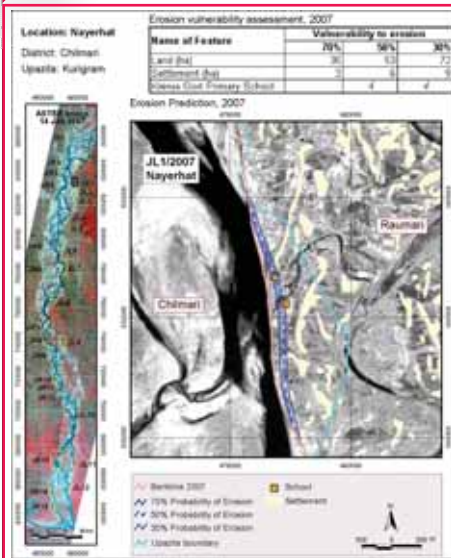


Issue 10
July 2007

the CEGIS

NEWSLETTER

Bi-annual bulletin of the
Center for Environmental and
Geographic Information Services (CEGIS)



Erosion vulnerable location along the Jamuna River (see page 7)

Inside

- ❑ Seminar on Sustainable Groundwater Resources Management for Mega Cities
- ❑ CEGIS participates in World Environment Day 2007
- ❑ Integrated research can help cut irrigation cost
- ❑ SIMS for monitoring the salt iodization process in Bangladesh
- ❑ Flood prediction to warn communities
- ❑ Satellite Images Processed by CEGIS
- ❑ CEGIS predicts bank erosion for 2007
- ❑ Framework for Environmental Sustainability



Center for Environmental and
Geographic Information Services

House 6, Road 23/C, Gulshan-1, Dhaka-1212,
Bangladesh

Phone: 8817648-52, 8821570-1

Fax: 880-2-8855935, 8823128

Email: cegis@cegisbd.com, Web: www.cegisbd.com

Seminar held with a call for 'Erosion Prediction for Poverty Reduction'



The Chief Guest of the seminar (seated in the middle) was Major General Dr. A S M Matur Rahman (Rtd), Hon'ble Advisor, Ministry of Water Resources, Ministry of Health and Family Welfare and Ministry of Religious Affairs, Government of the People's Republic of Bangladesh. The Special Guests of the seminar were Mr. Syed Mohammad Zobaer, Secretary of the Ministry of Water Resources (second from left) and Ms. Barbara Richardson, High Commissioner of Canada to Bangladesh (extreme left). Mr. HS Mozaddad Faruque, Director General of Bangladesh Water Development Board (second from right) chaired the inaugural session and Mr. Giasuddin Ahmed Choudhury, Executive Director CEGIS (extreme right) presented the keynote.

CEGIS held a dissemination seminar on "Erosion Monitoring and Prediction of the Jamuna, the Ganges and the Padma Rivers of Bangladesh" on 22 April 2007. The seminar was organized under the Environmental Monitoring Information network Project for Water Resources (EMIN) and Jamuna Meghna River Erosion Mitigation Project (JMREMP) of the Ministry of Water Resources. The slogan of the seminar was "Erosion Prediction for Poverty Reduction".

The seminar keynote illustrated the severity of land erosion over time along the Jamuna, the Ganges and the Padma respectively. This was followed by presentations made at the technical session, chaired by Mr. Kazi Golam Mustofa, Director General, Water Resources Planning Organization.

Cont'd overleaf...

The Ambassador of The Netherlands visits CEGIS

His Excellency the Ambassador of The Netherlands to Bangladesh, Mr. Kees Beemsterboer visited the CEGIS office on 26th February. He was accompanied by Mr. N. Niels Veenis, First Secretary, Water Sector.



During the visit, the Executive Director, CEGIS, Mr. Giasuddin Ahmed Choudhury, gave a briefing on the past and current activities of CEGIS. Afterwards, H.E. the Ambassador was given a tour of the CEGIS premises.

The Ambassador looking at a 50-year old map of Dhaka city. Also seen in the photo, Mr. Giasuddin Ahmed Chowdhury, Executive Director CEGIS and Mr. Sultan Ahmed.

Various CEGIS professionals presented their work in diverse fields such as river morphology and predictions, spatial databases (e.g. NWRD, ICRD, SOLARIS), impacts of climate change induced sea level rise and community based flood information dissemination.

Cont'd overleaf...

Professor M Fazlul Bari, Head, DWRE, BUET made a presentation on "Long-term erosion Process of the Jamuna River". Mr. Maminul Haque Sarkar, Head, Morphology Division, CEGIS gave a description of the severity of erosion and its technical background. Mr. Knut Oberhagemann, Team Leader, JMREMP, BWDB explained the uses of erosion prediction for riverbank management.

The seminar thus disseminated CEGIS' findings drawn from the methods it has developed for predicting bank erosion and morphological changes of the Jamuna, the Ganges and the Padma rivers. The prediction is based on dry season satellite images. The seminar keynote illustrated that during the last 34 years (1973-2007) 88,780 ha, 27,990 ha and 38,510 ha of land have been eroded along the Jamuna, the Ganges and the Padma respectively.

Just in 2006 as much as 1,140 ha of land, 140 ha of settlement, 635m of embankment, 2,200m of road, nine educational institutions and 3 market places were completely eroded away by the Jamuna. In the same year, the Ganges engulfed 600 ha of land, 90 ha of settlement and 250m of road while the Padma took 460 ha of land, 120 ha of settlement and 3480m of road. CEGIS' predictions for 2007 indicate that 1380 ha of land, 220 ha of settlement, 3360m of embankment, 5160m of road, 4 educational institutions and 2 market places will be eroded by the Jamuna. The Ganges will be responsible for the erosion of 720 ha of land, 55 ha of settlement and 570m of road while the Padma will engulf 660 ha of land, 150 ha of settlement, 3930m of road, nine educational institutions, five market places and one union office. The predictions made by CEGIS help different organizations take necessary measures for maintaining existing bank protection structures and plan new ones. This leads to the reduction of erosion related suffering and consequent poverty of the community.

cont'd....'The Ambassador of The Netherlands visits CEGIS'

H.E. the Ambassador appreciated CEGIS' work . He highlighted the strong ties that CEGIS has with the Government of The Netherlands, as this independent Trust had originated from a development project of the GoB that was funded by the Dutch from 1995 to 2002.

Mr. Niels Veenis also commended CEGIS' work and appreciated the fact that CEGIS sees itself as a service provider and is developing and maintaining its human resources accordingly. He said that hereon the Royal Netherlands Embassy will be represented at meetings of the CEGIS Board of Trustees.

Seminar on Sustainable Groundwater Resources Management for Mega Cities

- Mohammed Hossain

A seminar titled "Sustainable Groundwater Resources Management for Mega Cities" was held at the CEGIS seminar room on 16th May 2007. It was jointly organized by CEGIS and Waterloo University, Ontario, Canada.

The first presentation of the seminar, which was on the physical hydrogeological perspective of groundwater development, was given by Dr. Muin Husain, Adjunct Professor at the Department of Earth Sciences, Waterloo University. Dr. Shaun Frape, a Senior Professor at Waterloo University explained with some case studies how isotopes and geochemical tracers can be used in managing groundwater resources.

Mr. Mohammed Hossain, Groundwater Expert of CEGIS talked about the dependence upon groundwater throughout the world and specifically for Dhaka city water supply. He enumerated the present situation of city groundwater and how it has been impacted as a result of the expansion of the city leading to increased abstraction. He also pointed out that for a sustainable groundwater resource management plan it is important to ensure the integration of multi-tasks, multi-users, and programs of different relevant development agencies. It was also mentioned that in any groundwater plan, the three main aspects of groundwater: the Physical, Geochemical and Contaminant, must be considered.

The seminar was attended by a number of relevant professionals from WARPO, BWDB, DWASA, DPHE, CEGIS, IWM, CGC, BUET, Dhaka University, Jahangirnagar University, JICA and World Bank.



Mr. Giasuddin Ahmed Choudhury, Executive Director of CEGIS giving his welcome speech. Also seen in picture (from extreme right), Dr. Shaun Frape, Waterloo University, Special Guest Mr. Jalal Uddin Abdul Hye, Chief Engineer, Hydrology, BWDB, Chief Guest Mr. Kazi Golam Mustofa, Director General, WARPO, and the Chair of the seminar Mr. S M Ihtishamul Huq, Superintending Engineer, Groundwater Circle, DPHE.

CEGIS participates in World Environment Day 2007



Braving a driving rain on the World Environment Day, CEGIS joined the other organizations in a rally to mark the day.



Festoons from CEGIS and other participating organizations were displayed outside the Osmani Memorial to mark the World Environment Day.



CEGIS banner carrying World Environment Day slogan for 2007 'Melting Ice-A Hot Topic?'



The CEGIS stall at the fair organized by the Department of Environment (DoE), Ministry of Environment and Forest.



Ms. Anjuman Ara Baby receiving the World Environment Day Certificate on behalf of CEGIS. Also seen in photo (from left) Dr. Mahfuzul Haque, Chief Controller of Insurance, Ministry of Commerce, Mr A.H.M. Rezaul Kabir ndc, Secretary in charge, Ministry of Environment and Forests (MoEF), and Dr. Khandaker Rashedul Haque, Director General, Department of Environment, MoEF



Seen in photo: Hon'ble Advisor C.S Karim, Ministry of Environment and Forest.

Integrated research can help cut irrigation cost

- Abu Mohammed Ibrahim

The Director General of the Bangladesh Rice Research Institute (BRI) Dr. Nur-E-Elahi called for a concerted effort between research organizations to reduce the cost of irrigation by taking appropriate technologies to the doorsteps of farmers.

He made this call as Chief Guest while addressing a joint research review meeting of BRI and CEGIS. The meeting, which was on the techniques of water saving and the Drought Assessment framework (DRAS) model, was held on 16th May 2007 at the Conference room of BRI in Gazipur.

Four research papers were presented at the meeting by Abu Md. Ibrahim, Soil and Agricultural Expert, CEGIS; Dr. M. A. Sattar, Chief Scientific Officer, BRI; Md. Maniruzzaman, Senior Scientific Officer, BRI; and Md. Abdur Rashid, Agriculture Engineer, CEGIS. These research papers revealed that about 30 to 40 percent of irrigation cost could be reduced by utilizing the DRAS model and also by using BRI technologies. The technical session of the review meeting was chaired by Mujibul Haq, Environmental Expert, CEGIS. The meeting was followed by a visit to the experimental field where validation is being done of the DRAS model for Boro crop.

More than 50 specialists and officials from the Bangladesh Agricultural Research Institute, the Bangladesh Water Development Board, the Water Resources Planning Organization, the Soil Resources Development Institute, BRI and CEGIS attended the meeting.



Review meeting between BRI and CEGIS on the performance of the DRAS model

GSIS for monitoring the salt iodization process in Bangladesh

- Motaleb Hossain Sarker

CEGIS has recently developed a monitoring system titled "GIS based Salt Industries Information System (GSIS)" in order to assist the Bangladesh Small and Cottage Industries Corporation (BSCIC) improve the condition of iodine deficiency of the people of Bangladesh. Iodine is an essential element required by the thyroid hormone that controls cellular metabolism, neuromuscular tissue growth and development. Lack of iodine causes intellectual impairment as well as goiter. Micronutrient Initiative (MI) of Canada has been funding BSCIC's efforts to address the iodine deficiency problem in Bangladesh.

CEGIS conducted a study to develop the monitoring system. Information was collected from 292 salt industries, 751 salt ghonas (cluster of salt beds) and more than 166 wholesalers. Data from all the three levels were analyzed and compiled into a GIS based system, which can be accessed interactively on the Internet with web browsers.

For assessing the situation of salt industries and the salt iodization process, information was collected on:

- Annual crude salt production and transportation process;
- Salt industry status, industrial production, iodization plants, quality control and iodine level monitoring process, and pricing of processed salt;
- Average sales, iodine monitoring status, transportation process of wholesale salt etc.

Among other findings, the study reveals that most of the salt beds are situated in the Cox's Bazaar region where 57% of the farmers produce black crude salt and 43% produce polythene crude salt. 54% of the salt industries in the country produce iodized salt while 40% produce industrial salt and only 6% produce non-iodized salt. This is the kind of recent information that is contained in the monitoring system SIMS, including maps, photographs and other information.

SIMS is thus expected to be very effective for spatial planning and monitoring of the salt iodization process in Bangladesh.



Photograph of the transportation process of salt from salt bed to factory



GSIS Web Page

Flood prediction to warn communities

- Pia Afreena Khaleda Huq

High floods and cyclones are very frequent water related disasters in Bangladesh. It is proven that early warning of flood to potential affected communities and infrastructure managers could save lives and property.

A project named Community Flood Information System (CFIS) funded by USAID took an initiative to develop a community based flood information system in a study area of 366 sq km in Daulatpur and Nagarpur Thana of Manikganj and Tangail districts, respectively to provide early warning to the community in an understandable manner. Another project named Environmental Monitoring Information Network (EMIN) joined CFIS to develop and implement the dissemination network for the local community through SMS, bulletin boards, flags etc. These projects involved the community in the entire process of development of flood warning dissemination from 2003 and were successfully implemented in 2004, 2005 and 2006.

Though the EMIN project ended in April 2007 and CFIS will continue for one more year as community demand for flood warning remaining high in the study area. Keeping this situation in mind, this year CEGIS has taken up the task of disseminations early flood warning to the community with its own resources in the same study area under the banner of Community Hazard Early Warning System (CHEWS).

The flow of the Jamuna River on the west and the Dhaleswari River on the east mainly contribute to the inundation of the study area through the internal stream network. FFWC predicts flood with a lead time of 24 hr, 48 hr and 72 hrs based upon the water levels at station 49 (Jamuna) and station 50.6 (Aricha).

The USAID funded study on CFIS intends to reduce flood risk to the community by providing flood warning with a lead-time of 48 hours through an understandable and useful information package. Two field offices have been established; one in Nagarpur and the other in Daulatpur Upazila in order to train and monitor the recipients of the flood warning messages at upazila, union, mauza and household levels.

Under the study a model named WATSURF was developed. The model uses the predicted water levels of the above mentioned water level stations of FFWC. The model generates the study area flooding and sends flood warning messages to the communities. The messages are sent to four levels:

- ❑ District level - information from the District Gauge Station Water Level situation is sent for sharing by all relevant governmental agencies.
- ❑ Upazila level - information from the Upazila Gauge Station Water Level situation is sent along with a flood map.
- ❑ Union level - bulletins displaying mauza and union wise flood warning are sent through SMS to some selected operators in unions. The bulletins are used by UP officials, members and chairmen and by DMC members.
- ❑ Community level - flags are hoisted at selected places (rural markets, schools, offices) in each mauza that indicate changes in the water level of those mauzas. The flag messages are sent to the flag operators through SMS. Leaflets (Figure 2) have been distributed to the communities describing the flags, their color and number. CEGIS plans to send SMS to households in Jiyonpur and Duptior for 100% mauza coverage.

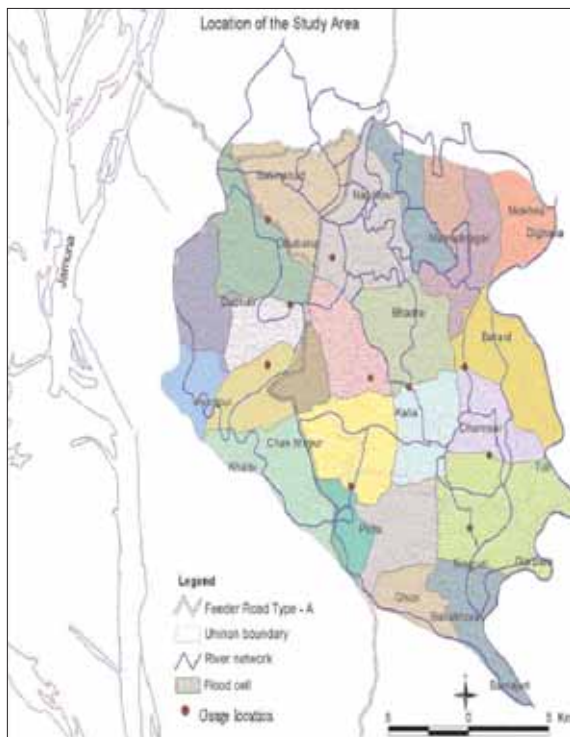


Figure 1: The study area at a glance

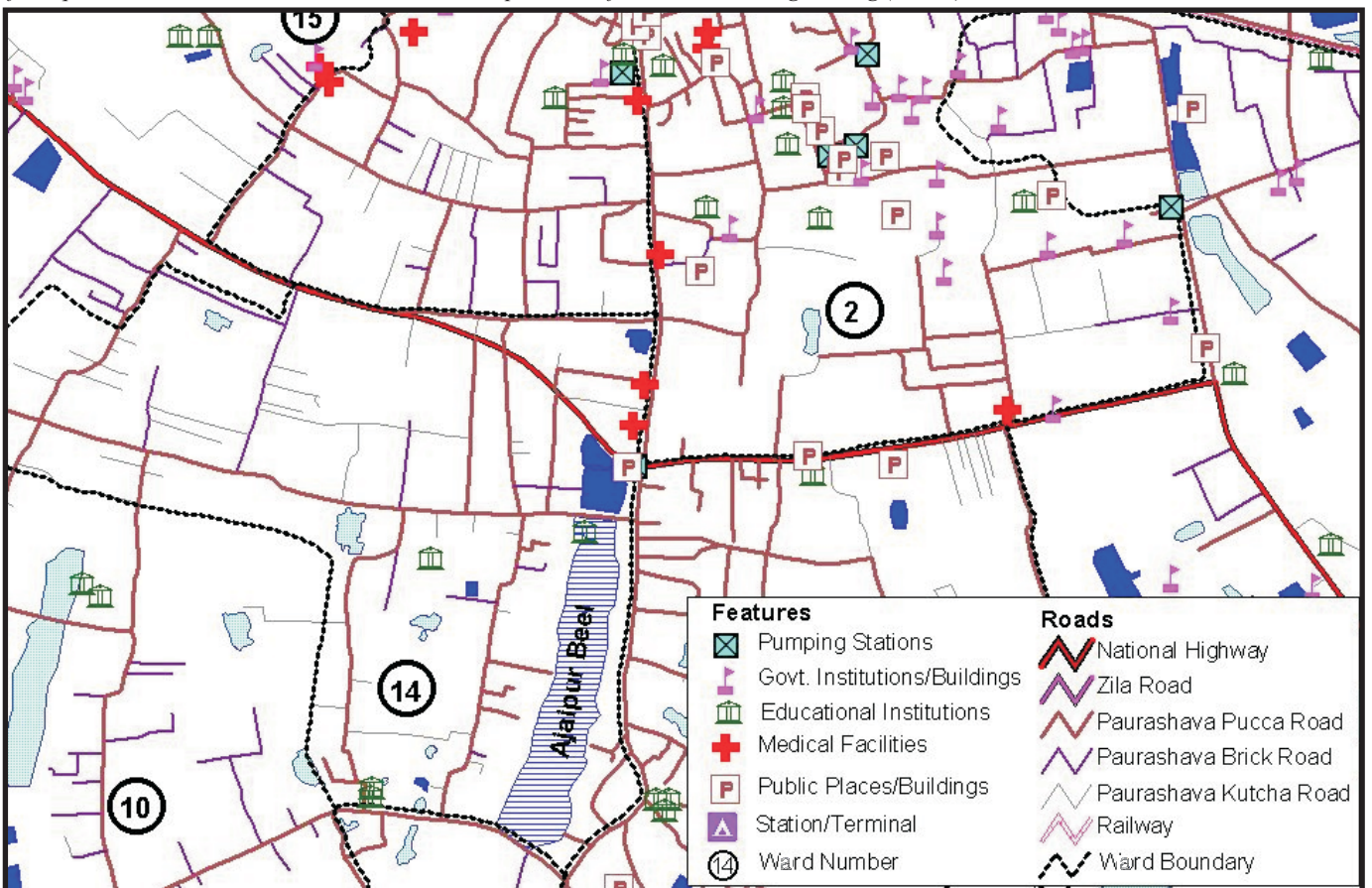


Figure 2: Leaflet for distribution.

Satellite images processed by CEGIS



High resolution QuickBird pan-sharpened satellite image of 19 Feb 2006 of a part of Chapai-Nawabganj Municipality, which was processed for Aqua Consultant and Associates Limited and Department of Public Health Engineering (DPHE).



Map of Chapai-Nawabganj Municipality prepared using satellite image and field survey data.

CEGIS predicts bank erosion for 2007

- Most Nazneen Aktar

This year like other years, CEGIS has predicted bank erosion for the entire Jamuna River. It has also predicted erosion for the Ganges and the Padma. Bank erosion prediction for the Jamuna has been made under the framework of WARPO's EMIN project and that of the Ganges and the Padma under BWDB's JMREM project.

Prediction has been made for a total of 45 vulnerable locations, among which 28 locations are along the Jamuna, 10 locations are along the Ganges and 7 locations are along the Padma River. Of these three major rivers, the Jamuna is the most dynamic. Therefore more than one-year ahead prediction of erosion for the Jamuna is still difficult. This is why prediction has been made one year ahead for the Jamuna and one and two years ahead for the Ganges and the Padma River respectively.

Erosion prediction has been made along with vulnerability assessment. Vulnerability of land, embankments, roads, settlements and different establishments like schools, colleges, madrasas, haat-bazaars, health centers, government offices etc. has been assessed.

A total of eight districts are threatened by bank erosion along both banks of the Jamuna this year. Around 1,400 ha of land and 220 ha of settlement are vulnerable in these locations. Around 3.5 km of embankment, 5 km of road, 26 educational institutions, 4 haat-bazaars, 3 union council offices, 3 government offices and 4 health centers are vulnerable along the Jamuna this year.

Around 720 ha of land, 55 ha of settlement and 570 m of road are vulnerable in five districts along the Ganges this year. Since CEGIS has no base information except for roads and settlements along the Ganges, vulnerability assessment of other different infrastructures along this river is not possible for this year.

Along the Padma River, around 660 ha of land, 150 ha of settlement, 4 km of road, 9 educational institutions, 5 haat-bazaars and one Union Council office are under the threat of bank erosion this year.

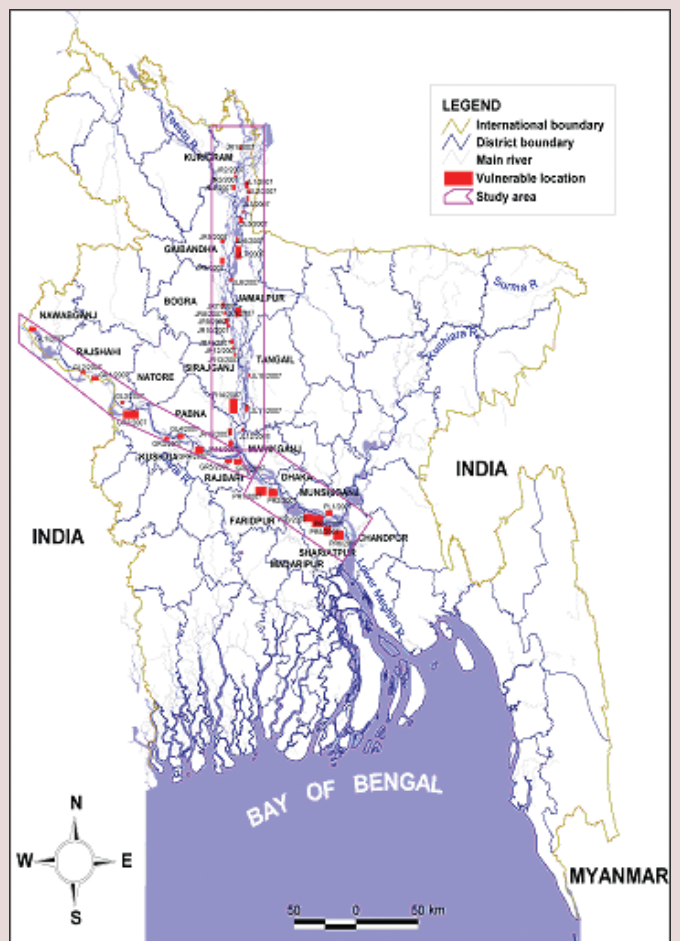
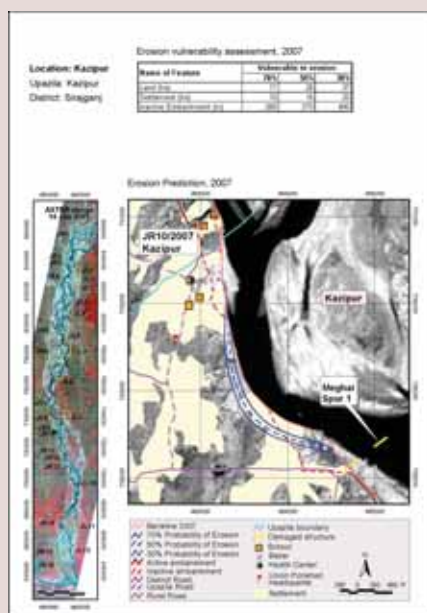


Figure 3: Map of erosion vulnerable locations along the major rivers of Bangladesh



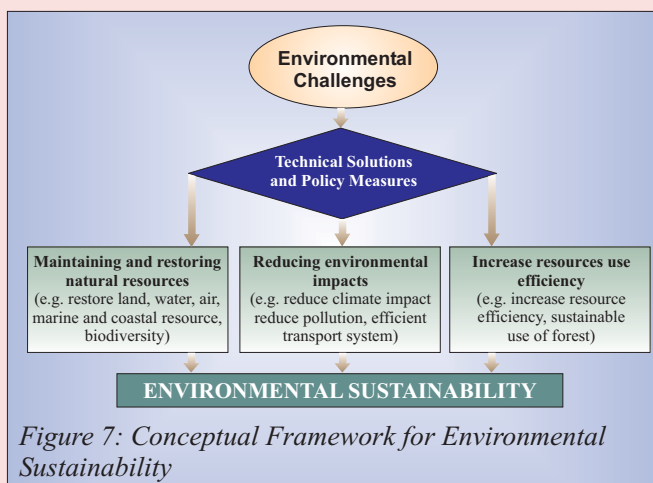
Framework for Environmental Sustainability

- Ahmadul Hassan

Human beings are engaged in different activities for their livelihoods. They use natural resources to find better ways of living. Consequently, the natural system is being disturbed. Human interference with the natural system in the guise of development activities is considered as the prime cause of environmental degradation. There are technical and policy measures in place now to protect the environment, but not many are successful. The increasing rate of environmental degradation must be mitigated with the existing knowledge base. For instance, in order to control industrial pollution modern technology with low emission must be used. Laws need to be enforced more strongly that prohibit people from using highly polluting equipment. In short, an environmental framework for sustainable development is needed.

Environmental sustainability is essential for delivering economic and social benefits, creating business opportunities and new jobs and a better way of addressing environmental challenges.

Environmental sustainability should consist of three aspects: maintaining and restoring natural resources, reducing environmental impacts and increasing efficiency in resource use that could be achieved through technical and policy measures (Fig. 7).



Resource availability and renewal / regeneration of resources can ensure the base of environmental sustainability. If the rate of regeneration of resource equals the rate of exploitation, sustainable use of that resource can be ensured. Otherwise sustainability would be a matter of available technology, time and human resources.

For example, water resources could be restored through technical and policy measures such as water pollution

control policies, water treatment plants, limited use of water bodies, etc. The natural pollution assimilating capacity of water bodies can be enhanced through limiting use of the water. Consequently, fresh water can be regenerated and aquatic ecosystem will be benefited.

Since most of the resources are non-renewable and have limited stock, resource use efficiency is imperative for sustainability. Especially energy resources, like oil, gas, coal, are crucial for man's existence. Forest resources are depleting in an alarming rate causing loss of biodiversity and biomass energy and destruction of natural habitats. So optimum and sustainable use of natural resources is essential for the very continuation of human civilization and for the sake of present and future generations.

Environmental Sustainability of the Buriganga River: a case study

The Buriganga is an old channel of the Ganges River. Its total length is 17km and its average width around Dhaka city is nearly 500m. In recent times however, this portion of the river has silted up during the lean period. Its waters are severely polluted by industrial wastes; sewages and solid wastes which are directly disposed in the river. Once the main artery of communication, it has now been virtually reduced to a narrow canal. Its width has been considerably reduced by illegal occupants and constructions.

A conceptual framework has been developed by CEGIS to restore environmental quality of Buriganga river. In the framework, the goal is to revive the Buriganga and enable it to continue its support to the ecosystem and human lives. The first phase is the assessment of requirement to restore services that can be provided by the river. The first phase consists of two specific objectives: 1) make water usable and 2) facilitate navigation. To evaluate these two objectives, certain criteria for each objective are chosen: "support aquatic life" (e.g. $DO > 4-6 \text{ mg/l}$) and "support reactions/swimming" (e.g. $BOD \leq 3 \text{ mg/l}$) for the first objective, and "required depth for navigation" (e.g. water depth $> 4.0 \text{ m}$) for the second objective. For these criteria there are some indicators such as BOD, DO, pH, depth, etc.

The second phase is the assessment and the application of technical and policy measures to restore the Buriganga River. Specific technical and policy measure should be identified and applied to bring the service of the Buriganga to an acceptable level for the long run. River excavation, increasing fresh water flow and proper waste disposal system can improve the services of the Buriganga.

Editorial Board:

Sultan Ahmed
Nityananda Chakravorty
Ahmadul Hassan
Iffat Huque
Malik Fida Abdullah Khan

Editor:

Asifa Rahman

Design and Layout:

Sayeefur Rahman Rizvi