5 Adaptive Capacity Development

Capacity is defined as the ability of individuals and organizations or organizational groups to perform functions effectively, efficiently and in sustainable manner. This has three important aspects:

- It indicates that capacity is not a passive state but is part of a continuing process;
- It ensures that human resources and the way in which they are utilized are central to capacity development; and
- It requires that the overall context within which organizations undertake their functions will also be a key consideration in strategies for capacity development.

Capacity development is a broader concept than institutional development, and in addition to a concern with human resources and the development of institutions, it includes an emphasis on the overall environment within which organizations operate and interact.

Unlike capacity building efforts, adaptive capacity is something organizations pursue in an ongoing manner through measures that embed the four attributes of adaptive capacity-external focus, network connectedness, inquisitiveness and innovation--inextricably in the corporate culture.

The difference between capacity development and institutional development is mainly a difference of perspective. A capacity development approach requires that, even if the focus of concern is a specific capacity of an organization to perform a particular function, there must nevertheless always be a consideration of the overall policy environment and the coherence of specific actions with macro-level conditions. Capacity development is therefore concerned with the micro and macro factors that determine how institutions translate their capacities into actual performance.

Five dimensions of capacity

Five dimensions of capacity have been identified as the major areas of analysis and the key levels of intervention.

First, training and education: Effective performance requires a well-trained human resource base of managerial, professional and technical personnel. This involves both specialized training and professional education, and in-service training needed for role-specific activities.

Secondly, organization and its management: effective performance requires the utilization and retention of skilled people. Thus, capacity development must include the organizational structures, processes and management systems, in particular the personnel management

systems, which make the best use of skilled human resources, and which ensure their retention and continued motivation.

Thirdly, the network and linkages among different groups: there is a need to consider the network of groups or divisions that facilitates or constrains the achievement of particular tasks. The accomplishment of many tasks requires the coordinated activities of many groups and any particular group may belong to several task networks. How these networks function, and the nature of formal and informal interactions among them, are important aspects of group's performance.

Fourthly, the public sector environment: the policy and institutional environment of the public sector is a major factor that constrains or facilitates organizational activities and affects their performance. This includes the laws, regulations and policies affecting the civil service, including hiring, promotion, salary structures and operating procedures, the budgetary support that allows organizations to carry out their tasks, the definitions of responsibilities among agencies, and the nature of the policy environment that supports or impedes the performance of functions.

Fifthly, the overall context**:** it is important to consider the broad action environment of the organization, beyond the public sector. This refers to the economic, social, cultural and political milieu in which organization operates, and the extent to which conditions in this broader environment facilitate or constrain the functional capacity of organization. For example, the level and rate of growth of output, changes in markets, and changes in aid policies of major donors are key economic factors that can constrain or facilitate capacity development.

5.1 SJVNL: Environmental Activities

Environment management and monitoring would continue to be a key area of activity in SJVNL along with growth in generation of power. Driven by its commitment for sustainable growth of power, SJVNL has evolved a well defined environment management policy for minimizing environmental impact arising out of setting up of power units and preserving the natural ecology. SJVNL has adopted an Environment, Resettlement & Rehabilitation Policy which reiterates company's commitment to sustainable development which is within the carrying capacity of the eco-system and promotes the improvement of quality of life.

Nathpa Jhakri Hydro-Electric Project is one of the most eco-friendly Projects in the country. Being run of the river project, it has minimum impact on ecology of the area and least disturbance to flora and fauna. The positive impacts on the environment are on very high scale of appraisal, because this project will generate in to Northern Region Grid about 7,000 GWh of electricity each year. The Satluj Jal Vidyut Nigam Ltd. has prepared and followed a comprehensive Environment Management plan and Rehabilitation & Resettlement Plan for its various Environments and R&R related activities.

SJVNL has established a separate ER&R Department for Nathpa Jhakri Hydroelectric Project site and also at corporate level under the direct control of Director (P). This

department undertakes all activities of Environment and R&R at Project and at corporate level.

Few tasks presently being undertaken by the department have been described below:

- Afforestation
- Avenue plantation
- Reclamation of muck disposal
- Catchment area treatment plan
- Sustenance & enhancement of fisheries
- Veterinary & horticulture camps at project area
- Medical infrastructure facilities
- Environmental monitoring
- Solid waste management

5.2 Environmental Institutional Set-up

Realizing the importance of protection of the environment with speedy development of the power sector, the company should constitute different groups at project, regional and corporate centre level to carry out specific environment related functions. The Environment Management Group can function from the Corporate Centre and initiate measures to mitigate the impact of power project implementation on the environment and preserve ecology in the vicinity of the projects. Environment Management Group established at each site, look after various environmental issues of the individual site.

Environment Impact Assessment

SJVNL is one of the environment conscious organizations and have ensured that their efforts towards improving the environment match with our developmental efforts in the power sector. SJVNL has been conducting Environment Impact Assessment (EIA) studies of the areas in the vicinity of projects, which form the basis of efforts to protect and maintain environment. These studies consist of literature search, field studies and impact assessment in the area of the land use, water use, socio-economic aspects, soil, hydrology, water quality, meteorology, air quality, terrestrial/ aquatic ecology and noise.

The EIA involves stage-by-stage evaluation of various parameters which affect the environment. Based on EIA study, wherever required, specific scientific studies are also conducted to scientifically assess the likely impact of the pollutants on the sensitive flora and fauna in the surroundings, as also, to take preventive and mitigatory measures, wherever required.

Ecological Monitoring

SJNVNL should undertake comprehensive Ecological Monitoring through Satellite Imagery Studies over project area and vicinity.

These studies would reveal significant environmental gains in the vicinity areas as a result of pursuing sound environment management practices. Some of these important gains noticed may be an increase in dense forest area, increase in agriculture area,

increase in average rainfall, decrease in waste land etc. Such studies conducted from time to time around and in vicinity of a project would establish the environment status at various post operational stages of the project.

Monitoring of Environmental Parameters

A broad based Environment Monitoring Programme needs to be formulated and implemented in all projects of SJVNL. Critical environmental parameters should be monitored at the stipulated frequency.

Environmental Reviews

To maintain constant vigil on environmental compliance, Environmental Reviews should be carried out at all sites and remedial measures should be undertaken wherever necessary. As a feedback and follow-up of these Environmental Reviews, a number of retrofit and up gradation measures should be undertaken at different locations.

Such periodic Environmental Reviews and extensive monitoring of the facilities carried out at all locations would have help in compliance with the environmental norms and timely renewal of different environmental permissions.

On-Line Data Base Management

In order to have better control on environmental degradation and to achieve effective environment management in and around project locations, it is imperative to have an on-line, reliable and efficient environment information system on the operational and environmental performance parameters at all levels. In consideration of the above, a GIS based computerized programme, which could provide reliable storage, prompt, and accurate flow of information on environmental performance of project locations should be developed and installed in SJVNL. This software will help and facilitate direct transfer of environment reports and other environment related information from project locations to the Regional and Corporate Centre.

This system will help in achieving continuous improvement in SJVNL's environment performance through improved monitoring and reporting system by using the trend analysis and advanced data management techniques.

Corporate Social Responsibility

SJVNL believes in growth with a human face, and pursuing people-centered development. SJVNL is a socially committed organization and a socially responsible corporate citizen. It attaches great importance to discharging its overall social responsibilities to the community and the society at large where its projects are located. In this regard Resettlement and Rehabilitation (R&R) program becomes an area of sharp focus, a program that addresses people affected directly or indirectly in the wake of the projects.

Community Development, as a part of corporate social responsibility, Initiatives Scheme has to be introduced with the aim of aligning business operations with social values. Through this initiative, NHPC should undertake community development programme in and around its sites.

ISO 14000 certification

SJVNL should establish Environmental Management System (EMS) as per ISO-14001 at its different establishments. As a result of pursuing sound environment management practices, all SJVNL sites as well as the Corporate Environment Management should be got certified for ISO-14001 EMS by reputed certifying Agencies.

Setting up of Environmental lab

An environment lab with the following facilities should be setup

For water analysis

- Flame photo meter
- BOD Incubator
- Desiccators (Moisture removal)
- Soxlet Apparatus (COD)
- Microscope
- GC-MS Spectrophotometer (for VOC/PCB etc)
- Atomic absorption Spectrophotometer (for Heavy Metals etc)
- Refrigerator
- Electronic Balance
- pH meter
- Turbidity meter
- Conductivity meter

For air analysis

- High Volume Sampler with gaseous attachments, impingers etc.
- Desiccators (Moisture removal)
- Oven with heating mantel

For Meteorological Observations

- Automatic Anemometer
- Hygrometer
- Rain gauge
- Thermometer

GIS facilities

To facilitate, on-Line Data Base Management and environmental management and monitoring requirements related to different proposed and on going project developments, advanced remote sensing and GIS facilities at corporate level should be set up. This cell will not only serve the in-house project requirements but also proposed to take up the charge of capacity building of other similar institutions. The following hardware and software facilities are proposed:

Hardware:

Few Pentium machines including laptops, A0 size scanner, A0 size color plotter, GPS, Digital camera, Data storage devices. Procurement of hardwares could be phased out depending on the priority.

Software:

- Image processing software like ERDAS Professional with all modules like Vector, Photogrammetry etc
- GIS software like ARCGIS or MapInfo Professional, AutoCAD Map etc
- In addition, the lab has to be equipped with a few qualified and trained GIS professionals having sufficient experience in the related field. This has been specified as a part of manpower subsequently.

5.3 Training needs

Training need assessment has been done based on discussions with SJVNL staff with regard to immediate requirements of ongoing/proposed projects at SJVNL, in-house expertise available at SJVNL for regular monitoring of ongoing hydroelectric projects & proposals for up-coming projects.

It is important to mention that besides operational NJHEP (1500MW) project and planned RHEP (412 MW) project, the following are 5 projects have been proposed by SJVNL:

1. Devsari Dam HE Project (300 MW)
2. Devra Mori HE Project (33 MW)
3. Jhakhol Sankari HE Project (35 MW)
4. Luhri HE Project (700 MW)
5. Khab HE Project (636 MW)

Successful operation of hydro electric project demands regular monitoring of various activities related to civil works, environmental issues and social issues. In addition, key contribution by the concerned organization, in overall development of the area by adopting R&R programme and by association with local organizations in various development schemes is must to deliver.

But it has been observed that though the organisation (SJVNL) has improved and developed over the time, the issue of the institutional strength of the organisation (now SJVNL) continues to be a concern; for example, there have been frequent periods when the organisation had less then its full complement of Directors. The organisation has a small environmental cell and less staff with relevant expertise to take care environmental issues linked with various ongoing and proposed projects. It may not have any impacts on running and monitoring of hydro electric projects in present but we can not say that the scenario will remain same in future too considering the complexity of various environmental and socio-

economic issues linked with these projects. SJVNL has already experienced this during construction and operation of NJHEP project and for taking up the Khab hydro electric project.

In view of existing organisational structure at SJVNL Corporate office, which is presently under process of restructuring and at project office (NJHEP & RHEP), following, is suggested:

The existing staff working on environmental aspects in SJVNL should be kept abreast with the latest tools and methodologies in Environment field especially Impact Assessment Studies. They should undergo short duration trainings on environmental issues linked with hydro electric projects and their remediation practices being followed in other areas from prestigious institutions in India or abroad. In India, it could also be in the form of attachment with some organizations already involved in implementing environment mitigatory requirements for hydro power development like NHPC, THDC etc or conceptual up gradation by attachment with TERI, NEERI etc. While short term overseas training could also be undertaken at University of Oklahoma or East West Centre, Hawaii with emphasis on modeling of various environmental parameters.

5.4 Man Power requirement

It is proposed to develop environmental group at corporate headquarters level. The group should be able to handle all issues related to different environmental attributes. The group will be responsible for monitoring of environmental and social issues related to all hydro projects being undertaken by SJVNL whether at investigation level or execution level. The group will have experts from all major environmental disciplines which are likely to be issues in hydro development. The management of environmental lab and GIS lab proposed above would also be the responsibility of this group.

Similarly at each project site, a similar environmental group should be formed having services of well trained professionals with ecology, socio-economic background depending on requirement of project. This group will also handle various other technical and administrative matters at project site. Depending on the quantum of work at project office, the staff of proposed environmental cell may not necessarily be a full timer. Depending on the phase of project as if project is under smooth operation the charge of the environmental cell can also be worked out with relevant department of local College or University for regular monitoring of issues on chargeable basis.

For specific increased workloads specifically during execution stage of various environmental mitigatory measures, the individual teams can be reinforced from the corporate head quarter environment team. Manpower requirement for corporate environment cell as well as at each project location has been indicated in the following tables.

Man Power requirement

Deployment at	Personnel	Qualifications	Exposure / Experience	Role and responsibilities
Corporate Environmental management Cell	Head (Environment)	Masters degree in Environment	About 10-15 years in the field, more is desirable. He/She should be well versed with environmental policies and legislations in India especially related to hydro power. He/She also needs to have good idea about the best practices being followed in environmental management and social sector else where in country as well as abroad. He/She should have actually executed a few environmental and social sector mitigatory initiatives in selected hydro sector development in country.	- Overall management of the environmental set up, technical matters of all projects - Overall management of the environmental set up , administrative matters of all projects
	Ecologist	Masters degree in Botany/B.Sc degree with specified experience in field	About 3-5 years of experience (for Master Degree)/5-7 years of experience (for B.Sc Degree holder) of working on forestry, taxonomy or ecology. Experience with some organization involved in implementing afforestation programmes or catchment area treatment measures should be desirable	Terrestrial ecology, Catchment area treatment, Compensatory afforestation, Restoration of quarry sites, muck disposal areas etc
	Aquatic ecologist/ Zoologist	Masters degree in Zoology Aquatic biology/ecology	About 5-7 years of experience of working on aquatic ecological studies i.e. pollution studies using bio indicators, sampling and analyses of Phyto-Planktons, Zoo-Planktons, Primary Productivity, Benthic Organisms, Fishries and other Aquatic organisms etc preferably with some institute	Wildlife, Fisheries, Aquatic ecology, etc
	Socio economist	Masters in Sociology/Social sciences	About 5-7 years of experience in socio-economic survey and assessment, preferably related to project affected population and their rehabilitation and resettlement. Knowledge of anthropology should be desirable.	Socio-economic assessment, Rehabilitation & Resettlement issues, Archaeological and anthropological aspects, etc
	Chemist	Masters degree in Chemistry	About 5-7 years of experience of working in CSIR/CPCB approved labs	Air, Water Soil, Noise quality parameters
	GIS Professional	Masters degree in Remote Sensing & GIS	About 5-7 years of experience in Remote Sensing and GIS especially related to natural resources management	Environmental and social monitoring, Database preparation, on-line data base presentation, updation of website and dissemination of

				environmental inventory
At project sites	In charge (Environment)	Degree in Civil Engineering	About 10-15 years, more is desirable. He/She should have fair idea of environmental policies and legislations in India especially related to hydro power. He/She should have been involved in executing a few environmental and social sector mitigatory initiatives in selected hydro sector development.	Overall management of the environmental team, technically as well as administratively
	Ecologist	Masters degree in Botany/B.Sc degree with specified experience in field	About 3-5 years of experience (for Master Degree)/5-7 years of experience (for B.Sc Degree holder) of working on forestry, taxonomy or ecology. Experience with some organization involved in implementing afforestation programmes or catchment area treatment measures should be desirable	Terrestrial ecology, Catchment area treatment, Compensatory afforestation, Resoration of quarry sites, muck disposal areas etc
	Socio economist	Masters in Sociology/Social sciences	About 5-7 years of experience in socio-economic survey and assessment, preferably related to project affected population and their rehabilitation and resettlement. Knowledge of anthropology should be desirable.	Socio-economic assessment, Rehabilitation & Resettlement issues, Archaeological and anthropological aspects, etc

- Here, emphasis is given on specialized/expertise areas/fields to be filled up at SJVNL. Expertise need has been assessed on the basis of existing environmental and socio-economic issues at project sites. Further, it has also been referred to existing level of expertise at Corporate as well as site level offices of SJVNL.
- To come out with detailed Organisation Structure in terms of exact number of employees, brain storming at in-house level is recommended.
- Proposed expertise areas may change depending on site conditions of particular project and on local issues of the area
- Existing staff of SJVNL with appropriate professional experience in relevant field as proposed above will be part of above team.
- Positions proposed at higher levels can be taken care by in house staff with similar discipline like Civil Engineering background and these could be replaced later as and when in-house lower staff becomes eligible.