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Mapping of Policy Instruments and Governance Agencies

for Environmental Clearance of Hydropower Projects in Upper Ganga Segment

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GRB EMP : Ganga River Basin Environment Management Plan

by

Indian Institutes of Technology

IIT Bombay | IIT Delhi | IIT Guwahati | IIT Kanpur | IIT Kharagpur | IIT Madras | IIT Roorkee

Preface

In exercise of the powers conferred by sub-sections (1) and (3) of Section 3 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government has constituted National Ganga River Basin Authority (NGRBA) as a planning, financing, monitoring and coordinating authority for strengthening the collective efforts of the Central and State Government for effective abatement of pollution and conservation of the river Ganga. One of the important functions of the NGRBA is to prepare and implement a Ganga River Basin: Environment Management Plan (GRB EMP).

A Consortium of 7 Indian Institute of Technology (IIT) has been given the responsibility of preparing Ganga River Basin: Environment Management Plan (GRB EMP) by the Ministry of Environment and Forests (MoEF), GOI, New Delhi. Memorandum of Agreement (MoA) has been signed between 7 IITs (Bombay, Delhi, Guwahati, Kanpur, Kharagpur, Madras and Roorkee) and MoEF for this purpose on July 6, 2010.

This report is one of the many reports prepared by IITs to describe the strategy, information, methodology, analysis and suggestions and recommendations in developing Ganga River Basin: Environment Management Plan (GRB EMP). The overall Frame Work for documentation of GRBMP and Indexing of Reports is presented on the inside cover page.

There are two aspects to the development of GRB EMP. Dedicated people spent hours discussing concerns, issues and potential solutions to problems. This dedication leads to the preparation of reports that hope to articulate the outcome of the dialog in a way that is useful. Many people contributed to the preparation of this report directly or indirectly. This report is therefore truly a collective effort that reflects the cooperation of many, particularly those who are members of the IIT Team. Lists of persons who have contributed directly and those who have taken lead in preparing this report are given on the reverse side.

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In addition to these a large number of villagers in the periphery of the project sites visited have helped us understand the issues from their perspective. We wish to convey our sincere thanks to all of them.

List of Abbreviations

BMC	:	Billion Cubic Meter
CAT	:	Catchment Area Treatment
CEA	:	Central Electricity Authority
CIA	:	Cumulative Impact Assessment
CPSU	:	Central Public Service Utilities
CPCB	:	Central Pollution Control Board
CSOs	:	Civil Society Organizations
DoE	:	Department of Environment
DPR	:	Detail Project Report
EAC	:	Environmental Appraisal Committee
EC	:	Environmental Clearance
EIA	:	Environmental Impact Assessment
EMP	:	Environmental Management Plan
EPA	:	Environment Protection Act
GAs	:	Governing Agencies
GoI	:	Government of India
GWh	:	Giga Watt hour
HPPs	:	Hydro Power Projects
HQ	:	Head Quarter
IA	:	Impact Assessment Division
IPPs	:	Independent Private Parties
MoEF	:	Ministry of Environment and Forest
MoP	:	Ministry of Power
MW	:	Mega Watt
NBWL	:	National Board for Wild Life
NCEPC	:	National Committee on Environmental Planning and Co-ordination (India)
NGO	:	Non Governmental Organization
NGRBA	:	National Ganga River Basin Authority
P&G	:	Policy and Governance
PIs	:	Policy Instruments
PLG	:	Policy, Laws and Governance
PPM	:	Post Project Monitoring
PSI	:	Peoples Science Institute
ROs	:	Regional Offices
SANDRAP	:	South Asian Network for Dams, Rivers and People
SEAC	:	State Environmental Appraisal Committee
SEIAA	:	State Environmental Impact Assessment Authority
SPCB	:	State Pollution Control Board
SROs	:	State Regional Offices
THDC	:	Tehri Hydro Development Corporation
ToR	:	Term of References
UGR	:	Upper Ganga Region
UJVNL	:	Uttarakhand Jal Vidyut Nigam Limited
UTPCB	:	Union Territory Pollution Control Board
WHO	:	World Health Organizations

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1. Introduction

Electricity demand forecasts, which seek to meet the demands of projected economic growth rates and the growing population, underlines accelerated need for massive additions in the existing installed capacity for power generation in the country (Planning Commision, 2011). For instance, the 2021-22 electricity demand forecasts the need for 1, 94,508 GWh requiring an installed capacity of 2, 98, 253 MW (MoP, 2011; Prayas, 2004). The reliance on fossil fuel is increasingly questioned with the climate challenge due to emissions. Hydropower, having known to be from the family of renewable alternatives is considered as a "green" source of power. Himalayan region, which is rich in glaciers and forms the headwaters of the major perennial rivers of the country like Indus, Brahmaputra and Ganga, is the water tower of the country that has immense potential of hydropower generation (Agarwal *et al.*, 2010). Given the need for power generation and availability of the flowing water resources, the nation in 1991, has already opened up the power generation sector for the private sector investors (MoP, 2011). As a result, a huge number of hydropower projects are either planned or under construction in the major river systems of the country (Agarwal *et al.*, 2010; Planning Commision, 2007), of which the Ganga is of special significance.

Close to half of Indian population stays in the Ganga basin which constitutes about one fourth of the county's total geographical areas. The river Ganga is of special significance because of the cultural-religious values attached and livelihood dependence of millions of people. Ganga carries huge amount of waters all over the year and provides the head differences ideal for generating electricity at several places, which attracts energy planners, private and public sector developers that results in a number of hydropower project proposals. The debate involves country's power demand, scope for State to harness it for commercial use and the plausible threats to the local environment and livelihoods. The need for hydropower and thus dams is well articulated, known and widely accepted by the State, developers and other sections of the society. However, social and environmental consequences of such dams demand a balance between the economic activities like dam construction and associated environmental and social externalities. Environmental Impact Assessment (EIA) - a globally accepted environmental management tool (Muttamara, 1996) is believed to be able to serve as an instrument to seek an expected balance between economic growth and environmental protection.

While Environmental Clearance is an essential requirement for some scheduled categories of interventions, there are several issues in its design and implementation. Hydropower development as an activity, involves many stakeholders ranging from the state to the people and from commercial developers to the environmentalists and their differential, often with contradictory perspectives and interests. EIA and EC, for the state, is a management tool that can show a pathway to achieve developmental goals without compromising environmental protection objective, for developers it is an essential procedural requirement for the project construction to start and for environmental activists and project affected people that would be affected by the project, it is the only way to

safeguard their interests. This misalignment of goals and expectations from the EIA-EC process is leading to violations of rules and laws, bringing out the limitations of the existing institutional framework, procedures and implementation. These symptoms of the core problem point to the gaps inherent to the statutory provisions in the Policy Instruments (PIs), and in the competency and legitimacy of Governing Agencies (GAs).

An EIA is supposed to provide conceptual framework and methodology to undertake a detailed appraisal of the base line information of the concerned ecosystems and development projects that are to be introduced in these ecosystems, predict possible negative impacts of such an intervention and explore mitigation measures to minimize the impacts. In 1994, Government of India (GoI), made it mandatory for a range of projects including hydropower projects that demands conduct of EIA studies and prepare an Environmental Management Plan (EMP) and laid down a governance procedure called as "Environmental Clearance (EC)" (MoEF,1994). This was replaced by a new notification in 2006 (MoEF, 2006). Although, there are several issues and challenges associated with its existing framework, EIA has been seen as a hope for the better. Civil Society Organizations (CSOs) and activists have grievances about the existing PIs and performance of GAs for environmental clearance.

1.1. Objectives

This report has twin objectives: (1) to systematically map the institutional structure (PIs and GAs) for environmental governance in India and (2) to bring out the critical perspectives of this from the civil society angle. This is consciously done since the perspectives from the State and Developers on the need for hydropower dams is well known. This report is preceded by another report (007_IIT_GRB_PLG_ANL_Ver 1 Dec 2011) on one aspect i.e. public consultation- to bring in transparency, accountability and participation of the EC process.

1.2. The Policy and Governance Perspective

The problem of effective implementation of provisions for the EIA-EC of hydropower projects has been aggravating because of the number of stakeholders, their differing and contradictory expectations from the EIA-EC and inadequacy of necessary competence and legitimacy of the Government Agencies. Since the introduction of legislations and building capacity of the concerned agencies to implement those 3 core issues, a progressive restructuring of the EC governance has been made by addressing the gaps in the Policy Instruments, and also making the Governance of EIA-EC more Transparent, Accountable and Participatory.

According to the 'Policy and Governance' perspective, the problems in performance of government agencies lie in the problems in the process of governance and the lacuna in the policy instruments for governance. As a result, until these root-causes or the core malady in governance is addressed, the other measures (such as financial inputs, technical solutions, management fixes, institutional innovations) can hardly improve the situation. A preliminary

analysis of the EIA legislations from the perspective of 'Policy and Governance' indicates that the main problem with the design and implementation of these legislations is that the measures to improve these legislations essentially focused on the symptoms, while leaving the core malady intact. Therefore, the P&G perspective requires that a thorough analysis of situation is conducted with an appropriate framework to identify: (a) problems with the policy instruments for environmental protection, and (b) the problems in the process of governance, especially issues of implementation of the PIs.

1.3. Methodology

In order to identify the actual instances of lacunas in the policy instruments, in the performance of the government agencies and the misalignments in Norms and Interests, diverse methods could be employed. To map the institutional structure, the study is restricted to a review of policy documents and existing body of academic knowledge on these issues. To distil the critical perspectives on the EC process, a range of stakeholders ranging from government officials, NGO workers, social activists and local people were interviewed in the Upper Ganga Basin. A list of respondents is given in Appendix 1.

2. Rationale for Hydropower Projects in Upper Ganga

A brief review of significance of river Ganga, hydropower development on Ganga and consequences of this development is presented as follows.

2.1. The River Ganga and its Significance

The 2,510 km long river Ganga originating from the *Gangotri* in the Himalayas in the state of Uttarakhand drains through one million square kilometers before emptying in the Bay of Bengal (NGRBA, 2011). The river is of special significance to the nation because of the:

a) **Ecosystem Services and Livelihood Values:** The total catchment of the river Ganga, which is one of the largest Indian Rivers, constitutes 26% of the county's total landmass and supports rich biological diversity including 43% of Indian population (NGRBA, 2011).

b) **Cultural and Religious Values:** Apart from the biological services and livelihoods of the people, Ganga is considered 'holy' and worshiped by Hindus and thus have great cultural and sentimental values attached to it.

c) **Hydropower and Irrigation Potential:** Surface water resources of the Ganga has been assessed to be 225 Billion Cubic Meter (BMC). On an average each sq km stretch of Ganga, which flows over high 'head' differences, receives one million cubic meter of water through rain fall. 50 percent of this is available as surface runoff (NGRBA, 2011), making an ideal scenario for irrigation and hydropower development.

2.2. Rationale for Hydropower Development

The arguments for hydropower development in the country are as follows:

a) **Urgent Need for Addition to the Installed Capacity for Power Generation:** Electricity demand in the country has increased forty folds since independence because of the increasing population and for ensuring higher economic growth. The long term demand forecast for the country is 1, 94,508 GWh for 2021-22. To meet this demand the country will have to have an installed capacity of 2, 98, 253 MW (MoP, 2011; Prayas, 2004).

b) **Shift from Government Owned and Fossil Fuel Based Power Generation:** The distribution of present installed capacity (as per the means of generation and as per administrative sectors) is given in Figure 2 a) and b) respectively. The maximum installed capacity is owned by government and heavily consumes fossil fuels. In order to meet the forecasted energy demands in an environmentally sustainable manner government has recognized hydropower generation as a clean energy option and private sector is encouraged.

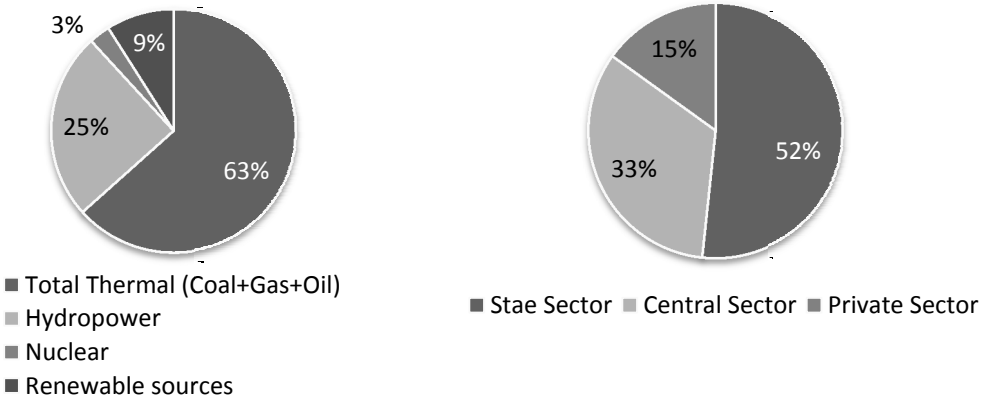

Figure 1 a) and b): Distribution of Installed Capacity in MW as per means of generation and as per administrative sector (CEA, 2007)

c) **Incentives for State Governments:** As per the present structure, the state government by allowing private, public sector developers to invest in and use resources for power generation can earn twelve percent of the profit. This, as argued by the State, shall percolate to the masses for their welfare.

2.3. Hydropower Development in Upper Ganga Segment (UGS)

The present study focuses on the hydropower development in the rivers Alaknanda and Bhagirathi in the state of Uttarakhand, which is a part of the Upper Ganga Segment (UGS). There are competing estimates of hydropower development from three major sources which includes, Central Electricity Authority (CEA), Uttarakhand Jal Vidyut Nigam Limited (UJVNL) and Peoples Science Institute (PSI) in Deharadoon. A total number of 75 hydropower projects with a total installed capacity of 12,039 MW is proposed to be constructed on river Ganga in seven different states, of which 64 projects having installed

capacity of 11,129 MW are to come in the state of Uttarakhand alone under 50,000 MW initiatives only (CEA, 2010a ; CEA, 2010b; CEA, 2010c). Other source of the information is the situation analysis done by People's Science Institute (PSI) in 2009 (PSI, 2009). According to this study, a total number of 286 hydro power projects, those falling under all capacity ranges, have been proposed on Ganga in the state of Uttarakhand (PSI, 2009). Some of these projects are part of 50,000 MW initiative while others are being constructed or planned for by state and central governments and have been undertaken by state agencies (UJVNL, 2010e), Independent Private Parties (IPPs) (UJVNL, 2010c) and Central Public Service Utilities (CPSU) (UJVNL, 2010b), whereas about 86 projects have been already commenced (UJVNL, 2010a; UJVNL2010d). The state of these projects is shown in Figure 2.

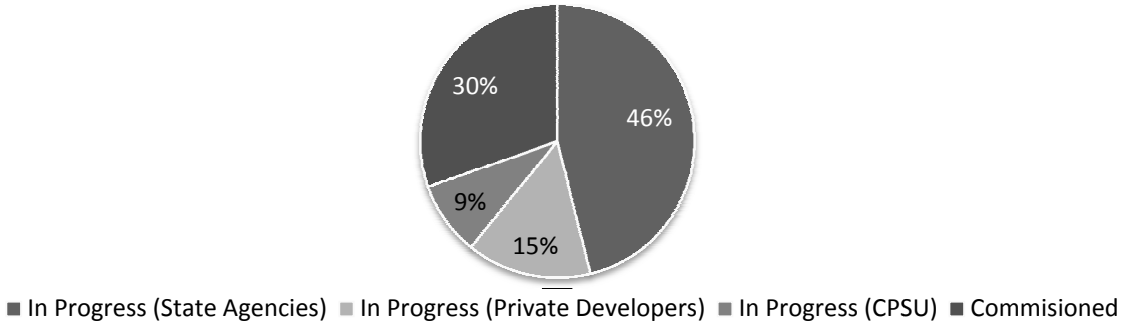

Figure 2: Developer Wise Distribution of HPPs in Uttarakhand

2.4. Environmental and Social Impacts of Hydropower Development in UGS

Some of the major arguments against damming of the river Ganga are described in following sections.

2.4.1 Drying of Rivers and Change in Natural River Flow Regime

The wide range of temporal variations in the rain fall patterns over the year already cause natural fluctuations in the river flow characteristics. Damming of rivers will further interrupt and alter the river's important ecological processes by changing the flow of water, sediments, nutrients, energy and biota. Due to the densely located Hydro Power Projects (HPPs), water drained from one dam would enter the reservoir of the next HPP. This would lead to seasonal drying of the river stretches during the lean season flows in Ganga.

2.4.2 Crowding of Environmental Perturbations and Cumulative Impacts

The numbers of hydropower projects (HPP's) that are proposed to be constructed in series are so densely located in the region that their influence zones overlap each other (according to the EIA guideline it is the region within the radius of 7km from a Dam). The cumulative influence zone is as high as 35% of the total influence zone. It is now proven that the cumulative environmental impacts result from spatial and temporal crowding of environmental perturbations. Project specific EIAs easily overlook such overlaps and related cumulative impacts in the present methodology (Agarwal *et al.*, 2010).

2.4.3. Seismicity and Possibility of Earthquake Disasters

Himalayan region is a geo-dynamically sensitive zone (Seismic zone IV; IS 1893:2000), that is naturally prone to disasters (NGRBA, 2011). According to the EIA guidelines of the MoEF, dam break analysis for disaster management planning is required for individual projects, wherein, there can be no consideration for other dams upstream or downstream, ignoring the cascade effects of the dams. In practice, the failure of structure of one dam would result in the failure of others in the cascade (Agarwal *et al*., 2010).

2.4.4. Loss of Livelihoods of Local Communities

A hydropower project requires construction of storage reservoirs, a penstock and power plant and power transmission facilities. The reservoir submerges the agricultural land and surface water bodies, the blasting results in fractures in the mountain, changing groundwater flow directions and drying of wells, destabilizes the mountain slopes, destroy trees and pasture land, and dam wall blocks fish migration and thus loss of livelihood opportunities for the local communities. HHPs brings influx of laborers and visitors leading to the dilution of the pastoral culture, induction of new diseases and cause stress on the carrying capacity of local natural resources[1].

2.4.5. Loss of Aesthetic Value of Ganga

With the development of HHPs the river flows will disappear and cause tremendous loss to the panoramic landscape, natural beauty and cultural heritage of the region resulting in decreased tourism potential[2]. The damming of rivers also causes flash floods which can be harmful to the lives of the local people, cattle and the visiting pilgrims.

3. Review of Existing Governance Framework

Environmental Clarence, which is supposed to be accorded on the basis of findings of EIA studies and adequacy and accuracy of the Environmental Management Plan (EMP), an integrated part of an EIA, was adopted and enacted in 1994 by Ministry of Environment and Forest (MoEF). The present major policy instrument is the 2006 notification for enacting EIA-EC. However, there are several laws associated with it. While mentioning the need to study these laws the present section will discuss the institutional structure and procedure for environmental clearance and challenges and opportunities in its design and implementation.

3.1. Policy Instruments (PIs) for EIA-EC

We define Policy Instruments as statutory provisions that define the jurisdiction of the concepts that are to be applied and lay down the necessary conceptual, procedural and methodological frameworks for the application of the concepts and its governance.

[1] Personal communication with Dr. Ravi Chopra, Director, People Science Institute, Dehradoon
[2] Personal communication with Dr. Bharat Jhunjhunwala, renowned economist & formerly professor of IIM, B

3.1.1. Principles Forming Philosophy of PIs for EIA-EMP

Two principles form the philosophical basis to address the conflicts associated with EIA-EMP-EC mechanism. Polluter pays' principle states that the polluter has to bear the cost of all remedial or clean up measures, and also the amounts payable as compensation to the victims of pollution (Gaines, 1991). Precautionary principle requires the government authorities to anticipate, prevent and attack the causes of environmental pollution. This principle also imposes the responsibility of proof on the developer to show that his or her action is environmentally benign. If the environmental damage is considerable then the project proponent should think in terms of alternatives (Nash, 2008).

3.1.2. Associated Laws

There is a menu of laws, as prescribed by a study on EIA of hydropower projects done by *Sutlej Jal Vidyut Nigam Limited* (SJVNL, 2010), that provide statutory basis to ensure the protection of environment under different conditions. For instance, the Forest (Conservation) Act of 1980 provides for regulating diversion of forest lands for non-forestry purposes like constructing a HPP (MoEF, 1980). An EIA study must consider these laws while identifying environmental attributes and should consider the mandate of these laws while predicting negative impacts of hydropower projects and suggesting measures to minimize and mitigate those. Identification of each of such laws and investigation of provisions therein would be helpful for critically analyzing the purpose of doing EIAs and adequacy of the check list of the content of an EIA report as prescribed in EIA notification. However, because this is beyond the scope of this study, we are giving an available list of these laws (See Annexure II) in view of initiating a discussion.

3.1.3. EIA Notifications

In exercise of the powers conferred by the Environmental Protection Act, 1986 (GoI, 1986) Government of India (GoI) on 27th January 1994 made it mandatory for expansion and modernization of existing projects to have prior environmental clearance (EC) (MoEF, 1994) Thirteen amendments were made to it during 1994 to 2005 (Kohli *et al*., 2011) and then, in 2006 principle notification was replaced with a new one (MoEF, 2006). The initial notification is no longer in effect, but it is our openion that in comparision with the principle notification, the new one is weak in some of the areas, at least. Following section shall discuss our major arguments.

4. Mapping of Government Agencies for EIA-EC

In order to administer the procedure laid down by the EIA notification, several institutions including but not limited to ministry, government departments, boards and regional bureaucracies have been set up over a period, both at the central as well as state level. A brief description of their jurisdictions and functions is given in the following sections. The government agencies with legal authority like Environmental Appellate Authority (EAA), National Green Tribunal (NGT) and High Courts and Supreme Court, which deal with grievance redressal are not included here but deserve a detailed appraisal of their roles and authorities.

4.1. Ministry of Environment and Forests (MoEF)

Following the Stockholm Conference and developments thereafter, the Department of Environment (DoE) was established as per the recommendation of the NCEPC in 1980, which was finally converted to a full-fledged Ministry of Environment and Forest (MoEF) five years later (Rao, 1997). Indian Parliament enacted the environmental protection act of 1986 (EPA-1986), which is an umbrella act covering various environmental aspects and MoEF is responsible for its implementation. MoEF through its Impact Assessment Division (IA) processes the case of hydropower projects. The Central Minister concerned (at present minister for state with independent charge), based on the recommendations of the EAC (see next Para) and on the behalf of Government of India in the Ministry of Environment and Forests, is responsible to take decisions about environmental and forests clearance of hydropower projects within the mandate of the ministry. Minister, having veto power can however make decision as different from the recommendations of the EAC and is accountable to the nation through the parliament.

4.2. Impact Assessment Division (IA)

In the matters of impact assessment of all polluting agencies/activities in the country, IA serves as the working arm of the MoEF. It is responsible for setting guidelines for the preparation of EIA reports in consent with the relevant state and central authorities, prepares and issues various notifications and amendments pertaining to environmental laws. IA has constituted six multi-disciplinary expert committees known as Environmental Appraisal Committee (EAC) to carryout review of different kinds of projects. These committees are supposed to appraise the impact assessment and management documents and recommend for clearance or otherwise to the Ministry. The facilitation of appraisal process of EC, involving review of the EIA reports and various documents submitted by the project proponent is the leading responsibility of IA. IA may also seek clarification from the proponent and conduct site visits if necessary during the review procedure. Based on the documents submitted and clarification presented, IA either grants or rejects the environment clearance of the developmental project (Ritu, 2006; Murthy, 2005).

4.3. Central Pollution Control Board (CPCB)

The CPCB is an autonomous organization under the administrative control of MoEF. It has no direct role in environmental clearance process, though it acts as a research organization by collecting, analyzing and disseminating information pertaining to pollution prevention and abatement; this benefits the MoEF, SPCBs and several other stakeholders of environmental clearance process. (Ritu, 2006).

4.4. State DoE and SPCB

Environmental matters of any state ranging from the execution to formulation of guidelines have been entrusted to the state department of environment (DoE). The state pollution

control boards (SPCBs) work under DoE having different structures for project appraisals[3]. For the rest, member secretary or Chairman of the pollution control board does it (Ritu, 2006). Earlier these departments had no role in conducting EC process but the amendment in EIA notification defined the role of state departments for EC of small hydro projects of installed capacity less than 50MW. The IA has conferred the responsibility of public hearings to SPCBs. The minutes of the meeting and major findings are to be furnished to IA within 30 days (Ritu, 2006).

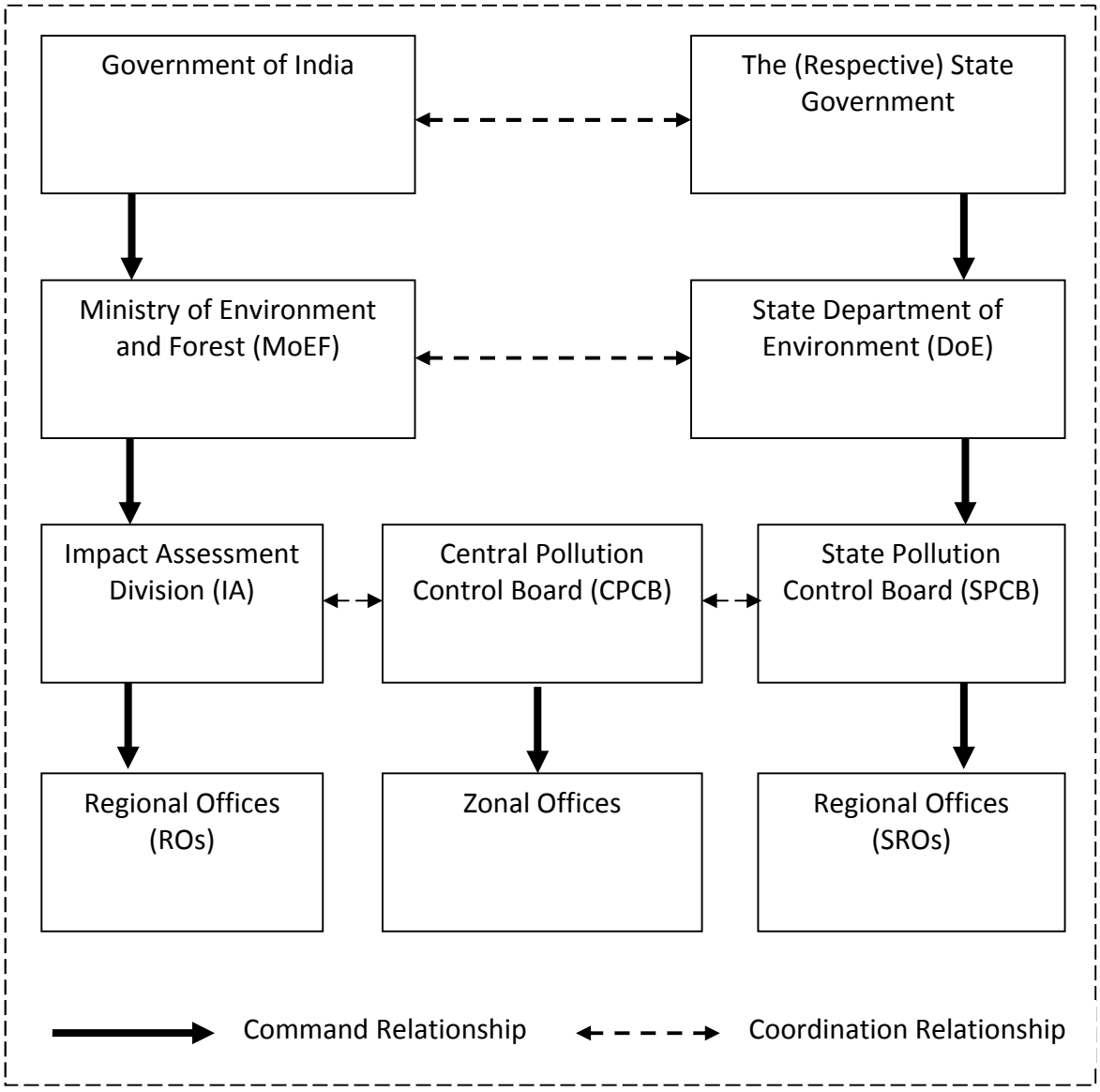

Figure 4: Map of Government Agencies for the Implementation of PIs of EC Process

[3] For instance, Andhra Pradesh (AP) government has State Environmental Appraisal Committee (SEAC) under SPCB, which appraises the report submitted by project proponent before issuing No Objection Certificate (NOC). Contrary, the states of Maharashtra, Gujarat, West Bengal and Karnataka have created SEACs directly under DoE instead of SPCBs, which issues NOC (Source: Personal communication with Mr. Himanshu Thakkar of SANDRAP, Delhi. However, Mr. Paritosh Tyagi, former chairman of Central Pollution Control Bord, was of opinion that the information about Andhra Pradesh SEAC provided here is incorrect and the fact requires to be verified).

4.5. MoEF Regional Offices (ROs)

The MOEF has set up six regional offices with a head quarter (HQ) unit at New Delhi for monitoring and implementation of stipulations under Forest (Conservation) Act, 1980 and provisions for environmental clearance, whereas office at Delhi coordinates with all regional offices. Post Project Monitoring (PPM) of the cleared projects in particular is the major responsibility of these offices. Project authorities are required to submit monitoring reports to these ROs every 6 months, detailing progress of implementation of the conditions, detailed while granting EC to the projects. These offices are allowed to take up site visits. If any violation of environmental standards is noticed, ROs inform HQ to take necessary actions (Ritu, 2006).

5. Environmental Clearance Procedure

As laid down in the EIA notification of 2006 (MoEF, 2006), procedure for EC follows four stages elaborated as follows and further detailed in Figure 2.

Stage 1 - Screening: Is only for category B projects. This stage determines whether a project requires an EIA. In case of river valley projects this stage is applicable only to projects with 25 to 50 MW capacities. The projects requiring an Environmental Impact Assessment report are termed Category 'B1' and remaining projects are termed as Category 'B2' and will not require an Environment Impact Assessment report.

Stage 2 - Scoping: At this stage EAC or SEAC is supposed to develop the detailed and comprehensive terms of references (ToR) based on the information provided by the proponent addressing all relevant environmental concerns for the preparation of an EIA report. Category B project does not require this stage. The ToR is to be conveyed to the applicant within 60 days from the submission of the documents. If it is not conveyed in due time, the ToR submitted by proponent will be accepted. Once the ToR is finalized, the applicant can start the EIA study. However, the concerned regulatory authority, on recommendations of EAC or SEAC, in case of projects requiring prior clearance, can reject the project.

Stage 3 - Public Consultation: Is a process by which the concerns of local affected persons and others who have plausible stake in the environmental impacts of the project are consulted through public hearing at project site or its close proximity to obtain written responses. All category A and Category B1 projects are liable to undertake public consultation. It's mandatory for concerned government agency and developer to well inform other stakeholders about the public hearing meeting and provide a summary EIA report in the local language.

Stage 4 - Appraisal: At this stage, EAC or SEAC is supposed to scrutinize the final EIA report, public hearing proceedings and applications. The applicant may be invited for further clarifications during scrutiny. The process must be completed within 60 days from the receipt of the final application. EAC/SEAC should place their recommendations before the

final regulatory authority within the next 15 days. The MoEF or SEIAA shall consider EAC/SEAC recommendations and convey its decision to the applicant within 45 days. If any clarifications are required, the authority should seek it during these 45 days. EAC/SEAC can give its views in another 60 days and this will be considered by the authority and will convey their decision to applicant in another 30 days, without which the recommendations of an EAC/SEAC, whether clearance or rejection, is considered as final decision.

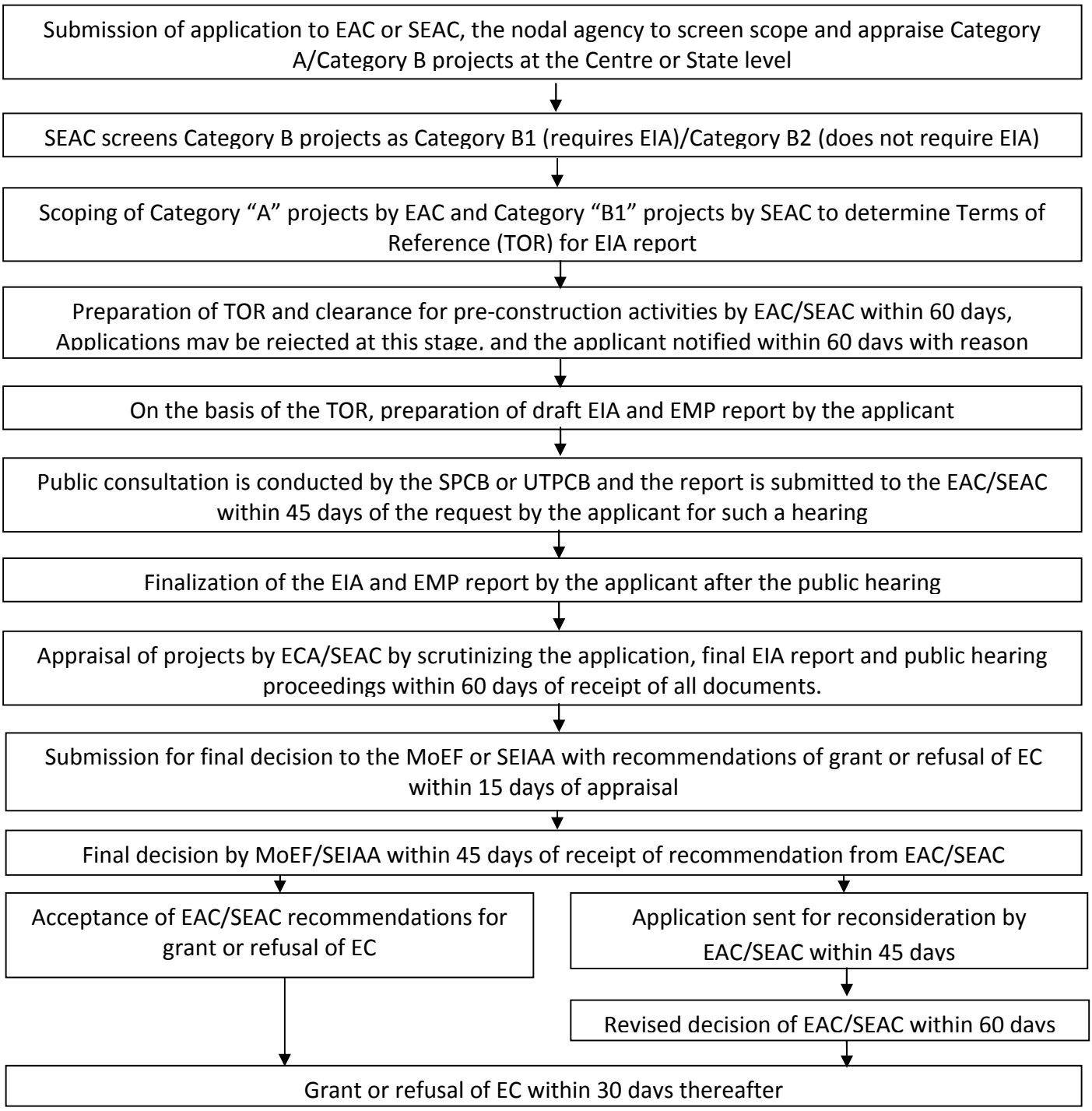

Figure 3: Procedure for obtaining EC as per EIA Notification 2006

Stage 5 – Post Clearance Compliance and Monitoring: The EC is a one time approval and it is valid for five years for all projects and ten years for river valley projects. The post monitoring is to be done through compliance reports submitted every six months by the project proponent.

6. Collation of Challenges and Opportunities

The Policy Instruments (PIs), provisions therein and Governance Agencies (GAs) for the EIA-EC implementation have been discussed informatively in the previous section. This section will present opportunities and challenges of these as articulated by the respondents of civil society in our field study and a review of literature. The section concludes with preliminary and tentative recommendations with a view of progressive restructuring of the system.

6.1 Purpose of EIA inadequately understood

An EIA study is supposed to be a tool that can assist environmental decision makers to make decisions in the interest of conservation of nature and local people. However, presently EIA has been understood by the developers as a formality that needs to be done for obtaining a clearance for the project[4,5,6,7]. A hydropower development project is an activity that seeks to utilize the land and water resource available. However, when multiple demands of these resources like irrigation, drinking are there, the EIA should explore the trade-offs among various alternate uses to set the priorities[8]. The framework for designing EIA studies from MoEF has to be analyzed thoroughly to ascertain to what extend this has been achieved.

6.2 Developer Appoint and Pay the Consultant

Environmental Impact Assessment studies are actually carried out by a professional consultant or a consultancy firm. Selection of consultant is thus a very important part of the process, which at present is the responsibility of the Developers. The practice of developers identifying and appointing consultants could lead to serious conflicts of interests because the loyalty of the consultants under such circumstances mostly remain with the proponent of the project. In order to bridge this shortcoming, the ministry, through Quality Council of India (QCI), has established two committees under National Accreditation Board for Education and Training (NABET). The Technical Committee, one of these two, has developed the procedural framework for accrediting EIA consultants and certifying them. NABET shall also evaluate after every three years, performance of the accredited consultants so that the

[4]Personal communication with Dr. Ravi Chopra, Director, Peoples Science Institute, Deharadoon

[5] Personal communication with Dr. Shekhar Singh, Former Chairman of an Environment Appraisal Committee

[6] Personal communication with Mr. Himanshu Thakkar, Director, South-Asian network on Dams, Rivers and People

[7] Personal communication with Dr. Bharat Jhunjhunwala, Former Professor of IIM Bangalore & an anti dam activist

[8] Personal communication with Mr. Katpaliya, a senior engineer and planner from irrigation department

quality of impact assessment would be ensured[9]. Ministry is looking forward to allow only NABET certified consultants to undertake EIA studies who will continue to be paid by the developers. Though the advisor to the ministry principally accepts that the consultants should be paid by the ministry through the corpus created by collecting impact assessment costs from the developers, in her opinion, to establish this practice it will require several legislative changes to be done through the parliament which is a tedious process[10]. Apart from this, another important challenge that needs to be dealt lies in developing mechanisms to verify the track record of consultants and to ensure implementation of the provision of blacklisting consultants or cross checking their work[11],[12].

6.3 No Standards for Designing and Conducting EIAs

There are no standards for identifying regional specific attributes for conducting, prescribing safer limits of impacts and designing the methods of EIA studies. This can lead to confusion and arbitrariness. However, there are guidelines prepared by MoEF and World Bank, which can give only a broad picture with different interpretations lacking a specific purpose[24]. Therefore the guidelines are less likely to be implemented without manipulation in the favor of the project proponent.

6.4 EIA Studies as Conducted presently are Inappropriate

The inadequacy of EIA studies is mainly because of the following reasons:

6.4.1. Identified Geographical Boundary for EIA Studies

Present EIA studies consider impacts in area within the radius of seven kilometers measured from the location of the dam site (Agarwal, Lodhi, & Panwar, 2010). This criterion is inadequate particularly in the Himalayan region which is geo-dynamically sensitive area (Agarwal, Lodhi, & Panwar, 2010) and going to house many number of hydropower dams that will be constructed in series, where a Cumulative Impact Assessment (CIA) is extremely important.

6.4.2. The notion of E-flows and Climate Change is not Considered

The amount of environmental flows to be released (PSI, 2007), damming and effect on micro climate change (Agarwal *et al.*, 2010), resulting in melting of glaciers in the region must be studied in the context of the projects on river Ganga (PSI, 2007).

6.4.3. EIAs are done simultaneously with Construction Activities

The environmental and social impacts are always being looked at not after, but at least simultaneously to other things happening in a project. Hence there is always a pressure to finish studies as quickly as possible and the Ministry grants clearance even on the basis of

[9] Personal communication with Dr. Paritosh Tyagi, Chairman, Technical Committee of the NABET
[10] Personal communication with Dr. Nalini Bhatt, Advisor, Ministry of Environment and Forests, GoI
[11] Personal communication with Dr. Shekhar Singh, Former Chairman of an Environment Appraisal Committee
[12] Personal communication with Dr. Bharat Jhunjhunwala, Former Professor of IIM Bangalore & an antidam activist

'Quick EIA', '3 months EIA' or 'do it later on' which is not acceptable because once the project is cleared then it is less useful assessing later on[13].

6.4.4. Methodologies to conduct EIAs are Poorly Prescribed

The aforementioned problems exist because methodologies to help conducting EIA studies are not adequately prescribed in the notification. In the absence of such standard methodology, EIA consultants can hardly complete the EIAs to meet the desired purpose of doing it on ground resulting in inadequate studies and borrowed from the previously done studies [14,15,16,17]. However, Ministry has recently prepared and published on its website a set of thirty five manuals to guide the impact assessment studies[18,19]. This may have to be analyzed for its adequacy to serve the purpose.

6.4.5. Content of the Present EIA Studies is Inadequate

MoEF has provided a checklist of what all should be considered in an EIA study (MoEF, 2010c). However, it is a generic framework and one has to take care of several context specific factors which are not covered in the checklist. At present the content of EIA studies are limited largely to the biodiversity studies only and underestimate the other possible negative impacts[16]. Moreover, the need of having EIA studies done and extent of such a study is to be decided by the concerned agency of the respective state government while writing terms of references (ToR) at the Scoping stage. Thus, the ToR is supposed to dictate case specific contents of the EIA studies and hence the capacity of concerned agency to incorporate such specific requirements while writing ToR need to be assessed. An EIA report is supposed to contain, in addition to EMP, an environmental monitoring plan and a risk assessment and disaster management plan. Adequacy of these studies as incorporated in the present EIA reports requires to be assessed[19].

6.4.6. Project Specific EIAs are Inadequate

Because the dams constructed in series will have cascade impacts on each other, as the present way of doing the project specific EIAs cannot appreciate it in the present practice of EIAs, less importance is given to understand how the projects fit into the ecology and social setting of the region.

6.4.7. Alternatives for Proposed Plant are not Assessed

Concepts of EIA includes the assessment of alternatives for the proposed activities and negative environmental impacts should be assessed for each of these alternatives. The

[13] This is the personal opinion of Mr. Himanshu Thakkar of SANDRAP. However Dr. Paritosh Tyagi and Dr. Sanchita Jindal, Director IA division (River Valley Project) disagree.
[14] Personal communication with Dr. Bharat Jhunjhunwala, Former Professor of IIM Bangalore & an antidam activist
[15] Personal communication with Dr. Shekhar Singh, Former Chairman of an Environment Appraisal Committee
[16] Personal communication with Dr. Ravi Chopra, Director, Peoples Science Institute, Deharadoon
[17] Personal communication with Mr. Himanshu Thakkar, Director, South-Asian network on Dams, Rivers and People
[18] Personal communication with Dr. Nalini Bhatt, Advisor, Ministry of Environment and Forests, GoI
[19] Personal communication with Dr. Paritosh Tyagi, Chairman, Technical Committee, NABET

alternatives should be assessed comparatively and the least negative impact ones must be selected and approved. Present EIAs do not consider this notion.

6.5 EMPs are Inadequate to Serve the Purpose

In order to reduce, mitigate and manage negative environmental impacts, it is mandatory for project proponent to prepare and implement an Environmental Management Plan (EMP) suggesting precautionary measures and mitigation plan in detail, and it must be approved by MoEF (MoEF, 2010a). However, proponent takes onus of neither implementing one's own plan, nor to evaluate the efficacy of its implementation which is generally done by the Forest Department with finance received from the proponent[20]. Even if an EMP is implemented effectively it is not adequate because of the conceptual shortfalls in it. For instance, definition of a Catchment Area is ill-defined in the case of Catchment Area Treatment (CAT) plan which are integral part of EMP and then there are issues regarding the fund and work allocation.

6.6 Inappropriate Public Consultation

6.6.1. Public Hearings are done in an uninformed Manner

People must be made aware about the importance and modalities of public hearing since informed participation plays a critical role. Because people are not formally introduced to the process, and the significance of public hearings and expectations, it finally becomes a bone of contention between many groups.

6.6.2. Violation of Provisions to Restrict Participation to Tokenism only

The EIA Notification has laid down the detailed procedure for providing necessary information (like date, time and venue of the meeting, summery of DPR and EIA-EMP reports) in local language well before the date of the meeting. However, though these provisions are not violated per say, are not also followed to meet the desired end of the study and to encourage them to participate in the debate by ensuring an open, democratic process whereby their concerns are respected. In other words, participation is manipulated, if not neglected.

6.6.3. Public Hearing Meetings are controlled by Vested Interests

The meetings are conducted by concerned government officials and local people are constrained to express their concerns. Since the meetings are supposed to be conducted at the project site or its close proximity, it is possible that the developers and their supporters take control of the situation and to influence the situation at least serve as "the Host" of the meeting.

[20] Personal communication with Dr. Bharat Jhunjhunwala, renowned economist and formerly Professor of IIM Bangalore.

6.6.4. Its only "Hearing" and "Consultation"

The EIA notification stipulates that the project proponent should give the replies to the concerns expressed by people. There are no provisions to ensure that people's concerns have been adequately addressed since it is a one time process and final decisions are not communicated back to them.

6.7 Lack of Competency, Transparency, Accountability and Participation

6.7.1 Lack of Independent Structure

Problems associated with project appraisal and clearance process are a problem of organizational structure. EAC is only an advisory body and has no authority to make decisions about clearing or rejecting a project (MoEF, 2006). It's very difficult, however, for members of EAC who are appointed by government to be fully independent of political influence, which points to the need of an independent structure that can bring transparency and accountability in operations.

6.7.2 EACs need Technical Capacity

The EACs, at present, are a group of professionals/experts working part time. Practically, in one or two meetings in a month, EAC has to evaluate 15-16 projects. EAC being a committee of people working for part time, need support staff to appraise the EIA studies and other documents for doing objective analysis.

6.7.3 Lack of Required Competency and Legitimacy

The chairperson and/or members of the EAC, to deliver their functions, require essential competency, particularly the environmental credentials of many are doubtful and some of them have conflict of interest since their backgrounds and perspectives are contradictory to their roles in the committee[21]. The previous notification (MoEF, 1994) had a clear directive for including CSOs and social scientists in the expert committees. The present notification has altered this provision of including NGOs in the Expert Appraisal Committee or the State Level Expert Appraisal Committees (MoEF, 2010d).

6.7.4 Need for Conceptual and Methodological Framework for Decision Making

In the absence of clear criteria for evaluation of EIA documents**,** the approval process is not always objective leading to a non-transparent, non-accountable decision making process[22]. An environmental clearance is designed to be a one time decision given for a period of five years, making it tedious to revisit or change it on proven grounds[17].

[21] Key Respondent: Mr. Himanshu Thakkar, Director, SANDRAP, Delhi.
[22] Personal communication with Dr. Bharat Jhunjhunwala, renowned economist and formerly Professor of IIM Banglore

6.7.5 Violation of Provisions for Transparency under the EIA Notifications

Under the section 10-ii of EIA noticification, 2006 (MoEF, 2006) it is specified that ministry shall display all latest EIA reports including ToRs, EIAs and EMPs on their website. However, having inadequate human resources, there are difficulties in making the documents available and/or accessible[23,24].

6.7.6 Non Compliance of the Post Clearance Activities

Presently, while the projects get clearances based on the conditions, there is urgent need to improve the ability to ensure that the post clearance activities are duly complied. The practice called 'Pari-Pasu' which started with Narmada, went on to Tehri, which, if the developer is not able to get the clearance, government agencies grant clearance subject to the condition that the developer shall continue the EIA studies while construction activities progress.

6.7.7 Lack of Capacity for Post Clearance Monitoring

The seven Regional Offices (ROs) of MoEF across the county are given the responsibility of monitoring the violations during post clearance construction stage. A limited number of staff at ROs is supposed to monitor and ensure compliance twice in a year for projects belonging to more than 35 categories scheduled in the notification. Looking at the massive number of hydropower projects being constructed, it is a tall task for ROs to ensure monitoring violations on ground and compliance.

7. Tentative Recommendations

1. Pre-environmental clearance based on EIA studies is to be made mandatory for projects of all capacity/types including micro-mini- projects and small-medium-large projects whether run-off-the river or otherwise. All of these project types are likely to cause significant impact on local environment which must be studied. Although ministry, given the limited capacity in terms of human capital available, wishes to prioritize first the large and medium projects only; we strongly suggest to take appropriate steps to make EIA studies mandatory for all projects.
2. An independent authority having required technical competence and supported financially by a consortium of developers is to be established through MoEF. Such an agency should design and conduct feasibility studies and location specific EIAs, if not cumulative impact assessments under the regulation of MoEF. This proposition differs from the consultancy services development mandate of the government[25] and hence, its merits and demerits are needed to be discussed in detail.

[23] Personal communication with Dr. Sanchita Jindal, Director of the concerned department of MoEF
[24] Personal Communication with Dr. Nalini Bhatt, Advisor, MoEF
[25] Personal communication with Dr. Paritosh Tyagi, Chairman, Technical Committee of the NABET

3. Independent professionals having required competence in their respective subjects and adequate environmental credentials should be appointed as EAC members and must be provided with adequate secretarial support to thoroughly appraise and evaluate findings of feasibility studies and EIAs, and to recommend for a clearance through a public proceeding.
4. To ensure transparency and accountability in the environmental clearance decision making process, it should be made mandatory for the concerned agencies to give speaking justifications of their decisions and to share the proceedings with the citizens of the country. Ministry officials are of the opinion that minuets of EAC meeting adequately justify their recommendations and same can be considered as speaking orders[26]. This deserves verification from the critiques. Since, the Minister has veto power to make decision, in the interest of the nation, as different from the recommendations of the EAC; under such case the Minister should also give speaking orders.
5. Another independent authority should be established to monitor violations during post clearance construction activities and ensure proactive compliances from the developers. Such authority should be empowered to cancel accorded clearance in case of serious violations and blacklist respective developers and consultants. As informed by a senior officer at MoEF, in recent future it is going to set up one such agency called National Environmental Assessment and Monitoring Authority (NEAMA)[27].

8. Concluding Observations

While acknowledging the need for hydropower generation, the process of according environmental clearances to hydropower projects on the basis of their EIA studies is an essential tool for safeguarding the ecological integrity and resulting livelihoods in the Ganga basin. Though the State has taken stringent provisions to make the EIA-EC practice mandatory for hydropower projects, various stakeholders (especially from CSOs) have expressed grievances about the lacunae in policy instruments and performance of governing agencies leading to violations in practice.

EIA studies can provide scientific basis for the necessary decisions and EC process can ensure their implementation, which needs the following: 1) comprehensive feasibility analysis and EIAs of all category projects, by an independent authority having required competence; 2) evaluation of projects by various stake-holding groups through public proceedings as different from consultation with clearance decisions based on their recommendations; 3) ensuring strict monitoring of post clearance construction activities

[26] Personal communication with Dr. Sanchita Jindal, Director, IA Division, Ministry of Environment and Forests
[27] This is as informed by Dr. Nalini Bhatt, Advisor, Ministry of Environment and Forests, GoI.

and compliances by an independent authority empowered to implement the provisions for cancelling the accorded clearances and blacklisting of EIA consultants/developers.

9. References

Agarwal, D. K., Lodhi, M. S., & Panwar, S. (2010). Are EIA studies sufficient for projected hydropower development in the Indian Himalayan region? *Current Science , 98* (2), 154-161.

Aruna Murthy, H. S. (2005). *Environemntal impact assessment process in India and its drawbacks.* Bhuvaneshwar: Environment Conservation Team, Vasundhara .

CEA (2007). *Details of Hydro Capacity added during 10th Plan (2002-07).*

CEA (2010a). *Details of Hydro Capacity added during 11th Plan (2007-12).*

CEA (2010 b). *Status of 50,000 MW Hydro Electric Initiative.* Government of India , Central Electricity Authority.

CEA (2010 c). *HE schemes under survey & investigation.*

CVC, R. (1997). Environmental impact assessment state-of-art. *Tech Monitor , 14* (3), 40–9.

Government of India, (1986). *Environmental Protection Act, 1986,* Governemnt of India .

Kohli, K., Menon, M., Das, S., & Divya, B. (2011). *Calling the Bluff: Revealing the state of Monitoring and Complience of Environmental Clearence Conditions.* Delhi : Kalpavrikshya .

MoEF (1980). *Indian Forest Right Act, 1980 .* MoEF, Government of India.

MoEF, (1994). *EIA Notification.* MoEF, Government of India.

MoEF (2006). *Notification of MoEF.* Gazette of India.

MoEF (2010 a). *MoEF- Environmental Management Plan.*

MoEF (2010 b). *MoEF Office Memorandum- Procedure for conduct of public hearing.* MoEF, Government of India.

MoEF (2010 c). *MoEF- Requirements and Procedure for seeking Environmental Clearance of Projects.*

MoEF (2010 d). *MoEF- Composition of the Expert Committees for Environmental Impact Assessment, MoEF, Government of India.*

MoP (2011). Retrieved March 2011, from http://www.powermin.nic.in

Muttamara, S. (1996). Environmental impact assessment (EIA). *Resources, Conservation and Recycling , 16*, 335-349.

National Ganga River Basin Management Authority, N. (n.d.). Retrieved April 2011, from Ministry of Environment and Forest Website : moef.nic.in/modules/recent-initiatives/NGRBA/index.html

People's Science Institute,(2007). *A proposed framework for impact assessment of large water infrastructure development project,* People's Science Institute, Deharadoon.

Peoples Science Institute, (2009). *Hydropower in Uttarakhand Situation Analysis Repor*, People's Science Institute, Deharadoon.

Planning Commision. (2011). Retrieved March 2011, from http://planningcommission.nic.in/plans/planrel/fiveyr/welcome.html

Planning Commision (2007). *Eleventh Five Year Plan*, Planning Commission, Governemnt of India.

Prayas (2004). *Know your power.* Pune: PRAYAS Energy Group.

Ritu, P. (2006). EIA practice in India and its evaluation using SWOT analysis. *Environmental Impact Assessment Review, 26*, 492-510.

SJVNL (2010). *Environmentl regulations and legal framework in India.* SJVNL.

UJVNL (2010 a). *Details of Hydro Projects Developed by UJVNL.*

UJVNL (2010 b). *Details of Hydro Projects Developed by CPSUs.*

UJVNL (2010 c). *Details of hydro projects developed by IPPs.*

UJVNL (2010 d). *Details of Projects Under Operation in Uttarakhand State.*

UJVNL (2010 e). *List of Hydro Projects Developed by Various State/Private Agencies in Uttarakhand State.*

Annexure I

List of Various Laws Relevant to the EIA- ECs (SJVNL, 2010)

S No	Title of the Law	Provisions/ Mandate
01	**The Electricity Act, 2003**	Create a framework for the power sector development. Electricity Act does not explicitly deal with environmental implications of activities related to power transmission. The applicable legal provisions under this Act are as follows: Section 68(1) - sanction from the Ministry of Power (MoP) is a mandatory requirement for taking up any new project.
02	**The Forest (Conservation) Act, 1980**	Provides for the conservation of forests and regulating diversion of forestlands for non-forestry purposes. When projects fall within forestlands, prior forest clearance is required from relevant authorities under this act.
03	**The Environmental (Protection) Act, 1986**	Provides a framework for the protection and improvement to the environment. Provides for obtaining environmental clearances for specific types of projects and for submission of compliances.
04	**Air (Prevention and Control of Pollution) Act, 1981**	Provide for the prevention, control and abatement of air pollution, for the establishment, with a view to carrying out the aforesaid purposes, of Boards, and assigning to such Boards powers and functions.
05	**Water (Prevention and Control) Act, 74**	Provide for the Prevention and Control of Water Pollution and the maintenance or restoration of the wholesomeness of water and for the establishment, of boards to carrying out the aforesaid purposes
06	**Hazardous Waste (Management and Handling) Amendment Rules, 2003**	Requires proper handling and disposal of Hazardous wastes. Organization will seek authorization for disposal of hazardous waste from concerned State Pollution Control Boards (SPCB) as and when required.
07	**Wildlife Protection Act, 1972**	According to the Act, "wildlife" includes any animal, bees, butterflies, fish and even vegetation which forms part of any habitat. Whenever, any part of Wildlife Sanctuary / National Park is getting affected by a hydro project the forest clearance proposal requires ratification from Hon'ble Supreme Court, which is to be based on recommendation of Standing Committee of NBWL.
08	**The Biological Diversity Act, 2002**	Provide for the conservation of biological diversity, sustainable use of its components, and fair and equitable sharing of the benefits arising out of the sued of biological resources and knowledge. As per the provision of act certain areas, which are rich in biodiversity and encompasses unique and representative ecosystems are identified and designated as biosphere reserve. All restrictions applicable to protected areas are also applicable to these reserves.
09	**Fisheries Act, 1897**	Section 5 of the Act prohibits destruction of fish by poisoning waters.
10	**The Indian Forest Act, 1927**	Makes it punishable if any person, who, poisons water of a forest area. The State Government has been empowered to make rules relating to poisoning of water in forests (Sec.32-f).

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S. No.	Title of the Law	Provisions/ Mandate
11	**The Factories Act, 1948**	Factories Act, 1948 is social welfare legislation intend to secure health, safety and welfare of the workers employed in factories. However, some of the provisions of this Act are concerned with prevention of water pollution.
12	**The River Boards Act, 1956**	The Act provides for the creation of River Boards for regulation and development of interstate rivers and river valleys. One of the functions of the Board is to advise to the Government concerned on "prevention of pollution of the waters of the interstate rivers".

Annexure II

List of Key Respondents

State Officials:

1. Dr. Ms. Sanchita Jindal, Director, department concerned to EIA-EC at MoEF, Government of India
2. Dr. Ms. Nalini Bhatt, Advisor, Ministry of Environment and Forest, Government of India

Project Developers:

1. Dr. A.K. Singh, Chief Engineer, National Thermal Power Corporation, Delhi
2. Shri, PPS Man, General Manager, Vishnugad Pipalkoti Hydropower Project of THDC.

Representatives of Civil Society Organizations and other stake holders

1. Dr. Bharat Jhunjhunwala, Renowned economist and formerly professor of Indian Institute of Management, Bangalore
2. Dr. Shekhar Singh, Formerly Chairperson of an EAC and Professor from Indian Institute of Public Administration
3. Dr. Ravi Chopra, Director, Peoples Science Institute, Deharadoon
4. Ms. Sona Thakur, Project Officer, World Bank
5. Ms. Sushila Bhandari, a conscious stakeholder in case of hydropower projects at Phata Beyung and Singoli Bhatwari
6. Shri. Gangadhar Nautiyal, Based at town Rudraprayag a conscious stakeholder in case of hydropower projects at Phata Beyung and Singoli Bhatwari
7. Shri. Himanshu Thakkar, Director, South Asian Network for Dams, Rivers and People (SANDRAP), Delhi
8. Shri. Lakshman Negi, Director, *Janaadesh* – A NGO located at town *Joshimath*
9. Shri. Piyush Dogra, Environmental Expert-Asia, World Bank
10. Shri, Vimal Bhai, Convener, Matu *Jan Sanghatan*