



THE EGIS NEWSLETTER

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The 2000 floods experienced by the southwest region of Bangladesh were closely monitored by EGIS to provide information on flood extent and damages. A flood damage assessment map was produced using RADARSAT images taken over a period of one month. The map, useful in cross checking field data, was disseminated to various ministries, donor agencies, and technical organizations.



Editorial

The Environment GIS Project for Water Sector Planning (EGIS) is happy to be able to bring out the first issue of its newsletter. This marks an auspicious time for the project when it is preparing itself for the transition to an organization as the Center for Environment and Geographical Information Services (CEGIS). The aim of this bi-annual newsletter is to bring its readers news regarding developments in the environment and water management field, particularly in relation to EGIS activities. It would also provide updates on the various collaborative efforts between EGIS and its partner organizations. Being the first issue, it is only fitting that a brief introduction of EGIS is included, with a description of how the transition from project to organization has been planned.

This long planned for newsletter is being brought out close on the heels of the important seminar on Integrated Water Resources Management, organized by EGIS in November 2000, that reiterated among other things the need for information sharing between stakeholders. It is hoped that the newsletter will succeed in serving as an effective source of information of EGIS involvement in the environment and water sector of Bangladesh.



From Project to Organization: EGIS to CEGIS

EGIS is an initiative of the Ministry of Water Resources, and is funded by the Government of the Netherlands. The project is a legacy of the Flood Action Plan (FAP 16 and 19). The first phase, EGIS-I, covered a period of 18 months (September 1995 to February 1997), and its second phase, EGIS-II, started in March 1997, will culminate into a Center for Environmental and Geographic Information Services (CEGIS) to institutionalize the extensive and advanced knowledge and experience accumulated.

Today, EGIS has a reputation of having a capacity for integrated studies based on an excellent set up for Geographical Information System (GIS) facilities. It is recognized as one of the few sources in Bangladesh that have extensive expertise in Remote Sensing (RS), and in building large spatial databases. Its two areas of core competence are integrated environmental studies, and geo-information tools to support natural resources planning.

The opportunity to set up a sustainable, long-term entity exists due to the increasing donor interest in water and environment management, as well as the Government's decision to shift its focus from flood management and project implementation to integrated management and planning. Continuing in EGIS footsteps, the Center would assist the Water Resources Planning Organization (WARPO) in its mandate for macro-level water sector planning and in setting up the National Water Resources Database (NWRD). It would also have the mandate to provide research, training and advisory services to clients, as well as serve as a source of environmental information, management and analysis expertise, and dissemination.

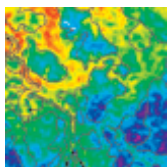
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EGIS does not focus exclusively on hydrology-engineering but takes on a more comprehensive inter-disciplinary approach that addresses the needs of agriculture, fisheries, transportation and environment. It is a service organization that has the important task of bringing advanced technologies to Bangladesh and developing application tools. It is also an organization that is aware of local realities, interacting with clients (which include WARPO, other GoB agencies and various private sector organizations), donors, policy makers and the public in order to avoid the danger of recommending technical options that are not feasible from the socio-economic and institutional points of view.

The most notable of EGIS' strengths is its multidisciplinary group of highly qualified scientists and technical professionals who are skilled in conducting integrated studies of water related problems. Its systematic approach to work, good ties with institutions within and outside the country and easy access to expertise from the Netherlands and other countries, all make for the perfect basis to transform the project to an organization.

The transition from project to an independent organization is a highly sensitive process, requiring continuous strong commitment by both the governments of Bangladesh and the Netherlands. The remaining period of the project will show whether the new independent organization could win a permanent place for itself on the institutional map of Bangladesh.



Research & Development in EGIS

The objective of R&D activities in EGIS is to produce high quality output through capacity development of professionals working in the organization. The four major categories of activities in the R&D plan are: integrated analysis and assessment, natural system monitoring and analysis, database and information technology, and spatial analysis. The following is a brief description of the activities:

Integrated analysis and assessments:

Projects include Framework Development, Integrated Environmental Management (IEM) and Blue Accounting Assessment.

Natural Systems monitoring and analysis:

Projects include Environmental Monitoring Information Network (EMIN), Floodplain Research Project, Flood Vulnerability Study, Quality Approach, and Local Initiatives in Water Management.

Database and information technology:

Projects include GCP Data Bank and some other projects related to the preparation of need-based maps.

Spatial analysis:

Projects include STREAM Instrument (Spatial Tool for River Basins and Environment and Analysis of Management options), River Morphology and Resource Information System (RMRIS), Global Positioning Satellite (GPS) receivers, and Digital Elevation Model (DEM) with GIS techniques using old topographic data.



Training and Outreach

EGIS training programs aim to introduce and promote new concepts and tools in the management of natural resources, disseminating the expertise and experience of EGIS. Courses currently offered are: EIA Reviewer's Course, EIA Practitioner's Course, ARC View GIS Course, ArcInfo with VBA, Fish-GIS Course, and Environmental Awareness Course. Courses that are being developed are: Integrated Water Resources Management (IWRM) and Initial Environmental Examination (IEE) for Small Infrastructures.

The outreach activities are aimed at creating awareness of EGIS work and capabilities among the public and private sectors. There is a library unit in EGIS, which is open to the public. It contains around 4000 books/ publications, all related to the focus issues of EGIS. The library has a particularly strong collection of publications on water resources and environment, fisheries and spatial analysis.

EGIS Training Courses in 2001 (January - June)		
Courses	Duration (in days)	Date (2001)
Water Resources Planning and Management		
Integrated Water Resources Management (IWRM) course	10	March
Environmental impact assessment (EIA) Reviewers' course	17	April
Environmental Awareness Program	1	January, February, April
Spatial Analysis and Database Training		
ArcView	4	February, March, April
ArcView & Spatial Analysis	5	May, June
Fish-GIS course	7	February
Seminars and workshops		
GIS related workshop	1	April
EIA related workshop	1	June

Seminar on IWRM

The seminar on Integrated Water Resources Management (IWRM) was held in Dhaka from 21-22 November. Sponsored by the Ministry of Water Resources, Bangladesh and the Embassy of the Netherlands, the event was organized by EGIS with the objective to compare the need, development and implementation of IWRM in Bangladesh and the Netherlands.



Ms. Monique de Vries, Hon'ble Vice-Minister of Transport, Public Works and Water Management of the Netherlands, delivering her speech as Special Guest at the inaugural session.

The seminar focused on the participatory and institutional aspects of IWRM where the conceptual framework of IWRM was presented and the water management situation in the two countries was compared. It was found that although there have been a number of guidelines prepared in Bangladesh by different agencies in the past to facilitate people's participation in development efforts relating to water resources, it has not been effectively achieved at the grassroots. A lesson could be taken from the long history in the Netherlands of people's participation in the decision making process related to water resources management in the country.

The need for an institutional framework in Bangladesh was discussed in the light of the National Water Policy, with suggestions that the role of the local government agencies and the NGOs should be further articulated and properly implemented. In general, the participants emphasized the need for adopting appropriate measures to ensure people's participation and to act according to the wisdom jointly derived by the professionals and different stakeholders.

Workshop on the 'Blue Accounting' Approach towards IWRM in Bangladesh

The purpose of the workshop was to pursue discussion on some of the issues raised during the Seminar on IWRM. In this context, three different categories of presentations were made at the workshop: (i) the conceptual framework of the blue accounting exercise; (ii) the experience in the coastal areas of the Netherlands and (iii) the scope of Decision Support Systems for IWRM. Professionals from EGIS, WARPO, SWMC, BARC, IUCN and BUET participated in the workshop.

Seminar on NWRD

A seminar on the National Water Resources Database (NWRD) was jointly organized by EGIS and WARPO on 23 November, 2000. The occasion provided an excellent opportunity for sharing the nature of data compiled by the NWRD. It also helped in assessing data requirements for water resources management in Bangladesh. The seminar dwelt on the approach for quality control and addressed the future vision and management policy for the NWRD. The



participants also discussed issues like the need for cooperation between WARPO and data providers, and the role of the NWRD in the formulation of the National Water Management Plan (NWMP). The seminar recommendation was to maintain an updated NWRD in a way that it could be accessed easily by all potential users.

Activity Update

Support to WARPO: EGIS is helping to operate, update and maintain the National Water Resources Database (NWRD). It is also providing expertise for the environmental section and assisting in the formulation of the NWMP, as well as providing training to WARPO professionals.

Support to other GoB agencies: EGIS has conducted a pilot project on a **National Fisheries Database for the Department of Fisheries (DoF)**. The project aimed at creating a database for a national fish and fisheries planning model that would link the fisheries sector with the overall water resources sector. EGIS was also involved in acquiring and processing ERS images through a RAPIDS ground receiving station to develop methodologies for flood mapping and monitoring. This cost-effective, PC-based station was set up at SPARRSO in 1999, and until November 1999, conducted mapping of Aman and Aus crops, shrimp farm areas and flood depth and duration. EGIS is working with **BARC on the Application of AEZ database in drought management and water availability assessment** which aims to develop a methodology and corresponding tools that could be applied on a national level to assess the vulnerability of present and future agricultural practices for water scarcity. Another collaborative project with BARC is the **Application of modern tools to update inundation land types in Bangladesh** by applying remote sensing and GIS. The **Char Development and Settlement Project (CDSP)** is receiving support from EGIS in the development of a GIS and integrated spatial database. EGIS has also been supporting **RAJUK** since March 2000 with recommendations for upgrading RAJUK GIS facilities and by providing direction in modernizing their planning work. An important morphological study proposed to assess the changes of coastal and intertidal areas using RS data is the **RS for Coastal Morphology** for the Meghna Estuary Study (MES-II project). The study covers a part of the area between Hatia and Sandwip. EGIS has also recently worked together with the **Forest Department** to build a Fisheries **Database on the Sundarbans**.



Client services: On GoB request, EGIS conducted the **Environmental Impact Assessment /Social Impact Assessment (EIA/SIA) Study of the Khulna-Jessore Drainage Rehabilitation Project (KJDRP)**. The study made an assessment of the environmental and social aspects of the project area, and recommended the tidal basin option as the most suitable for sustainable management of the water and land resources of the project area. EGIS is involved in carrying out a feasibility study through the World Bank financed **Environmental Impact Assessment of the Gorai River Restoration Project (GRRP)**, conducted for BWDB. This project



is looking at the problems of water flow shortage in the Gorai River. It has the task of assessing the impact of different flows on the environment, taking into account the needs of the different sectors such as agriculture, fisheries, and navigation. EGIS is also entrusted with the monitoring of possible environmental impacts caused by the dredging of the Gorai River. The project on **Monitoring morphological changes of the Jamuna River** was carried out by EGIS to conduct remote sensing, GIS and morphological analysis for the operation and maintenance component of BWDB's Right Bank Protection Project (RBPP). The project involves acquisition of 2 images of the dry season, and processing of the images for detailed morphological analysis and predictions of morphological changes for the monsoon. **The Pond inventory project** was carried out jointly by Resource Analysis (RA) and EGIS to determine the extent,

condition and location of the different types of water bodies of the country for proper planning, development and management of fisheries. EGIS also undertook the study **Coastal Land Use Zoning** in the south west as one of the components of the Sustainable Environmental Management Programme (SEMP). Land suitability layers for eight thanas have been completed and the exercise has helped in identifying 'matches' and 'mismatches' between current land use and the use deemed physically suitable for the specific land uses in these thanas. The Surface Water Modeling Center (SWMC) project, **Planform of Old Brahmaputra River**, is analyzing the planform of the Old Brahmaputra River from its off-take to Toke at the off-take of the Lakhya River. The analysis will be used in selecting the site of the proposed Sherpur Bridge over the Old Brahmaputra River. EGIS monitored floods in 2000 on a routine basis with the purpose of contributing to a better understanding of floods and improving the prediction of river floods and flooding of land.

Environmental Impact Assessment of Alternative Flow Regimes for Gorai River Restoration Project

The river Gorai has been the largest perennial distributary of the Ganges River, supplying fresh water to the southwest region of Bangladesh for hundreds of years. This fresh water flow is key to the maintenance of an ecological balance in the region, especially in terms of checking salinity intrusion. The dry season flow of the Ganges has decreased since the commissioning of the Farakka barrage in India, and since 1988 there has been a resultant hastening of the natural decline of the Gorai River. Death of this river would have disastrous consequences for the southwest region of Bangladesh, specially for the livelihood of the 9.17 million of people living in the Gorai River Restoration Project (GRRP) area. The Government of Bangladesh therefore decided to conduct a feasibility study of GRRP with financial assistance from the World Bank. EGIS has been entrusted with the responsibility of conducting the EIA.

The overall objective of the GRRP is to prevent environmental degradation in the Southwest region, specifically around Khulna, the coastal belt and in the Sundarbans, by undertaking restoration of the Gorai River and hence ensuring fresh water flows in the wet season, and augmenting these flows during the dry season. The purpose of the project is to contribute to the enhancement of the environment. The output is the restoration of the fresh water flows; while the activities consist of all the technical interventions to produce the output. The assessment framework was designed to facilitate evaluation of changes in the above mentioned key indicators due to different fresh water flows in comparison with the cost of the technical interventions to guarantee these flows. Three dry season fresh water flow situations were selected for this analysis: 60, 100 and 150 m³/s. The average year flow in the wet season was considered for all the three dry season flow regimes. Changes were measured against a Future-Without-Project (FWO) condition, which is a zero flow situation in the dry season and 2000 m³/s in the wet season. This implies a cost-effective approach in which decision is made regarding the acceptable level of investment and maintenance cost given the expected benefits in terms of improvement of the environment.

The FWO condition has indicated that more and more areas would be engulfed by higher levels of surface water salinity, adversely impacting agricultural and industrial water use in addition to constraining potable and domestic water use. The long term impact of increased salinity in the soil would lead to irreversible degradation of the soil environment which could result in turning the land resources in the region unproductive.

The Sundarbans, a world heritage site, would be impacted by the increased salinity to the extent that high salinity

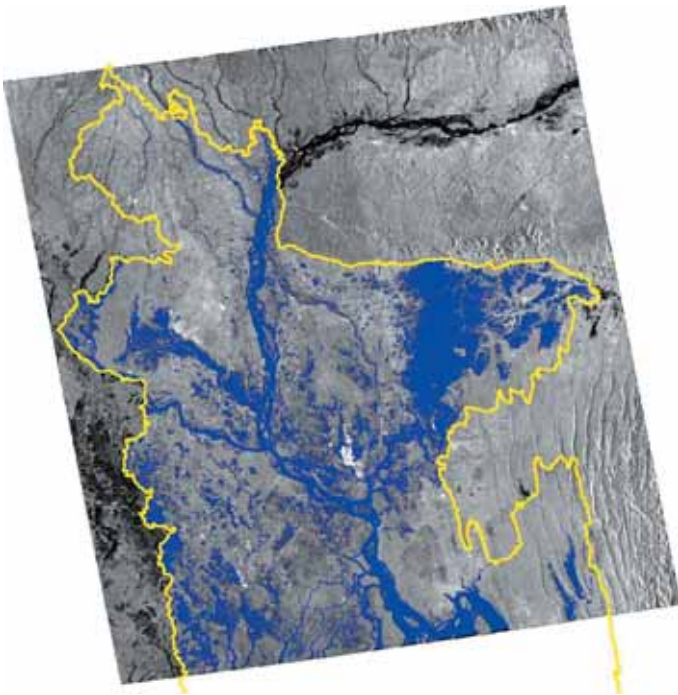
preferring species of flora with low values would gradually replace the low salinity preferring species of flora with high values. The Sundari, the low salinity preferring dominant species from which this largest mangrove forest derives its name, would gradually be replaced by the high salinity preferring Keora. This would be associated with a substantial reduction in timber production in addition to adversely impacting birds that prefer high canopies for nesting purposes. Increased salinity may even create problems for the famous Royal Bengal Tiger that requires large intakes of fresh water for its physiological functions. Disruption in the connection between the Ganges and the Gorai rivers would adversely impact migration of the gharial, an internationally acknowledged threatened species, as well as gangetic dolphins, hilsha, golda, carps, and other species of fish. All these would result in a decline in bio-diversity and a substantial change in species composition in the Sundarbans.



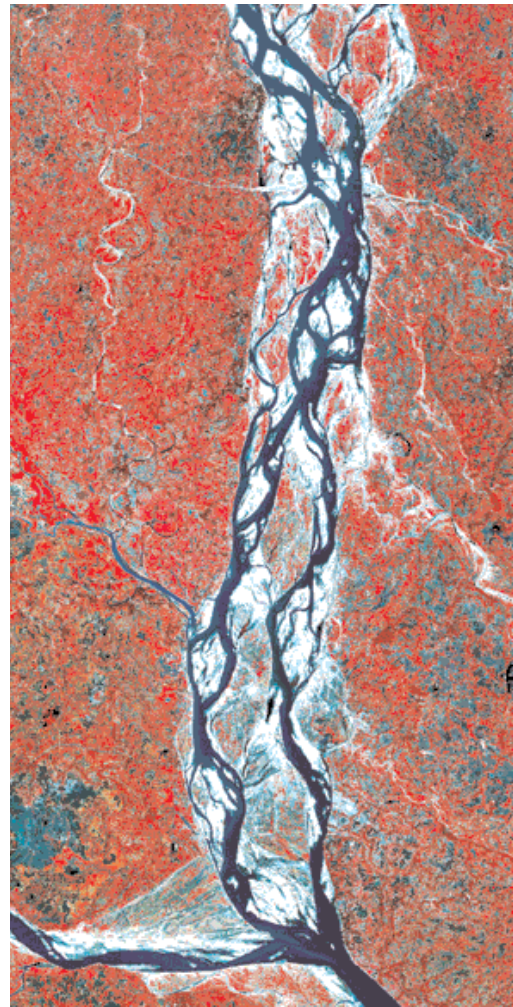
The EIA study has concentrated on assessing the environmental impacts of three different flow regimes (low, medium and high) with the objective of selecting the flow regime that would be optimum for protecting the environment in the region. Of the three flow regimes considered in the study, the high flow regime appeared to be the best option. The high flow regime has the potential to contribute to bio-diversity by facilitating the migration of the gangetic dolphin, hilsha, golda, etc. in addition to opening up the possibility of the return of the gharial into the Gorai-Sibsa-Pussur system from the Ganges river. Moreover, the high flow regime would contribute more to the soil moisture regime of the root zone of the perennial trees as well as the groundwater system, resulting in a more favorable crop production environment within the DIA. The study therefore recommended the high flow regime for the GRRP.

(The detailed report of the study is available at the EGIS library.)

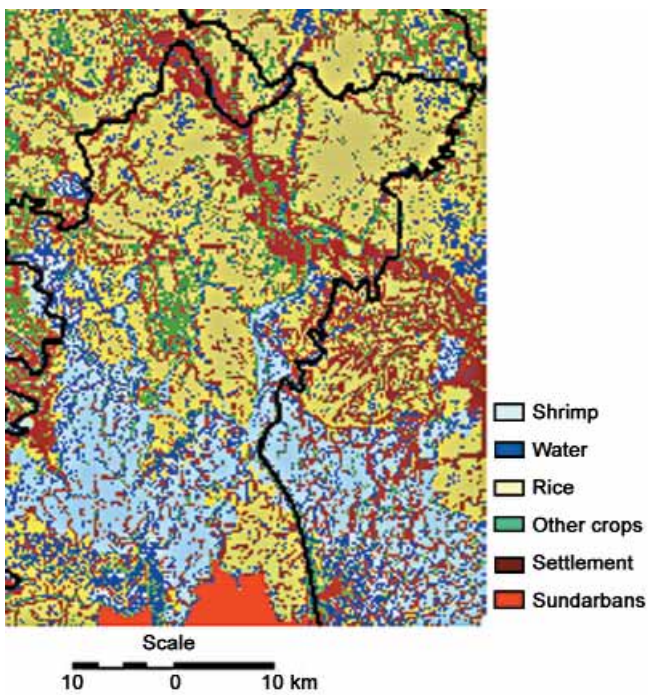
EGIS Satellite Images: A portfolio



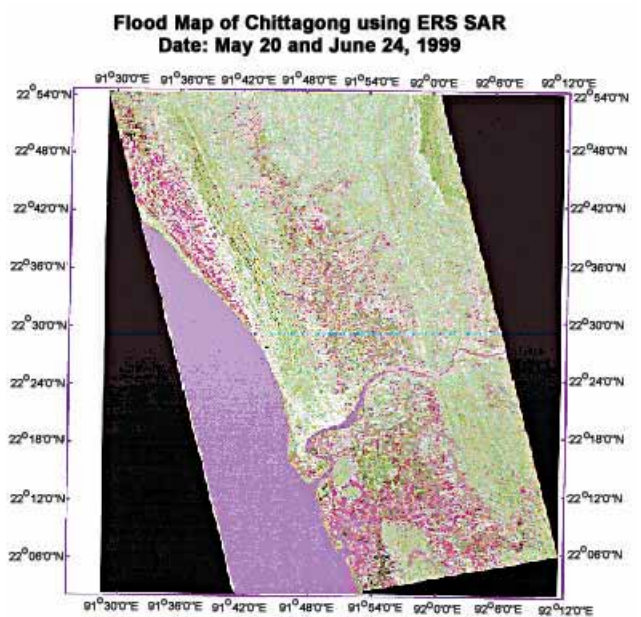
RADARSAT Satellite Image of Bangladesh of September 30, 2000.



LANDSAT TM Image of lower Jamuna - January 1999.



Classified image plane from the multi-temporal dataset

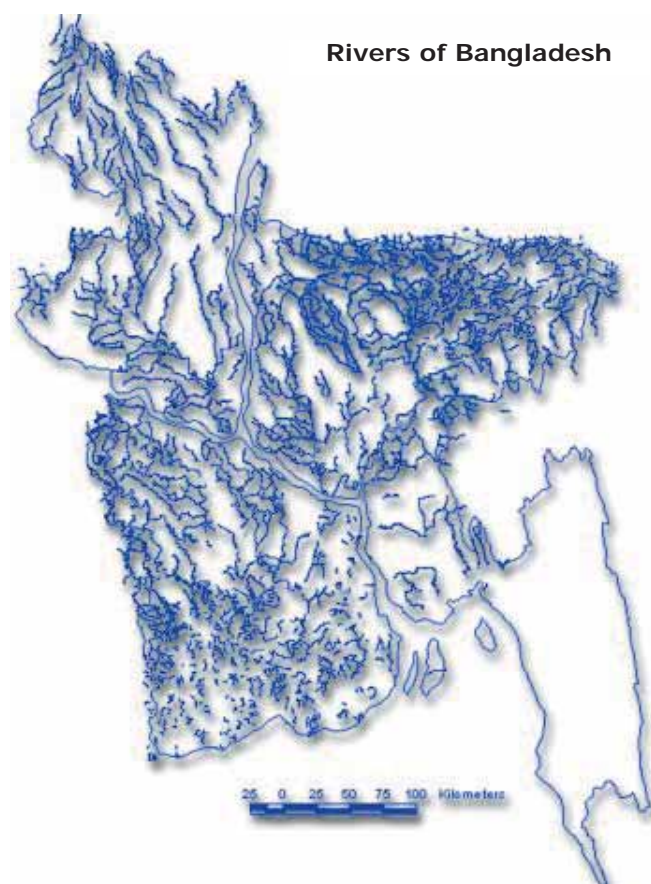


The ERS-SAR imagery of May 20, 1999 and June 24, 1999 have been used for the Chittagong flash flood study. The flash flood occurred in June 1999.

Integrated Water Resources Management

The seminar held in November 2000 on Integrated Water Resources Management (IWRM) is a significant sign of the Bangladesh Government's commitment towards the implementation of integrated water resources management in the country. The seminar was in line with the Twinning Arrangement, signed on 22 November between the Bangladesh Ministry of Water Resources and the Netherlands Ministry of Transport and Public Works and Water Management. The Arrangement has the objectives of providing a long-term basis for the inter agency/institutional collaboration in the water management sector, and supporting the on-going transformation process in the Bangladesh water sector as well as strengthening capacities in the field of integrated approaches.

The importance of water resources in Bangladesh can hardly be overemphasized. Activities like agriculture, fishing and navigation depend heavily on the state of the country's water resources. Since demands on the available water come from various sectors and users, it is important to adapt an approach of water management that is integrative in nature. On the supply side, the various sources of surface water used in the country are the rivers, khals, beels, haors, baors, with groundwater used specially for irrigation purposes and urban consumption. Given the multiplicity of use and source of water, it is all the more imperative to adopt an integrated approach here.



Bangladesh is often faced with the dual problems of too much water in the wet season and too little water during the dry season. The consequences are the damages from floods in the wet season and shortage of water for agriculture and other purposes during the dry season. However, flooding has some positive impacts as well, like the fertilization of the soils through the deposition of silt on the floodplains of Bangladesh. Assessing the functionality of the water resources of the country therefore requires a holistic approach that encompasses spatial and temporal dimensions. The context of IWRM also relates to the short-, medium- and long-term needs of the country.

While it is understandable that the water resources have to be used for purposes of economic development, there is also a need to be careful about the sustainability of these resources. Therefore, along with the questions of economic use of water comes the question of maintaining the quality of water and ensuring relevant bio-diversity. All these considerations underscore the urgent need for an integrated approach towards water resources management in Bangladesh.

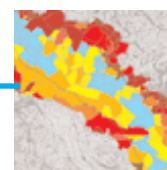
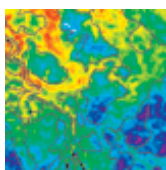
A number of suggestions have recently come up for the implementation of IWRM in Bangladesh - one of the most significant being the application of the blue accounting approach. It is felt that this approach would, on the one hand, provide a structure of analysis with appropriate physical and socio-economic indicators and, on the other, assist in understanding values of changes in decision support indicators due to changes in the (physical) state indicators. It is suggested that after deciding upon the structure of analysis vis-à-vis the different indicators, the immediate need would be to start working on a computational framework that could help in understanding the relationships between and among the different indicators.

The Netherlands, working closely with Bangladesh in the area of IWRM, are sharing their experience as to how the policy makers there have been finding it necessary to adjust to newer physical conditions as well as to the changing preferences of the people with regard to water resources management. It is evident that some of the experiences in the Netherlands would be of value in formulating relevant policies in Bangladesh.

Also important for the implementation of IWRM in Bangladesh is the use of tools such as Decision Support Systems at later stages of the IWRM exercise. The opinion is that results obtained through the use of these tools should be presented in very simple terms to concerned stakeholders to obtain effective feedback from them on various aspects of IWRM. WARPO has a major role to play here by being closely involved in further developing and making use of the concept and tools of IWRM.

List of EGIS Publications

1. Research and Development Plan, January 2000, EGIS-II, Dhaka
2. Blue Accounting, Introduction to a Methodology for Monitoring and Assessing the Functionality of Water Resources System (EGIS Technical Note 15), February 2000, EGIS-II, Dhaka
3. Geo-spatial Tools for Analysis of Floodplain Resources, March 2000, EGIS-II, UPL, Dhaka
4. Remote Sensing Techniques for Fish Pond Inventory, The Netherlands Remote Sensing Board (BCRS), May 2000, EGIS-II, Dhaka
5. Environmental Baseline of Gorai River Restoration Project, Bangladesh Water Development Board, May 2000, EGIS-II, Dhaka
6. Environmental Impact Assessment of Alternative Flow Regimes for Gorai River Restoration Project, September 2000, EGIS II, Dhaka
7. DGPS System Calibration Report, (EGIS Technical Note 16), October 2000, EGIS-II, Dhaka
8. Application for Remote Sensing for Assessing Changes in Inter-tidal Areas, Erosion and Accretion in the MES Area, November 2000, EGIS-II, Dhaka.
9. STREAM, Development of Flood Module, (compiled for Bangladesh from SPIHRAL report), (Technical Note; 17), November 2000, EGIS-II, Dhaka.
10. Riverine Chars in Bangladesh, Environmental Dynamics and Management Issues, 2000, EGIS-II, UPL, Dhaka



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