

# **Integrated Impact Assessment for Explaining Differential Impact of Watershed Development Projects**

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## **ABSTRACT**

The impact of large-scale watershed development projects in India has not been up to the desired level. The existing literature provides an agency-centric explanation of this poor impact. This paper argues this explanation as insufficient and proposes an explanation based on implementation theories which bring in issues like policy dilution, stakeholder interests and organisational processes. Through an integrated method of assessment this complex situation is captured by this paper.

## **Introduction**

The impact of large-scale watershed development projects in India has not been up to the desired level (GOI 2002). The existing literature attributes the problem to the weaknesses of the implementing agencies. This paper argues that this explanation is not a sufficient one and other aspects like organisational processes and stakeholders interest do affect the process of implementation which in turn makes the differential impact. The existing impact assessment approaches (mostly economic or environmental impact assessment) miss out on these variables. To understand these complex issues, an integrated assessment is needed which would explain the differential impact in a better manner. This paper makes an attempt in that direction.

## **Impact of Watershed Development: A Review**

The existing impact assessment of watershed development projects have used economic and environmental indicators like impact on landuse pattern, cropping pattern, crop yield, check in soil erosion (Deshpande and Rajasekaran 1997). Some other papers have discussed issues like participatory process and scale of observation (Bollom, 1998, Shah 2004). Chopra et al (1990) used social cost-benefit analysis (CBA) which included pricing at both market and shadow prices and then adjusted with income distribution effects. Chopra (1998) used multi-criteria analysis which included environmental, economic, social and institutional component. These studies provide good description of the impact but they do not explain fully why the differential impact occurs. The most common reason cited for poor impact is lack of people's in project related decisions. Poor planning and monitoring are also considered as major factors behind sub-optimal results (ARAVALI 2001, Rama Chandrudu 2006). Directly or indirectly, the responsibility is passed on to the implementing agency.

The agency-centred explanation of differential impact does not take into consideration the influence of various stakeholders (actors) involved at various stages of the project cycle. This paper proposes that from policy making to implementation process, various individual, groups, and institutional actors try to keep their own interests in making

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various decisions. This aspect has not been studied adequately in the field of watershed management, but literature from other fields (Selznick 1949, Allison 1971, Pressman and Wildavsky 1979) points out the influences of such actors on the outcomes. Impact assessment methods followed by earlier mentioned studies do not capture the stakeholder influence and hence they do not provide a comprehensive understanding of the project impacts. Hence the need of an integrated assessment arises.

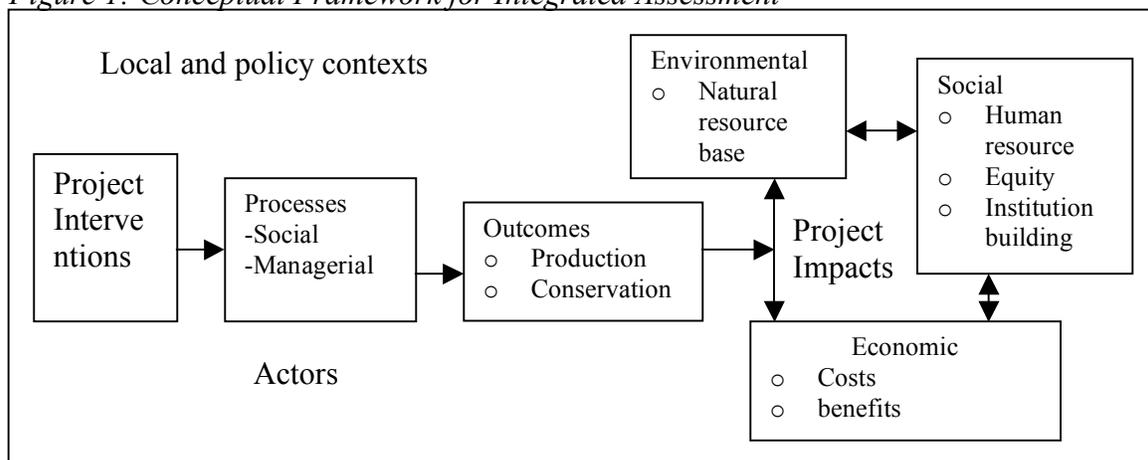
**Integrated Impact Assessment: Conceptual Issues and Methodology**

Integrated impact assessment has been a growing area of study and practice. Birley (2003) tried to combine health impact assessment with environment impact assessment (EIA) and he observed that for integrated assessment, piecemeal approach had been followed that led to wide degree of overlap. Ziller and Phibbs (2003) integrated social impact into cost-benefit analysis. They followed participatory method (through stakeholder consultation) and prepared a matrix integrating financial as well as non-financial costs and benefits incurred by or accrued to individuals and groups. The matrix brought in social issues in economic analysis, and the diversity of stakeholders made it a more comprehensive exercise.

Bond et al (2001) conducted CBA and EIA separately including some elements of social impact assessment (SIA) for studying three hydropower and irrigation projects. They classified integration into ‘weak’ and ‘strong’ ones. Strong integration involved a single assessment that presented unified results to the decision maker, while weak integration referred to the opposite. They defined integration having three characteristics – use of consistent aspects, cross-disciplinary issues, and procedural arrangements.

Given these complexities, a new framework was developed for understanding the impact of the watershed development projects as depicted in Figure 1. Case study method was considered followed because there was a need for observing the implementation process. Two watershed projects were taken as case studies. At the first stage, social cost-benefit analysis was undertaken. The process of implementation (decisions, events, interactions, and conflicts) was also analysed in the context of policy changes.

*Figure 1: Conceptual Framework for Integrated Assessment*



## **Findings**

### **Case Study 1: Sarjumi Watershed**

The Sarjumi watershed implemented by the Gujarat unit of BAIF Research and Development Foundation, a large non-governmental agency (NGO) having vast experience in implementation of natural resource management projects, during 2002-2006 is a village of about 500 ha area of hilly and undulating topography and has 187 households, of which about 80% of tribal and 20% are Bakshi (backward caste agriculturist). The main occupation of people in the village is agriculture and seasonal migration to cities (for employment as casual labourer). The project interventions included construction of seven check dams, field bunding over 22 ha area, horticulture (grafted mango plantation) on 22 plots, crop demonstration, vermicompost, vaccination to animals, health camp for animals, self-help group formation, awareness generation and exposure tours. The major benefits included creation of 24.86 ha of additional irrigation, conversion of 22 ha of uncultivated area for rainfed cultivation, about 2.5 ha of grafted mangoes, fuelwood plants, vermicompost production, prevention of foot and mouth disease etc. The total project investment was about Rs. 1.6 millions, against which the financial net present value figured out to be Rs. 1.56 millions. After adjustment with shadow prices the net present value became Rs. 0.8 millions.

The project went through a smooth interaction between BAIF and the villagers. However, the fund release was not regular. During the project period, only 76 per cent fund was released. Periodically, the government released orders which restricted the agency to keep the activities limited. Although the project was supposed to be integrated in nature, a government order restrained NGOs from undertaking land development activities (it was reserved for a line department). Land development is generally undertaken in upland areas where poor people have land. Had the activity not stopped, and had the fund release been complete and regular, the benefits could have been much more and the income distribution effect would have been higher.

### **Case Study 2: Patosan Watershed**

The Patosan Watershed was implemented by Gujarat Land Development Corporation (GLDC), a government corporation; the village is a 1000-ha area of relatively plain land inhabited mainly by Patel, Choudhary (agriculturist) and Koli (primarily landless or marginal farmers) communities. The Patel and Choudhary castes are relatively well off while, Koli communities are lower castes in social status and they are primarily poor households. The Patel and Choudhary people have caste rivalry for long.

The main activities of the project were 165 ha of land levelling (57% of project fund spent on this item), 20 ha of pasture development, construction of two check dams and plantation of grafted mangoes and aonla. The main benefits included better water availability due to recharge of tube wells (to the extent of about 20 ha of area getting two additional irrigation), and levelling of slopy land where moisture retention would be better thus yielding better agricultural outputs. The total project investment was about Rs. 2.94 millions, against which the financial net present value figured out to be Rs. 6.3 millions. After adjustment with shadow prices the net present value became Rs. 5.4 millions.

The nodal agency of the project was the GLDC itself, so there was no problem in fund release. However, in the later period of the project, a conflict arose between the two dominant castes of the village which was reflected on the project. There was contention over auctioning of the outputs of the pastureland. Ultimately the project activities discontinued when there was scope for more interventions. Further, during the project, poorer families did not get the benefit because they could not deposit the contribution money in advance. The watershed committee dominated by the Patels and Choudharies did not relax the norms. One interesting thing was that the main activity of the project was land levelling costing two-third of the project cost, which is a standard activity of GLDC but is generally not considered for watershed development activity as per the original guidelines.

### **Discussion**

The projects were found financially viable but the net present value decreased significantly after adjustment with shadow prices, which mainly occurred because of adjustment of fertilizer subsidy and unpaid family labourers. It was also observed that the income redistribution was better in the first case study.

It can be observed that policy objectives were diluted even before the project came to the hand of implementing agencies (as happened in banning land development work) coupled with fund release problems. Occasionally, the government came out with orders favouring its line departments (land development work was reserved for a line department). Then the organisations had their own standard procedures which not necessarily followed the original policy intentions (as seen that two third of cost in Patosan were spent on land levelling). Finally, at village level the conflict of interest and power-play changed the portfolio of interventions. The combined effects of these have watered down the project outcomes.

The implementation theories earlier propounded the organisational process model, governmental politics model, implementation as an 'interaction', and the structural adaptation by organisations according the environment. These theories partially explain the observations in the two case studies. While the observations fit well with the organisational process model, the proposition of structural adaptation of organisation could not be confirmed. Rather it has been observed that the bureaucratic organisations have tried their best to bring the policy in tune with their own machinery.

While undertaking the study some of the indicators were estimated using participatory tools from secondary data. A singular impact assessment method like EIA would call for laboratory testing to understand the soil and water quality and econometric models might have been appropriate for CBA. Furthermore, individual case studies were subjected to cost-benefit analysis and the observations on the 'processes' were made using discussion and interaction with key informants etc. A full fledged social impact assessment (SIA) would call for an ethnographic approach. However, the purpose of the study was to explain the differential impact, hence to some extent precision was relaxed.

The paper concludes that the impact of watershed projects could be assessed through an integrated approach which goes one step above the existing methods of CBA, EIA and SIA. It suggests a new integrated impact assessment framework which accommodates the management processes, the influence of various actors, local and policy contexts too. Finally it argues for trading off between costly sophistication of tools which gives precise results and participatory methods which are less precise but costs less and requires less training and time.

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