

Environmental compliance in River Valley Projects of North East Indian Region*

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Abstract

The Ministry of Environment, Forest and Climate Change, Regional Office Shillong, organized a *Workshop* at Shillong to discuss the major non-compliances of River Valley projects which have been accorded Environment Clearance in the North East Region. While the regulators highlighted the noncompliance and mitigative measures, the project authorities projected the successful implementation of various environmental safeguards in their project sites. Participants stressed on the conservation of threatened and endangered species, highlighting on the poor EIA quality, urging projects to engage accredited consultants. Medical Professionals from NEIAH and NEIGRIHMS, Shillong discussed on the occupational diseases and occupational health treatment, and showed willingness to act as resource institute for projects of North East region on Occupational Health Monitoring and Assessment. Importance of actual field data in the preparation of EIA and EMP reports, preservation of area rich in flora and fauna, and revival of disturbed habitats were some issues highlighted by Professor A. P. Das. Watershed Erosion Response Model (WERM) and thematic maps to identify the vulnerable watersheds in a sub-basin was discussed by Brahmaputra Board. Representatives from NHPC focussed on the implementation of CAT plan of Rangit HEP and Teesta-V projects. Successful implementation of Plant Resource Centre and Botanical Garden, at Kopili Hydro Electric Project was presented by NEEPCO and BSI Shilling. Various measures taken by Teesta Urja Limited (Teesta –III HEP), Sikkim were also discussed. The impact of acid mine drainage (AMD) due to unscientific coal mining on the Myntu –Leshka HEP project was deliberated and it was suggested to develop technology for treatment of AMD to conserve the River ecology. The meeting ended with a positive approach to arrest the decline and destruction of forest covers in the North East Region.

Key words: MoEF&CC, NE Region, EIA/EMP implementation, Present scenario

PREVIEW

The Government of India enacted the Environmental (Protection) Act also referred to as the Umbrella Act in 1986 after the Bhopal Gas tragedy under article 253 of the constitution. In India, the foundation of environmental impact assessment (EIA) started in 1976 – 1977, when the Planning Commission asked the Department of Science and Technology to examine the river valley projects from an environmental angle. Until 1994, environmental clearance from the Central Government was an administrative decision and lacked legislative support. The union Ministry of Environment and Forest, under the EP Act (1986) notified the EIA notification on 27th January 1994 making Environmental Clearance (EC) mandatory for expansion or modernisation of any activity or for setting up new projects listed in Schedule 1

*A report on “Workshop on Environmental Compliance in River Valley Project of North East (NE) Region held on 22nd June 2017 at Regional Office, MoEF&CC, Shillong

of the notification. On 14 September 2006, Ministry of Environment and Forest (MoEF) notified new EIA legislation.

The Ministry of Environment, Forest and Climate Change is the nodal ministry responsible for conservation and assessment of flora and fauna of India, forests and other wilderness areas, prevention and abatement of pollution, afforestation and mitigation, along with implementing environmental and forestry programmes in the country. The ministry has ten regional offices in the country for monitoring and assessment of compliance status of projects which are accorded EC by MoEF&CC, and State Environmental Impact Assessment Authority. Other two primary mandates of the regional offices include (1) To maintain liaison and provide linkage with the project authorities and State Pollution Control Board, Central Pollution Control Board and its regional office, Central government agencies (such as BSI, ZSI, FSI), research institutes, universities, in implementation of programmes related to environment and (2) to organize workshops to provide linkages of the project proponent with research organization, regulatory authorities etc.

Meeting for the NE Region

With this mandate, the Ministry of Environment, Forest and Climate Change, Regional Office Shillong, organized a *'Workshop on Environmental Compliance in River Valley Projects of NE Region'* on 22nd June, 2017 at Shillong. River Valley Projects have major impacts on the rich biodiversity of the North East Region. It accounts for 22% of the total EC accorded for this region. Thus to ensure better implementation of environmental safeguards mentioned in the environmental clearance for River Valley projects of the NE region and better interaction with projects, the regional office organized this interactive session. The Rules and Regulations under EP Act (1986) and FC Act (1980) applicable to River Valley projects were also discussed and the main non-compliances were identified as: (1) delay in implementation of Environmental Management Plan (including CAT plan and R & R plan), (2) non-implementation of Wildlife protection, (3) unscientific mining for construction materials (minor minerals), (4) non-implementation of public hearing commitments, (5) restoration in the reservoir and other project areas, (6) afforestation in catchment and command areas, and (7) occupational health issues.

The Report

The discussion was organized as a part of the mandate of the regional office with an objective to achieve better coordination between the regulators, projects and R&D institutes. Therefore, experts having expertise in EIA studies, Pollution Control, Wildlife and Biodiversity Conservation from different Institutions, Universities and regulatory departments of NE Region were invited to share their views and experiences which included the State Forest and Environment Departments, Botanical Survey of India (BSI), State Pollution Control Boards (SPCB), Brahmaputra Board, SEIAA, Mizoram and Doctors from North Eastern Institute of Ayurveda & Homoeopathy (NEIAH), Shillong and North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences (NEIGRIMS) and senior Executives from Projects.

In his welcome address, Shri Sunil Kumar Aggarwal, Additional Principal Chief Conservator of Forest (C), MoEF & CC emphasized that the workshop is specifically for River Valley projects and like any project, it is also comprised of three stages: formulation, implementation and monitoring. The Regional office is involved in monitoring of the projects. The interactive workshop is a platform to discuss issues and constraints in implementation of environmental safeguards to develop strong linkages between user agency and implementing

agency. It was mandatory in the projects to strictly follow extant rules and regulations and also respect indigenous practices of people of the region. He talked about impact of traditional agricultural practices in the region like shifting cultivations on the biodiversity and urged the projects, regulators and R & D Institutes to take proactive role in educating and involving local people, to protect and conserve the biodiversity of the region.

Dr. V. P. Upadhyay, Scientist G, MoEF&CC, projected that the River Valley sectors are the second most important category in the NE and as such the compliance level of these projects must be satisfactory. Arunachal Pradesh and Sikkim have the highest number of projects. While focusing on NE being a biodiversity hotspot, Dr. Upadhyay stressed for more emphasis on the conservation of threatened and endangered species. He presented a review on the performance of the projects on the basis of field monitoring and highlighted the non-compliances. Some of the major issues include : (1) *ex-situ* conservation efforts not being satisfactory, (2) plant operating without PCB consent/authorization, (3) green belt not being developed in the area, (4) no plan for afforestation in consultation with State forest department, (5) solid waste dumped on the land and slopes, (6) scientific Land Disposal Plan not prepared, (7) reclamation/restoration not priority, (7) discharging untreated effluent water directly to the natural water course, and (8) not examining the quality of effluent after treatment.

Other areas of concern highlighted by Dr. Upadhyay included the need for automatic water sprinkling system to suppress dust from crusher and other construction areas, health hazard to workers, treatment of tunnel water from underground workings being discharged into natural course, non-availability of settling tanks to prevent silt to go directly to the natural water course and quarry reclamation. He projected that poor implementation may be due to the poor EIA quality and credibility of consultants /laboratories, most of whom are ill capable of conducting EIA studies. Dr. Upadhyay suggested that in projects consultants who have good in-depth knowledge and are recognized under EPA, 1986 should be engaged. He stressed that if the scope of the project changes, impact parameters also change and therefore, fresh appraisal is needed. He advised the projects to appoint specialist medical practitioners having a degree in occupational medicine for the purpose of occupational health assessment and monitoring. All PIs were requested to strictly comply with all EC conditions with timely implementation of R & R Plan, CAT Plan and afforestation of catchment and command area development.

Dr. A. K. Tripathi, from NHPC, presented 'Implementation of CAT Plan' of Rangit-HEP. An area of 12992 ha was treated at a cost of Rs. 11.00 Crores, by carrying out mixed plantation, fuel wood plantation, natural regeneration, bamboo plantation, medicinal/MFP plantation, creation of nurseries, balley benching, fencing and contour staggered trenching on the forest land; agro-forestry, horticulture, contour graded bunding and broom-grass plantation on agricultural land and silvi-pastoral development, sowing and broadcasting, bamboo and , avenue plantation, balley benching, fencing and contour staggered trenching on wastelands.

Dr. Avinash Kumar, and Dr. A. K. Jha, from NHPC, informed that the total free draining catchment area of Teesta-V Project was 43015 ha. For 10710 ha in 14-sub watersheds CAT plan was prepared at a revised cost of Rs. 3,680.66 lakhs. Field monitoring by joint team of NHPC and Forest Department was done to assess the effectiveness of the various technologies (balley benching, small contour terraces, plugging of spread water, training of the main Jhora, strengthening of the lower side of the landslide, selection of suitable soil binding species, edge control work, grassing, creation of contour bunding in the adjoining land, and bamboo and broom plantation). Local community was also involved in plantation and other regeneration works. They informed that the survival rate of samplings was 75-

80% during the implementation of CAT plan. Restoration and reclamation of dumping sites, development of green belt, fishery management, and creation of Butterfly Park were also included under CAT through appropriate biological and engineering measures.

Dr. Binay Sen and Dr. Jayanta Talukdar from NEIAH, Shillong discussed on 'Occupational Health and AYUSH System' and highlighted the importance of database on Occupational Diseases and Environmental health problems, thereby linking occupational disease /environmental exposures and health effects, finally leading to prevention and control of occupational diseases. They highlighted the contribution of AYUSH system that involves Rasayana Therapy, Yoga Therapy, and Panchakarma – Sodhana Therapy, which may be useful in occupational health treatment. The participants, requested NEIAH to provide training on AYUSH System. They

Dr G. K. Medhi, Professor and Head, Community Medicine, NEIGRIHMS, Shillong discussed the 'Principles of Prevention of Occupational Diseases' and stated that common diseases associated with Occupational Health are caused due to: (a) physical agents like heat, cold, noise, radiation, (b) chemical agents such as gases, dusts, heavy metals, (c) biological agents like tuberculosis, asthma, malaria and (d) psychological agents such as depression, anxiety, irritation. For prevention of diseases, it is important to know the causative agents and Prof. Medhi explained different levels of prevention. Primary prevention is defined as the action taken prior to the onset of occupation-related disease/injury, and includes preventive action such as medical measures, engineering measures, ergonomics and personal measures. Secondary prevention involves action which halts the progress of an occupational disease and prevents complications, and includes specific interventions such as early diagnosis, adequate treatment and periodic medical examinations to detect early diseases. Tertiary-prevention is used when the occupational disease has advanced beyond its early stages, and interventions are accomplished through medical rehabilitation, occupational rehabilitation and psychosocial rehabilitation. It was suggested that these institutes may act as resource institutes for projects of NE region on Occupational Health Monitoring and Assessment.

Shri Ranjit Deka, from Brahmaputra Board, discussed on 'Watershed Prioritization of Simsang Sub-Basin in Meghalaya'. He demonstrated that Watershed Erosion Response Model (WERM) and thematic maps may be used to identify the vulnerable watersheds in a sub-basin. Thematic factors used in the study included drainage density factor, slope, aspect, land use land cover, soil, climate/rainfall. The entire sub basin of Simsang was divided into 27 watersheds under five vulnerability areas. Severe soil erosion exists in NE Region due to high rainfall, steep slopes, land use pattern and fragile nature of soil which leads to removal of precious top layer of fertile soil from the upper watershed thereby depositing the sediments on river bed and reservoirs of river valley projects. Such study is essential as part of EIA study. Assessment of treatment cost of highly vulnerable watersheds under direct drainage area in the EMP is possible through this study. Dr. V. P. Upadhyay enquired whether maps of watersheds were freely available for whole NE region states, and whether they take consultancy. It was informed that Brahmaputra Board will extend all technical support to projects and the study reports may also be shared.

Prof. A. P. Das (Rtd. Professor) Department of Botany, North Bengal University shared his experiences in the preparation of EIA and EMP reports for three hydro-electric projects. He informed that EIA & EMP reports in most projects are being prepared based on secondary data, as a result some species which is not present in the area are wrongly reported while some species present in the project area are not reflected. He urged the user agency to prepare EIA & EMP Reports based on actual field data and not with literature/secondary information so that all species of the area are represented in the EIA report. He

informed how an EIA result helped the dam getting shifted upstream from the actual proposed dam site due to the presence of one endangered ground Orchid species. Prof. Das asserted that preserving an area, rich with flora and fauna, is more important and stressed on the need to revive the disturbed habitats. He advised project PIs to implement all recommendations made in EMP. On issues pertaining to compensatory afforestation, he hoped that natural vegetation lost due to project activities shall be properly compensated through afforestation of local species and not exotic species. Further, he informed that hydroelectric projects of NE region must engage to arrest the decline of forest covers in the region and destruction of natural vegetation.

Shri Mohan Ch. Dihingia, NEEPCO, elaborated the successful implementation of Plant Resource Centre and Botanical Garden, Kopili Hydro Electric Project under the guidance of BSI. One EC condition was for the creation of Plant Resource Centre (Botanical Garden) to help conservation of various plant species of the region. A total of 8063 plant saplings were rehabilitated in the area of the catchment. Since 2006, a total of 17,502 numbers of saplings have been planted which included medicinal plants and other important local plant species. Another garden of approximately 2.00 ha has been developed with 750 fruit bearing plants. The projects were requested to replicate the same in their respective project sites with the help of BSI.

Dr. A. A. Mao, Scientist E, BSI, Eastern Regional Centre, Shillong discussed on 'Restoration Measures in the Reservoir and other Project Areas'. Dr. Mao highlighted how BSI successfully guided NEEPCO in setting up a Plant Resource Centre and Botanical Garden in Kopili Hydro Electric Project during the year 2006-08. The main objectives were to : (1) carry out rapid survey of the project impact areas in order to identify and demarcate all areas rich in biodiversity for total protection, (2) take up the studies on biodiversity of catchment areas, (3) set up a Plant Resource Centre with representative species of regional flora through creation of Plant Resource Centre and nursery in the site near project colony, dam site, (4) plant species which are endemic, endangered or vulnerable and are falling in the project impact area to be rehabilitated and a live germplasm centre for ensuring the continued existence through rapid multiplication by green house technique, and (5) multiplication and rehabilitation of species in natural condition of the area. NEEPCO made nursery, green houses and live plants were collected and introduced in PRC/nursery. About 11,000 plant saplings were raised in nursery during the first year and 10,600 plant saplings during the second year. Moreover, 8063 plant saplings were rehabilitated in catchment area. The projects were requested to take guidance from BSI in setting up of a Plant Resource Centre and Botanical Garden and any other matters concerning plant conservation.

Dr. Bahuguna of Teesta Urja Limited (Teesta-III HEP), Sikkim informed about measures taken as per EMP in consultation with Forest, Wildlife and Fisheries Department, and Kanchenzonga National Park (KNP). Road protection measures included constructing plum concrete and crate walls towards the valley side and hillside of the roads along with drainage system and plantation using local species for propagation of poly-cultural plantation along the slopes and pasture development at various locations. The muck generated from Dam complex was utilized in construction of Concrete Face Rock fill Dam (CFRD). Muck dumped sites were provided with crate walls, concrete plugs, RRM walls, etc. as a part of engineering measures. About 80% muck generated from the project were utilized as construction material for concreting of various structures.

Project also supported State Forest department to create three Check Posts, at Chungthang, Theng and Mangan to control illegal tree felling and unauthorized movement of forest produce. A nursery is set up and around 65000 saplings planted on different slopes on

the Power house road, Adit roads and muck dumping yards. Financial support was provided for conservation of *Hedygium spicatum* (medicinal plant) and *Cyathea spinulosa* as part of the Biodiversity Conservation Plan and for creation of inspection paths, check post, watch & ward towers, pot holes & some fencing of parts of the KNP under wildlife management. Forest Department carried out biological measures like nursery creation, artificial regeneration, pasture development, fodder, bamboo and broom plantation, barbed wire fencing, medicinal plantation. Compensatory afforestation has been done over an area of 137 ha in Mangan, Dzongu and Chungthang Forest ranges. Trout hatchery cum rearing farm at Rabum village, North Sikkim was commissioned. Reservoir RIM treatment, with reinforced soil system and RCC grid beam technologies, slopes with geo textile membrane & boulder filling by creating chimney drain and creating a crossed links of drains was done. Resettlement & Rehabilitation Plan was implemented for 9 villages through District administration in addition to land compensation. Several programmes as part of livelihood development in the community and social infrastructure development at Singhik, Ramom, Saffo and Pegong villages, science laboratory, girls hostel, meditation centre at Chungthang village, and Monastery school hostel at Shipgyer have been taken up under the project.

Shri J. Kharjana, MePGCL, discussed on 'Acid-Mine Drainage (AMD) Treatment' under the Myntdu-Leshka HEP project. He elaborated the impact of AMD due to unscientific coal mining affecting the upstream of river Myntdu and the river water is highly acidic. The project initiated pilot project at Khliehriat, Chyrmang, Shkentalang, Lumshyrmit and Mustem, where three chambered plant designed by IIT-Kharagpur was constructed using lime for treatment of AMD which indicated an improvement in the pH level of the river. However, due to various reasons, the pilot project treatment structures have been destroyed. Dr. Upadhyay urged the project to run the treatment plants and explore whether the operator of the treatment plant can be from the local unemployed youths, who would operate the plant supported by projects of the region. R&D effort is needed to use pulp from waste banana peel for the treatment of acid water since the peels are highly alkaline in nature which may neutralize acidic pH. This process would also encourage banana cultivation in the neighbourhood. Pilot scale project may be taken up.

Other points on compliance were discussed with projects and suggestions on these issues were as follows:

1. Six monthly compliance report is being sent by project proponents at irregular intervals. If stipulations are fully complied, project may write to the MOEF&CC, for exemption, and removing the project from site monitoring or compliance report not to be sent to the regional office.
2. Project authorities stated that implementation of CAT is done by state Govt. and progress report is not provided to project. It was suggested that such issues can be resolved during Environmental Committee Meeting where the CAT report is discussed in the meeting. The CAT Model being implemented by Forest Dept. Sikkim is successful with clearly defined guidelines and functions of various departments and with comprehensive review during Environmental Monitoring Committee (notified in State gazette) meeting chaired by Secretary Forest cum PCCF, Sikkim at least once in a year by which stakeholders, become fully aware of the progress and get opportunity to participate in order to improve the CAT implementation programme. All other states may follow such similar way to implement CAT plan.
3. Projects engage laboratories which are not notified under EPA 1986/not accredited by NABET, therefore the condition is not complied. It was suggested that project authorities must engage EPA notified laboratories/organizations for monitoring.

Universities and Research institutions may also be involved in EIA/EMP implementation including monitoring.

4. On the issue of Occupational Health, project authorities were requested to avail expertise of the institutes such as NEIAH, NEIGRIMHS etc.
5. Suggestion was given to develop nursery of local plant species in villages as “Captive Village Nursery” and seedlings from these nurseries should be used by projects, thus, paving the way for employments of local villagers.

Shri R. L.Sanga, CF, Shillong insisted that a thorough study of the social and legal impact of the construction of project must be taken up and during the construction phase, the area of muck disposal and labour camp should not be in the forest land, that is not diverted.

Projects were requested to submit time bound action plan in the next half yearly report on how these safeguards are going to be implemented with the help of other institutions. For *ex situ* Biodiversity Conservation and development of infrastructure for multiplication and plantation of local, native and indigenous species, all projects must, therefore, involve R&D institutions and Biodiversity specialists of NE region. Implementation of CAT, *in situ* and *ex situ* species conservation, wildlife management and eco-restoration of construction / degraded areas would help in improvement of overall ecological and social condition around project areas of NE region.

Report submitted by: DR. V.P. Upadhyay , Scientist 'G, Ministry of Environment, Forest and Climate Change, North Eastern Regional Office, Shillong.
