Force.

The projects briefly described below fall roughly under the categories of IGAC, JGOFS & LOICZ. The projects dealing with possible mitigation of SLR, cyclones and floods are classified separately and have been reported in the recent IOC - UNEP conference of SLR, held in Dhaka. Some emphasis has also been given on cost effective large scale afforestation methodologies, because of its effectiveness as carbon sink while providing a means of significant socio-economic benefit for Bangladesh.

Last but not the least, some methodologies are given for effective joint research, both regionally and globally. The cost effectiveness of all the projects has been emphasized.

Projects Related to Sea-Level Rise Carbon Transport and Cyclones in Bay of Bengal

Submitted by: Dr. Mahfuzul Huq, Chairman, Sraavan

The Projects(I)-(IV) briefly described below, discusses some methodologies for the mitigation of Sea-Level Rise (SLR), cyclones, carbon transport and greenhouse warming of the Bay of Bengal.

These particular projects are based on the following scientific assumptions:

- (a) The transient SLR of the Bay of Bengal during the monsoon is greatly enhanced due to the large run-off from the Ganges-Brahmaputra-Meghna Basin.
- (b) The thermal expansion due to greenhouse effect is directly proportional to the local greenhouse gas concentration in the atmosphere directly above the Bay of Bengal.
- (c) The efficiency of Bay of Bengal as a carbon sink will depend on the relative pCO_2 of the ocean-atmosphere interface, which again will be dependent on the carbon transport into the Bay of Bengal, as well as the local CO_2 atmospheric load.

Therefore the following mitigation methodologies should have significant transient effect on the SLR in the Bay of Bengal during monsoons.

Project (i) Reduction of Surface-Run-Off During Monsoon By Upper Catchment Conservancy and Dense Afforestation

It has been estimated that as much as 150 million cubic hectometer of water can be stored by dams in the Himalayan upper catchment of Ganges & Brahmaputra, situated in Nepal, India, Bhutan & China. Annual run-off can be reduced by as much as 50 million cubic hectometer. Most of this will be during the monsoon, thereby reducing significantly the transient sea-level rise near the Meghna Estuary, as well as mitigating floods.

Project (II) Salinity Stratification on bay of Bengal "Solar Pond Effect"

The heavy fresh water run-off over a relatively short period during the peak of the monsoon should create the condition for the formation of a stable water mass of lower salinity at the surface of the ocean which would give rise to "Solar Pond Effect" for the layers of higher salinity below, creating condition for storage of solar energy of a long period of time. Large turbulent kinetic energy in the form of cyclones or upwelling will release the stored energy for creating a large thermal flux at the surface, which could contribute towards intensification and development of tropical cyclone.

Some evidence of such "multiple salinity-strata" has already been found. Further study both in the field and with satellite data will help correlate the stratification with surface-run-off and possibly lead to mitigation measures.

Project (III) Bio-Digestion of Organic Wastes as a pollution Control Measure and its effect on Organic Carbon and pathogen Transport to the Bay of Bengal

Apart from reducing atmospheric methane load, bio-digestion would also lead to reduction of discharge of organic carbon and pathogens into the surface water, thereby reducing the transport of organic carbon and pathogens to the coastal ocean. Excessive carbon transport over short periods (i.e. during monsoon), coupled with shallow stratification may significantly alter the pCO_2 of the ocean surface water, affecting the CO_2 absorption capacity. Some field data coupled with estimation of organic waste and some theoretical modelling may suffice for this project.

Project (IV) Maximization and Quantification of carbon Fixation by Dense Afforestation

The purpose of the experiment would be to establish the maximum possible biomass production i.e. carbon fixation per unit area of land, for various species of fast-growing trees under different management methodologies by dense afforestation. Carbon fixation will allow Bangladesh to be a candidate for providing additional global carbon sink which is one of the major aims of the Rio conference. Many other environmental and socio-economic benefits will also be studied. This will also lead to local reduction of atmospheric carbon load.

Projects Related to IGAC and Greenhouse Gas Limitation

The projects briefly described below relate to mitigation of the greenhouse effect, including limitation of greenhouse gas emissions. It should be noted that some of the projects above (III & IV) also fall under the same category.

Project (V) Methane Emanation from paddy fields and wetlands and mitigation measures

This project follows the core-project of IGBP, with additional elements of wetland methane emanation and methodologies for possible mitigation by:

- (a) Rice-algae-fish cultivation in paddy fields.
- (b) Algae-fish cultivation in wetlands.

Project (VI) Dense Afforestation (Plantation) as a Possible Measure for Control of River-Bank Erosion and Flood

Dense afforestation is a new concept which allows plantation of certain fast-growing species (i.e. Ipil Ipil) in such a high density that it forms almost a "Green Wall" above ground and strong erosion-resisting mesh of roots below ground. Some pilot studies may be carried out in areas prone to river-bank erosion and flooding.

Proposed Projects for Co-Operative Research on Global Change and Sustainable Development

It goes without saying that IGBP itself is a set-up for co-operative research on Global Change. But it has been our experience that future strengthening of co-operative research has become necessary on sub-regional (like Bangladesh & India), regional (like Asia-Pacific) and global scales. I would like to suggest several projects which would be far-more effective if carried out on a co-operative basis in the Asia-Pacific, with, no doubt, Japan providing a leading role.

The co-operation proposed is not only for carrying out the research within the IGBP scientific agenda, but to widen the scope to include socio-econo-demographic aspects so that "Earth Science" in its truest sense might evolve. It is also necessary not just to monitor the "Global Change" with extensive data, but also to actively look for mitigation methodologies.

At the risk of sounding very "commercially minded" I would venture to say that economic benefits, both direct and indirect must not only be highlighted but efforts must be made to discover new areas of economic pay back and cross-sectoral benefits, so that private sector should start getting more and more convinced investing for "The Future of Mankind".

Projects (II) and (V) are suggested for Cooperative Research