

**MINISTRY OF DEVELOPMENT OF NORTHEASTERN REGION
&
THE WORLD BANK**

WORKSHOP REPORT

**STUDY ON
NATURAL RESOURCES, WATER & THE ENVIRONMENT NEXUS
FOR DEVELOPMENT AND GROWTH IN NORTHEAST INDIA
GUWAHATI, 10-11 NOVEMBER 2005**

1 INTRODUCTION

The Government of India (GoI), in its endeavor to enhance development and growth in the Northeastern Region has requested the World Bank to focus its poverty reduction efforts more intensely on this part of the country. The Northeastern Region is home to an abundance of natural resources that constitute a basis for regional wealth. Part of these resources, however, is underutilized and other parts are under threat due to population growth, unregulated economic development, and a host of other reasons. Specifically, the Ministry of Development of the Northeastern Region (MoDONER) has requested the World Bank to help outline a strategy so that the natural resources of the Northeast become a platform for sustainable economic growth and poverty reduction in the region. The MoDONER and the World Bank are now jointly carrying out a study on the “**Natural Resources, Water & the Environment Nexus for Development and Growth in Northeast India**”. The primary perspective of the Study is how to strategically support development and growth through effective and sustainable investments. Accordingly, the study deals with a wide range of topics and includes overviews on the existing knowledge base on the water and other natural resources of North East India.

The study consists of 2 phases. Phase I is expected to be completed in 2006. As part of the study, a series of background papers (see Table 1) are currently being prepared and will serve as a basis for the development of a Strategy Report. The themes covered by these background papers (sub-studies) include water resources and geomorphology of the Brahmaputra and Barak basins, river flooding and erosion, hydropower and water resources development possibilities, options for development of inland water transport, communities and forest management, legal and institutional framework and options for river basin management, and regional biodiversity. The background papers will be finalized in the first half of 2006, after dissemination and discussion. Currently, first drafts are available for 9 of the 12 background papers undertaken in Phase I.

Table 1 – Background Papers for the Study (Phases I & II)

PHASE I (To be Completed by June 2006)			PHASE II (to start in July 2006)		
Topic	Author	Status	Topic	Author	Status
Development Options in a Cooperative Framework	B.G. Verghese	Second Draft finalized	Tribal issues related to water, natural resources and livelihoods	TBD	-
Geomorphology of the Brahmaputra Basin	Sanjay Pahuja / Dulal Goswami	First Draft under revision based on workshop inputs			
Overview of Water Resources of the Brahmaputra and Barak Basins	Chandan Mahanta	First Draft under revision based on workshop inputs			
Indian Experience with Riverbasin Authorities and the Legal Framework with regard to Basin Management Options	Syed Naqvi	First Draft under Revision based on workshop inputs	Watershed Management	TBD	-
Design Questions in Putting Together an RBO	Don Blackmore	Initiated	Livelihoods	TBD	-
Living Intelligently with Floods	S. Hazarika	First Draft to be received	Other papers identified as a result of the Phase I studies	TBD	-
River Flooding and Erosion in Northeast India	Herb Wiebe	First Draft under revision based on workshop inputs			
Hydropower Development Potential and Key Elements of the Strategy to Realize the Potential	VVRK Rao	First Draft under revision based on workshop inputs			
Review of Inland Water Transport in Northeast India	IWAI	First Draft under revision based on workshop inputs	Other Papers identified as per Stakeholder Feedback	TBD	-
Forests and Hydropower – Options for Carbon trading in Northeast India	S Meijer / R Damania	First Draft under revision based on workshop			

PHASE I (To be Completed by June 2006)			PHASE II (to start in July 2006)		
Topic	Author	Status	Topic	Author	Status
		inputs			
Communities and the Forests of Northeast India	Mark Poffenberger	First Draft under revision based on workshop inputs			
Review of Biodiversity in Northeast India	WWF-India	Initiated			

2 THE WORKSHOP

MoDONER organized a stakeholder consultation workshop on November 10 and 11, 2005 in Guwahati.

2.1 Objectives

The aim of the workshop was to present and discuss the initial findings of the available background papers to stakeholders from the Northeast and to obtain and incorporate, as appropriate, their recommendations in the study findings and the priorities that should be addressed in further work.

At the workshop, the study team (a) presented the study objectives and contents to the stakeholders; (b) presented the preliminary findings of the background papers; (c) received feedback on the study and the preliminary findings to assist finalizing the background papers; and (d) received feedback to decide upon next steps.

More specifically, participants were asked to contribute to the following questions:

- Does each background piece address the key issues of its topic? If not, what aspects are missing? What should be highlighted? Are the preliminary conclusions pointing in the right direction?
- How can we work towards a prioritization? [Benefits and costs of different interventions and strategies? Political economy – what is feasible? Timing and phasing of possible activities?]
- What should be addressed in Phase II?

2.2 Using Workshop Feedback

The feedback received from workshop participants will be taken into account in the further elaboration of the study. In addition to many specific technical comments and suggestions received, key issues raised by workshop participants were:

- An appreciation of the linkages between the various natural resource issues highlighted by the broad multidisciplinary approach of the study;
- The need for broad development in the Northeast within a framework of local and state-level actions;

- The importance to specifically focus on the strong tribal cultures in the Northeastern Region and their pivotal role in managing the productive natural resource base of the Region;
- The importance of taking into account the differences in the development needs, development priorities, and specific natural resources situation of the different states of the region (e.g. with regard to availability of water and/or forest resources; variations in flood and erosion risks; options for watershed management, etc.);
- The need to assess the mechanisms through which it can be assured that benefits from any activities would be shared equitably and would reach intended beneficiaries;
- The role of functioning institutions in catalyzing and promoting cooperation between the various stakeholders who share the natural resources of the region;
- Recognition of the information and knowledge gaps about the river basins in the Northeast and the need for further research on the physical, biological, economic and social aspects to inform the planning and development process;
- Substantial interest in further consultations in the states themselves.

2.3 Workshop Program

The workshop, chaired by Mr. D. S. Poonia, Joint Secretary of the MoDONER, covered topics such as water resources development in the North East, knowledge about water resources, structural and non-structural possibilities of flood management; communities and forests, etc. See **Annex I** for details of the Workshop Program.

2.4 Workshop Participants

A total of 101 participants attended the workshop. They included

- Representatives from Planning Commission, the Union Ministries of Environment & Forests, Power, Water Resources and Tribal Affairs;
- Representatives from Central Water Commission, Brahmaputra Board, North Eastern Council, and Inland Waterways Authority of India;
- Representatives from State Governments of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim;
- Invited Experts from the Indian Institute of Technology - Guwahati, Guwahati University, Dibrugarh University, Rajiv Gandhi University – Itanagar, North Eastern Hills University – Shillong;
- Members of the MoDONER and World Bank study team; and
- Invited Civil Society Organizations.

See **Annex II** for the list of participants.

2.5 This Workshop Report

This Report provides a synthesized overview of the workshop proceedings. It aims to reflect the key issues raised by participants, both in the respective presentations and in the plenary discussions. Many of the opinions voiced were contradictory, as is expected in open discussions. This is reflected in the Report. It is clear that the synopses of each presentation

alone could not do justice to the richness of the material presented. Therefore the readers are advised to also refer to the powerpoint presentations, which were distributed at the workshop and are also available at www.mdoner.gov.in.

3 SUMMARY OF WORKSHOP PRESENTATIONS & DISCUSSIONS

Day 1

Session 1 – Opening

Mr. Poonia, Joint Secretary of the MoDONER and the chair of the workshop, outlined the objectives of the workshop and emphasized that it was a part of the MoDONER initiative for getting a comprehensive study conducted by the World Bank so that the abundant natural resources in general, and water, forestry and minerals in particular may be gainfully and systematically utilized, without disturbing the rich bio-diversity and environment, for accelerated development and growth of the Northeastern Region. The objective of the workshop was to consult the State Govt. of the 8 NE States, Planning Commission, concerned Central Ministries, the CWC Brahmaputra Board, IWAI, NEC etc. on the draft Papers prepared by the Consultants and take stock of the progress of the Study. It was expected that the workshop would facilitate a constructive discussion on the study and the broader development of the Northeast region. It was a conscious and deliberate decision to hold the workshop in the NER.

On behalf of the World Bank, Mr. Salman Zaheer discussed the background of the involvement of the World Bank with the MoDONER in the study. The study is led by MoDONER, and supported by the World Bank, on invitation from MoDONER. The idea of the workshop and the study is to leverage a series of consultations with regional stakeholders. He also said that the World Bank is participating in the study on the basis of the World Bank's India Country Assistance Strategy (CAS).

- The CAS, a Bank document agreed with the Government of India in early 2005, provides the basis for deploying the relatively scarce resources of the World Bank strategically to support India's development and poverty reduction strategy. The World Bank is a relatively small player on a national level in India (with a lending portfolio of 3 billion USD annually, which is less than 0.5 % of India's GDP).
- The World Bank assistance is based on three working principles: (i) outcome oriented; (ii) strategic selection of sectors of engagement; and (iii) improving the knowledge base regarding development issues in India. In terms of involvement in development sectors, the World Bank country assistance program focuses on infrastructure, human development and rural livelihoods. Within its programs and projects, the World Bank seeks to leverage increased governance effectiveness, empowerment of peoples and communities, and private-sector led economic growth.

Ms. Karin Kemper, leader of the World Bank study team, presented the outline of the study and the study objectives. The prime objectives of the study are to (a) develop a vision for the development and management of water and related natural resource/environmental issues in the Northeast that can catalyze investment and initiate institutional change; (b) develop a framework to identify and prioritize high-return investments in physical and institutional infrastructure, taking into account development options; (c) identify critical institutional reforms for more effective development and management of the region's water and forest

resources; and (d) create a platform for interaction with stakeholders. The MoDONER had requested the Bank to jointly carry out the study with help from international and national experts.

- **DISCUSSIONS**

The following points were raised in the plenary discussions:

- The participants welcomed the opportunity for engagement with the study and would take this discussion back to their respective states, agencies and/or organizations. Participants suggested that the consultations be conducted within the states as well. The information pertaining to this workshop should be available on the internet (also in hard copies to the state governments) and further consultation outputs should feed into the study documents.
- One of the invited NGO representatives (a spokesman for “River Basin Friends of Assam”) stated that he would leave the workshop. After walking out, he reentered the workshop venue with 13 other protestors, voicing slogans for about 10 minutes, and circulated a statement, which principally focused on dam building in the Northeast Region. In spite of invitations from the workshop organizers and other workshop participants for the protestors to stay and contribute to the workshop, they decided to leave, returning during the closing session of the workshop on the next day with similar slogans. Workshop participants voiced their regret that despite repeated invitations the protestors did not agree to having a dialog about the content of the study, the process and the development challenges in the Northeast.

Session 2 - Water Resources Development and Management in the Northeast

- **WATER RESOURCES IN THE NORTHEAST – DEVELOPMENT OPTIONS IN A COOPERATIVE FRAMEWORK BY MR. GEORGE VERGHESE**

Mr. Vergheese discussed the diverse background in the Northeast - a cross-road of cultures, and political boundaries defined by the partition. The region is endowed with ample resources, but people are poor, very low in income and development. Development of the region will depend upon cooperation – cooperation among states, and cooperation across international borders. Non-cooperation in the long run is an expensive option for all parties. Development of the overall economic infrastructure in the NER should be paralleled by the improvements in the economic and social benefits to the local communities. There are several innovative ways to go about this cooperation and development framework, such as the creation of trusteeship areas (in areas which are disputed among the states), smart water projects, new technologies and rural electrification. It would be important to build trust among the people of the NER, particularly among the tribal communities, that the state governments are keen on development, equity and service delivery. Along with taking up new large infrastructure projects (with adequate social and environmental protection), it would constitute a good example to decommission dams that had outlived their utility (such as the Gumti dam in Tripura – where there is potential to bring back the tribal and other communities earlier displaced). There also needs to be new means of involving people, for example by making the local people part-owners of the development projects that are commissioned in their areas. A part of the income from the projects ought to be ploughed back into the local community development programs. International cooperation, especially with Bangladesh is vital for the NER - for successful development of water resources, flood management, navigation, irrigation and fisheries. Cooperation with neighbors like Myanmar (on dams and waterways), and international cooperation on carbon finance provides further development options. Hydro

income could be used as an engine for growth, such as for example in Bhutan. Flood mitigation is vital not only for Assam, but for the entire region. With Assam constituting 75% of the population, it is clear that the region cannot prosper if Assam does not flourish. Mr. Verghese concluded that for the NER either cooperation or languishment were the options, and that cooperation should be based on fresh ideas, political cooperation among a range of partners, and an emphasis on using development to sow seeds of peace.

- **WATER RESOURCES MANAGEMENT OF THE BRAHMAPUTRA – MR. B.P. SINGH, CWC**

Mr. B.P. Singh, Chief Engineer (Flood Management) of the Central Water Commission, presented on water resources management of the Brahmaputra. He highlighted the strengths of the region (an abundance in water resources, and 40% of the nation's hydropower potential) and the major problems (floods and erosion). In the NER, only 34% of the irrigation potential, 2% of the hydropower potential and some 70% of the navigation potential had been developed. He described the mandate and performance of the different organizations involved in the NER - the Brahmaputra Board, the Central Water Commission, the Central Groundwater Board, the National Institute of Hydrology, the power corporations (NEEPCO, NHPC, NTPC), and the state government departments. He considered the main challenge to be the development of water resources potential, including hydropower, irrigation, navigation, flood management, fisheries, and recreational activities. To meet the challenge, it would be essential to establish an organization that can plan, regulate, coordinate and implement new development projects in an integrated manner. This organization should be equitable, efficient and should ensure sustainable development of water resources. The organization should also be autonomous, empowered, and self-sustainable, with a strong regional identity.

- **THE BRAHMAPUTRA BOARD – MR. ISLAM, BRAHMAPUTRA BOARD**

Mr. Islam, General Manager Brahmaputra Board, highlighted the history, mandate and achievements to date of the Brahmaputra Board. He pointed out that its jurisdiction, including both the Brahmaputra and the Barak basins covers almost the entire Northeast. The Brahmaputra Board has carried out a Masterplan for the basins and has also made a number of investments. The presentation outlined proposals for ongoing and future investments.

- **PLENARY DISCUSSION**

The following points were raised by participants in the plenary discussion:

- A Riverbasin Organization as was discussed in the CWC presentation would be important for the region. A Riverbasin Organization would become the mechanism for ensuring sustainable, equitable, and coordinated development of the water resources of the region.
- The development of the Brahmaputra basin requires a comprehensive management plan that includes erosion control.
- Only a focal government agency is not enough and it should be complemented by state-of-the-art research and mechanisms for building political consensus. The Brahmaputra Board needs to coordinate with state governments.
- Several participants supported the ideas of cooperation between the regional states on the water resources development in the Northeast.

- One participant raised the need to not only look at the mainstem of the rivers, but to also look at the catchment areas.

Session 3: Knowledge Base of the Brahmaputra Basin

- **STATE OF THE KNOWLEDGE BASE OF WATER RESOURCES OF NORTHEAST INDIA – PROF. MAHANTA, IIT GUWAHATI**

Mr. Mahanta introduced the premises of his paper and showed that there is a need for a sound water resources database, especially in light of changing environmental conditions and rapid population growth, in order to plan regional and national food and energy security. Currently, the lack of data and data reliability and the low knowledge base is a barrier to development and management of resources. Therefore, the paper provides an estimate of water resources available in the Brahmaputra and Barak, and the groundwater and the major surface water bodies like lakes and wetlands in the region. It provides estimates of rainwater harvesting potential, water demands of municipal, agricultural and industrial users, and includes development scenarios, based on a compilation of the available information, in order to present a big-picture assessment. The per capita water availability in the Brahmaputra and Barak basins is 17,000 CM, that is approximately 7.5 times higher than the national per capita availability. This water comes from a range of tributaries and is stored in the river bodies and in approximately 3,500 wetlands covering 100,000 ha in the Brahmaputra basin. The overall surface area of wetlands is approximately 220,000 ha. Groundwater potential in the Northeast is around 850 MCM, most of which is in Assam, and around 85% of this potential is available for development, since in all the states of the Northeast the risk for over-abstraction of the aquifer is minimal. In Assam rainwater harvesting is gaining ground as a source of domestic water supply due to the presence of fluoride and arsenic in the groundwater. Water withdrawals are mainly for irrigation (80%) and to a lesser extent for domestic and industrial use (20%). Water demand to sustain the current aquatic environment is 27% of the renewable water resources. Future water demands are rising. There are multiple development projects, either on-going or planned, and these include several projects for hydropower, flood control, irrigation, fisheries as well as some small-scale recreational water use projects. The synergy between the developments for different water uses needs to be investigated and new ways need to be explored, like development of heavy industries, and redistribution of water resources, based on a regional consensus. The knowledge base of the water resources is poor and not organized, whilst the technical problems raised by the specific characteristics of the river basin are enormous. Joint monitoring projects between riparians are essential, as is quantifying much of the information that is mostly qualitative at this moment. Therefore it is recommended to advance scientific and technical studies and research and water resources monitoring, and to use novel scientific tools like remote sensing and modeling to develop a knowledge base on the river basin, jointly with a variety of regional and international stakeholders.

- **EXPLORING CONCEPTS CONCERNING THE FLUVIAL GEOMORPHOLOGY OF THE BRAHMAPUTRA BASIN – PROF. DULAL GOSWAMI, GUWAHATI UNIVERSITY, AND SANJAY PAHUJA, WORLD BANK**

Mess's Pahuja and Goswami provided the context for a paper on the fluvial geomorphology of the Brahmaputra Basin and argued that action requires a solid understanding of the physical system. The Brahmaputra Basin is very complex, being a large alluvial braided river in a

seismically active region, without any precedents for river management from other regions in the world. Fluvial geomorphology generates an understanding of the natural river and floodplain processes. Building on this knowledge, it can help predict responses of a fluvial system to interventions, and separates natural and human induced changes in the system, and can help to design river management approaches. The fluvial geomorphology is important in assessing river bed sedimentation, influence of channel and flood conveyance infrastructure, erosion processes, sedimentation and flooding, and the rehabilitation of wetlands. For this paper, the knowledge base of fluvial geomorphology was assessed through a review of 250 references on a range of sub-themes. It was found that most information is available in non-peer-reviewed materials like government reports and engineering studies, with more information available on the main Brahmaputra river, and not its tributaries. Current understanding and most studies rely on the same unauthenticated and partly outdated dataset of government agencies. Furthermore, most studies were based on remote sensing and not on field data or rigorous analytical work in modeling and simulation. Modeling is a complicated exercise requiring substantial amounts of data. In spite of these constraints some tentative empirical modeling exercises are currently underway. An assessment in a comprehensive fluvial geomorphology framework reveals that the knowledge base is poor at the level of catchment baseline analysis. Given the fact that individual project studies will not have the resources to undertake catchment-level studies, it is imperative that regional and national agencies initiate and conduct such studies, which are critically needed for understanding the project-level physical processes in this complex river system. The presenters recommended establishing a coordinated database and monitoring program that integrates lessons from international experience, taps the available local knowledge and is coordinated through a partnership of government agencies and academic institutions.

- **PLENARY DISCUSSION**

The following points were raised by participants in the plenary discussion:

- The study should also address other rivers in the Northeast and the changes that are currently anticipated in the river system through sedimentation. The shifting riverbed should have been addressed in more detail.
- It is important to study the processes causing the widening of the Brahmaputra, and field studies in the specific braiding patterns of the Brahmaputra.
- Inaccessibility of sites for data collections is a major issue for data collection in case of the Northeast, and satellite images are frequently impacted by cloud cover.
- There is a need for a specific technical workshop on rivers and hydrology in the North East.
- More attention should be given to the riparian wetlands and wetland biodiversity.
- There is a need for more flow simulation models.
- It is important to conduct studies on the tributaries to the Brahmaputra and to conduct research jointly with the institutions in the regional states, in order to build local research capacity.

Session 4: River flooding and erosion

- **RIVER FLOODING AND EROSION IN NORTHEAST INDIA – HERB WIEBE, NORTHWEST HYDRAULICS**

Mr. Wiebe introduced his presentation by emphasizing that flooding and river erosion are interrelated and strongly impact livelihoods and investments, and that therefore improved management of water and floods would promote growth and reduce poverty. The key messages of his presentation were that 1) the Brahmaputra basin presents an enormous problem in flood and erosion control with few precedents to learn from, that 2) no control system will provide absolute certainty in this system, and that 3) insufficient information was available to the author/presenter to assess the merits of flood control with upstream multi-purpose dams. Most floods occur in Assam. The available data does not show a worsening of the floods or their frequency. Increased flood damage is partly due to increased population densities and increased economic activity. While people can recover from the impacts of flood damage over time, the impacts of erosion are much more catastrophic since there is no recovery for those whose land is lost. Unstable bank lines impoverish people, curtail investment, and destroy embankments intended to reduce flooding. In this context, there is a need for a flexible and adaptive erosion management system, one that regularly/yearly assesses and forecasts vulnerable reaches of the system, prioritizes the vulnerable reaches on the basis of social and economic factors, and then responds accordingly. The development of an erosion management system should not be delayed while other long-term flood management measures are being decided upon. There are a range of issues associated with embanking the River. Allegations that embankments increase flood levels need to be studied. Maintenance funds are not adequate with the result that embankments are not properly maintained. A public perception exists that if embankments were to be removed, then the ensuing flooding would be uniform. Importantly, the data indicates this not to be the case. Experience with spurs and porcupine structures has been positive and seems appropriate for erosion management in the Northeast. More fluvial geomorphology work should be carried out to identify an appropriate bank erosion strategy, and various research and monitoring tools should be used to improve designs. A mapping of security of embankments requires a documented history of embankment construction and stage discharge curves for all stages. Remote sensing would be a tool that could be used to create such a history and could then be used for predictive analysis of potential attacks on the bank line.

- **PLENARY DISCUSSION**

The following points were raised by participants in the plenary discussion:

- More attention needs to be paid to the issue of river-bed sedimentation, which is widely recognized as a major factor aggravating the flood intensity.
- Flood management measures in India to channel excess flows will have implications for downstream flood problems in Bangladesh.
- Floods do not only cause problems in Assam, but also bring benefits like replenishing the flood plains with fertile alluvium and the annual rejuvenation of the riparian wetlands. Therefore, instead of a blanket approach of constructing and raising embankments, a balanced approach

involving compartmentalization of flood plains could prove to be a better flood mitigation option.

- It is important to get reliable estimates of the annual damages from floods. Work is underway on analysis that is based upon obtaining private flood loss data from the insurance agencies.
- Mankind is used to living with floods, so instead of looking into ways how to mitigate floods, it might be more useful to address ways to cooperate with floods, like floating houses.

Session 5: (a) Hydropower and (b) Inland Water Transport

- **(A) OPTIONS FOR HYDROPOWER DEVELOPMENT IN THE NORTHEAST – MR. V.V.R.K. RAO**

Mr V.V.R.K. Rao outlined the need for hydropower for India as a whole and the Northeast in particular. Strictly from an energy-supply point of view, hydropower has various advantages, since it is cheap, renewable, clean, not related to rising fuel costs, suited for peak supplies and providing multi-purpose benefits.. Although other regional states have substantial hydropower potential, the key to development of hydropower in the Northeast is Arunachal Pradesh. Pre-feasibility studies of 72 sites in the Northeast have been conducted, of which 30 sites are economically viable (the price of energy generated is less than 2.5 Rs/kWh). Nineteen of the 30 sites are in Arunachal Pradesh (with combined potential of 22,000 MW). However, there are various issues around hydropower development in the Northeast. These include comparative benefits of storage projects over run-off river projects; integration of hydropower generation and flood management, irrigation and navigation aspects; uneven distribution of costs and benefits among the riparian states; environmental issues, particularly threats to biodiversity; equitable distribution of benefits for the local and affected communities; and issues related to international cooperation. The possibilities are also substantial (the power revenue to Arunachal alone could be Rs 2,600 crores); and the hydropower projects could be the basis for economic development of the states and the local communities; attracting large industrial investments (as opposed to exporting energy to other regions). A cooperation framework needs to be worked out to evenly distribute the benefits and the costs, investments, and power transmission. The draft recommendations are to (a) select projects that have the least submergence; (b) address issues of storage and flood control for an optimized design, and (c) develop a mechanism for resettlement and rehabilitation tailored to the Northeastern region's unique community cultures, aspirations and traditional decision-making systems. There are a number of feasible options to go for integrated development of water resources (hydropower, flood management, irrigation, navigation, etc.) – such as increasing the free power component to the states, reduced interest rate and tax exemption on investments for storage schemes. Further, the government could think of a mechanism to use savings on the otherwise regular flood relief operations to contribute to development of upstream communities (or states), and fiscal incentives to reduce investment costs for transmission.

- **PLENARY DISCUSSION**

The following comments were made by participants during the Plenary Discussion:

- The study should focus more on states other than Arunachal Pradesh.
- Any project should first determine who are the winners and who are the losers. There is a need to ensure that the advantages and disadvantages are correctly perceived by all. Even with large

current hydropower projects, a number of local communities in Arunachal do not have access to electricity (one reason is the lack of transmission lines). The revenues flow to the Government but the local communities do not benefit from this money. Distribution of power to local communities could be very expensive financially, but if this issue is not addressed, the poverty issue is not addressed. The states need a vehicle to redistribute revenue.

- Since a concern is that a big dam destroys the environment, and that the benefits do not reach the people, therefore there should be visible mechanisms to ensure that benefits would reach the poor and the local communities.
- A participant contended that “In general, the picture painted by the presentation on hydropower was very rosy and an indication that the Central Government is applying pressure to have storage dams constructed”, and that “There is no such thing as a good dam”. When the communities want livelihood from water, they should not be made to suffer to build dams to supply power to other parts of India, and in the name of flood control (as “floods cannot be controlled”). For the benefit of flood control in Assam by building storage dams, by displacing 80,000 people - the indigenous people of Arunachal Pradesh would heavily suffer, and “would become extremist”.
- The problem of border disputes between Arunachal Pradesh and Assam have not been resolved by the Central Government, so this raises the question why Arunachal should let Assam and the Central Government benefit from hydropower generated in Arunachal. There is a need for data collection and studies, and especially a need to learn the lessons from international cooperation, like the Mekong River and the Tennessee Valley Authority. Development of natural and water resources requires regional and local cooperation, and development of the full potential of 66,000 MW requires international cooperation.
- Some questions remain – what is more beneficial: run-of-river power generation or storage dams? Is micro-hydel an option? In case of low population densities, how expensive will it be to construct local infrastructure? Can we use the rivers for transport? Also design of dams is critical, since storage could be optimized to minimize submergence, and well-designed spillways can contribute to navigation benefits. Also important would be to assess the risks arising from global warming.
- Dam safety is a critical concern, given the high seismic activity levels in the region.
- The perception is that the involvement of the World Bank means big dams, and immediately the issue of resettlement and rehabilitation comes up. With the forests and water resources being their livelihood, culture and religion - the general public is opposed to storage dams. Government of Arunachal Pradesh’s choice is for eco-friendly run-of-river projects that have a small ecological footprint. Arunachal is a highly risky seismic area, and therefore, the decision to stop construction of storage dams should be seen to be beneficial for the downstream states. Most importantly, in case of development of hydropower and natural resources, local livelihoods cannot be compromised.
- Village electrification can be taken care of, and resettlement and local development can be tackled by distribution of benefits and development projects.
- Micro hydropower requires twice as much investment per MW than storage dam hydropower. Smaller hydropower schemes break down more often, requiring cumbersome O&M in remote places. “If Arunachal is smart, they can start making money with big dams.”
- A phased approach is the key to developing hydropower. Start first with small-scale rural electrification, show direct benefits to the people, then move on to a larger scale. At this moment, the 12% free power cannot be used for the energy supply of the region, since no

distribution network is in place, so the free power has to be sold to the state grid, and the revenues disappear in the state government budget.

- The appropriate organizations and professionals need to be involved for social consultations and local community engagements in case of hydropower development; this should not be left to engineers.

- **(B) OPTIONS FOR IMPROVED INLAND WATER TRANSPORT IN THE NORTH-EASTERN STATES OF INDIA – CMDR. NAIR, IWAI**

Mr. Nair provided an overview of the railroad and road networks in the Northeast and the existing waterways in use. There are a total of 82,000 km of roads in the Northeast and 2,500 km of railroads. The main waterways could extend this network by 4,000 km, mainly suitable for transport of bulk goods. A number of investment activities are on-going and planned to make inland water transport in the Northeast more viable: It is planned to construct a 45 m wide canal stretch from the Bangladesh border to Dibrugarh 750 km east, with a permanent terminal at Pandu and floating terminals at 9 locations along the canal. For the Barak there is a proposal to construct a 40 m wide channel for the entire waterway. Both waterways combined are the National Waterway 2 (NW-2). Major investments in this waterway include a terminal at Pandu, terminals along the route, floating terminals on a need basis, sailing vessels, 24 hrs navigational services for the entire waterway, and feeder routes to the Brahmaputra. There is a range of other waterways that could be developed and contribute to the development of the Northeast, between Karimganj-Lakhipur, along the Kolodyne and Tizu river to promote Indo-Myanmar border trade, and the Gumti river in Tripura. Projected cargo for 2005 on the NW2 is 2,900,000 tons, consisting of a range of goods. Furthermore, a range of ferry services could operate along the NW-2. There are several advantages to using the NW-2 waterways. The waterway is the shortest distance, and during the flood season, the NW-2 is the only mode of transport for basic commodities. Bulk commodities can be easily transported over water. A key issue in making inland water transport viable for Northeast India is cooperation with Bangladesh. Such cooperation already exists, and needs to be formalized and expanded in line with the as yet unrealized potential. Much more could be done to enhance options for goods movement through Bangladesh between the Northeast and peninsular India. There are a number of specific issues that need to be addressed, e.g. an increase in the required number of ships, mechanisms for public-private sector partnerships, reducing fairway and financial risks, reducing policy risks, improving ferry services and attracting the private sector.

- **PLENARY DISCUSSION**

The following points were raised by participants in the plenary discussion:

- It was noted that the Brahmaputra is better navigable than the NW-1, but is lacking appropriate supporting infrastructure and a facilitating process for stakeholders.
- There was a call for one single multi-modal transport strategy document, which, in addition to addressing the coordination between different modalities of transport in the region, would also address supplementary issues like developing the potential for feeder services from smaller tributaries, with overhaul facilities and busy commercial waterfronts.
- For the smaller rivers different hull designs of ships are required.

- Storage dams contribute to maintaining the required water depth for navigation, especially in the dry season, but channeling of the waterway remains a requirement.
- A joint venture/public-private partnership could be formed with the tea industry in the Northeast, since they seemed most likely to benefit from increased transportation efficiency.

Day 2

Session 6: Options for Forest Management and Development

- **COMMUNITIES AND THE FORESTS OF NORTHEAST INDIA – MARK POFFENBERGER, COMMUNITY FORESTRY INTERNATIONAL**

Mr. Poffenberger introduced his presentation with an overview of the status of the forests in India, with 8% of India's geographical area and 25% of India's total forest, including high biodiversity and increasing pressure on forest resources. Therefore, he and his team conducted a study with the Community Forestry Alliance working group, investigating 7 state profiles and 15 case studies in order to conduct a legal and policy analysis, provide recommendations for action and set up pilot projects in Meghalaya and Manipur. There is a large and increasing part of the forest under jhum, on average 13%, but as high as 45% in Nagaland. A variety of laws and policies are in place with regards to forest. Indigenous forestry in Northeast India is characterized by a high dependence on the forest, in a forest-rich and forest-surplus region. Shifting cultivation is practiced on 14% of the forest lands, and forest ownership and tenure rights are different from peninsular India, as 54% of the total recorded forest is under community or private ownership. There is an unbroken tradition of indigenous community forestry systems, recognized under Indian laws, with a system for protection, management and product extraction. There are increasing trends towards centralized control of tenure and utilization that pose challenges to indigenous community forestry, in combination with population increase, reduced effectiveness of traditional institutions, timber exploitation, and a limited effectiveness of government programs. Privatization has sometimes led to a decrease in social equity, elites and outside actors have captured the natural resources management benefits and poorer families have been economically marginalized. The speaker highlighted the vast range of ownership and management structures prevalent in the region, and the impossibility of using one-size-fits-all approaches. He provided multiple examples of stewardship of forests (as sacred groves or otherwise) by indigenous communities. Recommendations for action included strengthening indigenous community institutions, formally recognizing community forestry management areas, strengthening community forestry management norms, assisting communities with management plans, improving policy, the legal and judicial framework and reorienting forest department strategies. It is important to allow flexibility to project planners to respond to the constantly changing dynamics on the ground in community forestry development.

- **PLENARY DISCUSSION**

The following points were raised by participants in the plenary discussion:

- Communities manage to maintain their identities in the face of increasing pressures through solidarity, resilience, strong leadership, and a sense of "if we open up too much, we will lose our identity".

- Economic integration whilst maintaining tribal identity can happen under leadership of local community leaders. The two are not necessarily in conflict and converge through building capacity at the community level.
 - Land conversion is feasible if viable long-term plant use models are available, especially agro-forestry models. Communal ownership of lands is key to keep the community together, as shown from case studies of the American-Indian tribes.
 - A Supreme Court decision limits the extent to which the local community can draw on the resources from the forest, and more support from the Central Government for the state governments is needed to resolve these issues.
 - IFAD has extensive project experience and worked successfully in 862 villages, with 39,000 families over a period of 6.5 years. Jhum reduction is high at 40%-50%, through optimization of jhumming culture, providing alternative livelihoods and biodiversity conservation. The project stretches over the whole of Northeast and includes a variety of community management activities. The upstream hills should be managed first if one talks about flood mitigation, and everyone is invited to have a consultation with IFAD and look at what makes the interventions a success. Successful cases should be studied to get clues about what works and what does not.
 - For forestry management it is important to work directly with the communities and increase their awareness about forestry. Use of LPG is requested by the people, and its use would decrease firewood usage. But, there is no infrastructure to refill any gas canisters once empty.
 - People's dependence on forests needs to be reduced and biodiversity and forestry programs need to be synchronized. Tree plantation is being done by the Naga people, but is not synchronized with any biodiversity program.
 - There is no clash between Community Forestry Management (CFM) and indigenous institutions. Private plantations in Mizoram are more successfully managed than community-owned forests.
 - The work of the Forestry Departments is constrained by the Supreme Court's decisions that have to be incorporated in their work.
 - There is an on-going conflict between human development and maintaining wildlife habitat.
- **CARBON FINANCE IN NORTHEAST INDIA – EXPLORING OPTIONS IN THE FOREST AND WATER RESOURCES SECTORS – RICHARD DAMANIA, WORLD BANK**

Mr. Damania gave an introduction to carbon finance and its potential in the forest and water sectors of Northeast India. Carbon financing is one of the mechanisms that has been developed through the Kyoto protocol to combat global warming by emission reduction of GHGs (especially CO₂). It allows signatories to the Kyoto Protocol to fund emission reductions or carbon sequestration in developing countries. Carbon finance could provide “win-win” opportunities for India by providing an additional source of grants that could be used to generate both development and environmental benefits. However, to secure these funds India would need to establish the necessary institutional mechanisms and structures.

The current rules state that carbon finance funding is available for reforestation only on land that had no forest since 1990. According to official statistics, there may not be too much scope for carbon finance in *existing* forests since the statistics show that there has been a dramatic

recovery of forests in many of the states of the Northeast in the last 5 years. There is some concern that the data may reflect definitional changes rather than the status of forests. There is also potential for converting marginal agricultural lands where returns are low (and sometimes negative) to forests. The most promising avenue for the Northeast is to evoke a clause of CDM which allows countries to classify land as forests in ways that allow ground realities to be reflected in land-use categories. This would allow for a larger area of land to become eligible for carbon finance and thus provide an injection of funds and some of the poorest areas of the region. In the water sector either upgrading or expanding of current hydropower turbines, or creation of new dams in India or upstream are potential options. The World Bank administers a range of these funds, but disbursement of funds is based on a set of requirements, that include involvement of the designate national authority, i.e. the government of India, who approves, validates and verifies actual emission reductions. These institutional arrangements are currently under development and negotiation.

- **PLENARY DISCUSSION**

The following points were raised by participants in the plenary discussion:

- The people of the Northeast are maintaining a carbon sink for the whole world, but do not receive anything in return so far. On top of that, by Central Government regulations, all of a sudden people are not allowed to cut wood for firewood, but there is a customary right to cut wood from time immemorial.
- Carbon finance could be an alternative for jhumming, provided the local communities could directly receive the benefits. Although the previous experiences with social forestry in the region neglected the aspects pertaining to agriculture, there remains a significant potential for agro-forestry, and this needs to be investigated
- Since monocultures (for instance fast growing eucalyptus) are eligible for financing under the Kyoto Protocols, there is a risk of creating “green deserts” and efforts should be geared towards avoiding such monocultures.
- Hydropower projects generating over 15 MW are not eligible for funding under the Kyoto protocols, and therefore there is an additional incentive to pursue the development of hydropower potential via small-scale power generation schemes. This criterion was instituted to take into account the surface area of forest that is submerged in case of large-scale hydropower schemes.
- In the jhumming cycle, around 50 crops per farm are used (with instances where 20 different rice varieties are grown). There is a concern regarding what will happen to the local biodiversity if the whole area is reforested again.
- Jhum farming would sequester more carbon dioxide than a steady-growth forest, but is not eligible for carbon financing because of the 1990 rule.
- There is no clarity regarding the concrete steps to obtain carbon financing, except for the fact that the Central Government is the designated authority to apply for these funds.

Session 7: Communities and Floods

- **COPING WITH FLOODS – IMPROVING LIVELIHOODS, SANJAY SHARMA, CENTRE FOR NORTHEAST STUDIES**

Mr. Sanjay Sharma (on behalf of Mr. Sanjoy Hazarika) opened his presentation with a brief anecdote on a medical emergency boat, called the “Hope” that provided medical services to the population during periods of flooding. He pointed out that most of the statistics describing the state of Assam and other flood-prone areas do not reveal the intimate interaction of the population and their livelihoods with the rivers which flow into and through the region. Therefore, for their paper they interviewed 600 people in flood-prone areas, on the basis of random sampling resulting in a sample population of mainly farmers, but also students, government employees, students and landless dwellers. The results indicate a huge variation in incomes related to flooding, with incomes dropping to zero at times because of property damages and health effects. Worst affected populations are livestock owners, since livestock is affected by diseases and a lack of veterinary care. Floods cause yield losses of the autumn paddy and winter paddy crops due to water logging, sand deposits and subsequent decrease of land fertility. Public health effects of floods include increased incidence of water-borne diseases, which are worsened by poor communication facilities and poor access to health services. In most cases the population depends on government relief efforts, which are perceived to range from average to good. Poor relief efforts result in a lack of basic supplies like foodgrains, oil and salt. Coping mechanisms of the rural population include fisheries, gathering of driftwood, migration, the construction of raised houses, and high-level in-house storage of grain crops. The majority of the population has one or two boats for navigation, and at the least, rafts made of banana trunks. The agricultural system is adapting to floods by using flood-resistant paddy varieties, cropping pattern diversification and inter-cropping. Post-flood coping mechanisms include sale of productive assets like livestock to generate cash flow, and non-agricultural jobs in nearby towns. The survey respondents formulated a range of recommendations to improve their flood impact management strategies and coping mechanisms, including 1.) Construction of raised platforms for evacuation and as a marketplace based on local designs and constructed locally; 2.) Halting construction of embankments, since they are poorly constructed and create water logging problems; 3.) Using international flood management expertise to identify novel ways of flood adaptation; 4.) Improved design of boats; 5.) More and larger vessels for (medical) relief services; 6.) Channels dug by the local population, including the right to sell the mined sand for urban construction; 7.) Improved technologies for crop diversification and inter-cropping; 8.) Improved access to veterinary services, including training of designated community members as para-vets.

SESSION 8 - CLOSING STATEMENTS

Several statements from the workshop participants were contributed after the last session.

- A spokeswoman of the Centre for Organisation Research and Education, submitted a statement to the effect that (i) the structure of the study was not adequately sympathetic to the identities, livelihoods and cultural needs of the indigenous populations, (ii) free consultations need to be conducted region-wide on the subject, (iii) exemplary intervention practice would be required in the fragile environment of the Northeast, including complete consultations with experts and

representations of indigenous people in the region, (iv) MoDONER should take note of the various position papers of the Northeastern tribal organizations and (v) that MoDONER and the World Bank should disclose in the public domain all documentations pertaining to this study. The statement emphasized the willingness of the organization to continue the study dialog.

- It was emphasized by the Assam Water Resources Department that an integrated, multidisciplinary approach is needed. Water resources development should not narrowly focus on hydropower, but consider a holistic multi-sector development approach. An umbrella organization for water resources management needs to be formed that would serve as a nodal point, but appropriate laws would need to be enacted to empower such a nodal organization. The foundation of the lower Subansiri dam needs to be designed in such a way to allow for further heightening of the dam crest, pending on-going discussion. It is not justified that the potential for flood control of an entire state is to be squandered for the sake of a small upstream town and a few villages, especially since alternatives for this town and villages can be put in place. Road construction by hill blasting and cutting is expensive and leads to downstream sedimentation, so the alternative of road construction on stilts should be investigated. Certain sites in the Brahmaputra Valley should be declared UNESCO World Heritage sites and should be protected from annual floods.
- The Agriculture Production Commissioner, Govt. of Nagaland, gave a brief presentation outlining the potential of agro-forestry and small-scale hydropower for income generation in rural communities, and argued that development in the region should move sequentially from pico to micro to macro stages, but only after development benefits were obtained for the local population in each subsequent stage.
- The Principal Secretary, Government of Sikkim, pointed out that Sikkim had for the first time been invited to a region-wide consultation on development of the Northeast. He felt, though, that too much of the discussion had focused on the Brahmaputra basin. Land, landslides and soil erosion need to be treated as a part of water management. He emphasized his request to circulate the workshop documentation to the state governments also in hardcopy.
- The Chief Engineer, Arunachal Pradesh stated that the choice for run-of-river dams over high dams was firm. He noticed that the issue of drinking water provision had not been addressed. Irrigation and irrigation management is another topic to be discussed. Overall, more emphasis should have been given to the financial and economic picture of the different development options. In closing, he pointed out that the regional situation not only offers challenges but also presents major opportunities, and the way forward would emerge from a coordinated and consultative approach.
- The Government of Tripura representative commented that in their state drinking water supply is a burning issue that needs to be solved with high priority. The main problem is high iron contents in the water and subsequent clogging of pipes. One of the options to remove iron is to filter the water over woodchips. These woodchips are available in principle, but in practice it has been forbidden by the Central Government to fell trees. Therefore, there is a general appeal to MoDONER to take into full account the different and differing points of view of the states.

Mr. Poonia, MoDONER, and Ms. Kemper, World Bank, closed the workshop, thanking the participants for their very valuable contributions towards informing the further development of the study. They pointed out that this workshop was the first one to present all the preliminary study findings and that it would be followed up by further stakeholder workshops.

All presentations and the consultation steps are available on the MoDONER website: www.mdoner.gov.in.

ANNEX I
FINAL WORKSHOP PROGRAM

Time	Topic	Speakers
THURSDAY, NOVEMBER 10, 2005		
0900 - 0930	Registration	
0930 - 1030	Inauguration of Workshop	Mr. D.S. Poonia , Joint Secretary, MoDONER Mr. Salman Zaheer , World Bank
1030 – 1100	Presentation of the Study and Current Status Discussion	Ms. Karin Kemper, World Bank
1100 – 1115	TEA BREAK	
1115 – 1245	1. Development Challenges in the Northeast - Options for Regional Cooperation 2. Water Resources Management and the Brahmaputra – History, Challenges and Options 3. History of Management of the Brahmaputra Basin Discussion	Mr. George Verghese Mr. B.P. Singh, Central Water Commission Mr. I. Islam, Brahmaputra Board
1245 – 1345	River Flooding and Erosion in Northeast India Discussion	Mr. Herb Wiebe, NWH
1345 – 1445	LUNCH	
1445 – 1600	1. Knowledge Base of Water Resources of Northeast India 2. Physical Characteristics of the Brahmaputra Basin & Implications for Regional Development Discussion – Plenary	Prof. C. Mahanta, IIT Guwahati Mr. Sanjay Pahuja, World Bank & Prof. D.C. Goswami, Guwahati University
1600 – 1615	TEA BREAK	
1615 - 1745	1. Hydropower in the Northeast – Potential and Harnessing Strategy Framework Discussion 2. Inland Water Transport – Challenges and Options Discussion	Mr. V.V. Ramakrishna Rao Cdr. R.M. Nair, IWAI

1930	SOCIAL HOUR followed by DINNER	
FRIDAY, NOVEMBER 11, 2005		
0930-0940	Introduction	Mr. D.S. Poonia, Joint Secretary, MoDONER
0940 - 1100	1. Communities and the Forests of Northeast India 2. Carbon Financing and Northeast India – Exploring Possibilities in the Water and Forest Sectors Discussion	Mr. Mark Poffenberger, Community Forestry International Mr. Richard Damania, World Bank
1100 – 1115	TEA BREAK	
1115 - 1215	Living Intelligently with Floods Discussion	Mr. Sanjay Sharma – Centre for Northeast Studies and Policy Research
1215 – 1315	Summary of Workshop and Plenary Discussions: <ul style="list-style-type: none"> • Feedback on Presentations • Recommendations for Finalization of Papers • Next Steps 	
1315 - 1345	Closing Remarks	Mr. D.S. Poonia, Joint Secretary, MoDONER Ms. Karin Kemper, World Bank
1345	LUNCH	

ANNEX II

WORKSHOP PARTICIPANT LIST

From (Agency)	Name of Participants (Address)
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Ministry of Tribal Affairs	Mr.B.S.Kharmawphlang , Director (CLM&R), [Shastri Bhawan, New Delhi;Tel:23073817(o)/23389881;Fax:23073160]
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