CHAPTER 35

Priorities and Rationalities in Watershed Governance: A Study of Watersheds of the Semi-Arid Tropics

Biswajit Mondal, S.L. Patil, N. Loganandhan, K.K. Reddy and K. Channabasappa

Central Soil &Water Conservation Research & Training Institute, Research Centre, Bellary

In the context of watershed development, diverse kinds of activities are involved such as creation of natural resource management structures, improving water and soil conservation, planting of better crops and varieties including water saving and high value crops, technologies for efficient use of water, and the promotion of livelihood enhancing enterprises for the landless. In each of these activities, apart from material and financial inputs, a substantial amount of human interaction is involved in the planning and implementation process. This includes structures, processes and governance through formal and informal institutions. Governance issues are very critical in planning, implementing and monitoring watershed activities. Literature review has indicated that the reasons for poor performance of many watershed programmes in Punjab were the lack of sufficient integration and cohesiveness among line departments, inspite of having an excellent theoretical organizational structure but which lacked in execution that led to substantial shortfall in the economic rate of returns from various components (Singh et al., 1991). Various other evaluation studies have also observed that watershed progarmmes mainly failed due to inability of the implementing agencies to respond to clients' needs in the implementation procedures programmes (Pangare, 1998; Shah, 2001 and Mitter, 2005). Hence, good institutional arrangements which define and restrict access to and control over resources, give

appropriate incentives to users and theoretically guarantee the sustainability of natural resources (Ostrom et al., 1999) become very important for reducing transaction costs and promoting co-operative solutions. It should also address the different rationalities, viz., technical, economic, organizational, financial, social and political, without which the outcomes would be poor and the benefits would not reach the intended beneficiaries. Therefore, it was imperative to study various priorities and rationalities during implementation of watershed development programmes in the states of Karnataka and Andhra Pradesh.

Materials and Methods

Study area

Amongst various predominantly rainfed areas in India, the most vulnerable are the semi-arid regions. About 53.4% of India's land area falls in the arid and semi-arid regions (GoI, 2004), characterized by low and erratic rainfall, periodic droughts and different associations of vegetative cover and soils. The states which fall in the semi-arid tropics (SAT) include Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Chhatishgarh, Maharashtra, Rajasthan and Tamil Nadu. The share of rainfed agriculture in SAT states is about 73% of which the two selected states (Karnataka and Andhra Pradesh) contribute around 40% and the percentage of rainfed area to the net area sown in these two states are 77% and 60%, respectively (Bhatia, 2005). Major crops grown in this region include coarse cereals like jowar, bajra and ragi; pulses like bengalgram and horsegram and oilseeds like groundnut and sunflower. Not only are the yields per hectare low in rainfed areas in the semi-arid regions, the variability in both area and yield for most of the crops in these states is much higher than the all-India average. The semi-arid areas have been subject to large scale degradation of natural resources caused by the depletion of forests, soil erosion, declining common pool resources, etc. (Jodha, 1990) and around 300 million people depend for their sustenance on dryland agriculture, of which 30-40% can be classified as poor (Ryan and Spencer, 2001). Seasonal migration could be seen as a form of spatial diversification, which is at the root of food and livelihood security strategies.

Bellary (Karnataka) and Anantapur (Andhra Pradesh) districts were selected purposively because of distinctive physical properties of the watersheds located in these districts and harsh environment like poor soil depth, high run-off and soil loss, low average rainfall, etc.,

which are expected to influence the institutional dynamics also. In each district, one project implemented by a government organization (Lottinekere and Mangampally watershed) and NGO (Kalvi and Mallapuram watershed) were selected for detailed investigation.

Data and analysis

Recorded observations as well as primary survey/focus group discussion were used for fulfilling the objective of the study. For judging the priority given to different components of the programmes, a schedule developed by Dogra et al. (2005), containing 80 questions covering all aspects of participatory watershed development was used for data collection from field level functionaries of project implementing agency (PIA) and watershed development team. These 80 components were further grouped into ten individual categories based on the broad aspects of participatory watershed management for assessing the preferences for particular components of watershed development projects. Based on the response of field level functionaries of a particular watershed development project, a score (1–Yes or 0–No) for each of 10 major components was estimated by summing up the positive response with respect to individual component. The obtained score was multiplied by estimated average weight and a maximum weighted score was also estimated for each of 10 major components. Participation Paradigm Index (PPdI) for each watershed was estimated for each major component as:

$$\text{Participation Paradigm Index (PPdI)} = \frac{\text{Weighted score}}{\text{Maximum weighted score}} \quad 100$$

For evaluation in terms of all 10 major components, a Participatory Watershed Development Index (PWDI) was also estimated as:

$$\text{Participatory Watershed Development Index (PWDI)} = \frac{\sum_{i=1}^{10} \text{Weighted score}}{\sum_{i=1}^{10} \text{Maximum weighted score}} \quad 100$$

where, i = i th major component

Following Dogra *et al.* (2005), each of the categories of participatory paradigms were rated from "Excellent" to "Poor" (Table 1).

Table 1 : Rating of Participation Paradigm Index (PPdI) and Participatory Watershed Development Index (PWDI)

S.No.	Category	PPdI/PWDI
1	Excellent	> 90
2	Very Good	80 – 90
3	Good	50 – 80
4	Fair	20 – 50
5	Poor	< 20

The selected watersheds were subjected to rationality analysis following the indicators developed by Gandhi (2010) for judging the priority given to organizational, social, technical, economic, financial and political issues addressed during implementation of each of the programs.

Results and Discussion

Brief profile of the selected watersheds

A brief profile of the selected watersheds is presented in Table 2. The area of selected watersheds ranged between 500 and 864 ha. Average rainfall in the selected watersheds varied between as low as 350 mm to maximum of 587 mm. Rainfed area constitutes varied between 75 to 96% of the arable area and rest is irrigated through bore-wells only. Sorghum, bajra, sunflower, groundnut, cotton and sesumum are major crops grown in the area with lower yields that ranges from 0.8 t ha^{-1} in case of cereals, 0.6 to 0.8 t ha^{-1} in sunflower and 0.5 t ha^{-1} in groundnut.

Priority analysis

In all the selected watersheds emphasis has been given for watershed plan preparation, creation of watershed level institutions, ensuring beneficiaries participation, etc., but monitoring activities, CPR management, equity aspects, were poorly emphasized. On an average, NGOs were ahead of GO (Government organizations) PIAs in fulfilling participatory issues (Patil *et al.*, 2012). Though there was a clear-cut distinction in terms of participatory aspects, the different categories of projects can only be compared using qualitative ordinal scale in relation to the priority given to various components and the results indicated a mixed trend (Table 1). In fact, biomass development and production enhancement activities were not a priority in all the projects.

Table 2 : Profile of the selected watersheds

Particulars	*Karnataka*		*Andhra Pradesh*	
Implementing agency	Kalvi SNEARDS[1], Hadagali	Lottinekere DWDO[2], Bellary	Mallapuram RDT[3] , Anantapur	Mangampally Multi-Disciplinary Team [4]
Duration	2000-01 to 2008-09	2001-02 to 2009-10	2000-01 to 2005-06	2005-06 to 2010-11
Average annual rainfall (mm)	531	587	350	540
Treated area (ha)	500	500	864	500
Rainfed area (%)	75	87	83	96
Villages covered	Kalvi; Bhanayana, Dungabati, and Beethana Tanda	Lottinekere and Hyalya Hampapur	Mallapuram	Mangampally
Households (no.)	465	435	246	128
Major crops	Sorghum, bajra, sunflower, maize, hybrid cotton and groundnut	Bajra, redgram, groundnut, maize sesamum, sunflower and sorghum	Groundnut, redgram, ragi and sunflower	Groundnut, redgram, ragi and sunflower

[1] Sri S. Nijalingappa National Education and Rural Development Service Trust (SNEARDS): An NGO based at Hadagali, Bellary district of Karnataka state, engaged in village development programmes including watershed development.

[2] District Watershed Development Office (DWDO): District level office responsible for watershed development programmes.

[3] Rural Development Trust (RDT): An NGO based at Anantapur district of Andhra Pradesh state, carrying out welfare and integrated programmes of development.

[4] Watershed Development Advisory Committee at the district level which consists of specialists from different disciplines of government departments, voluntary agencies and research and training institutions.

Table 3 : Priority [#] given to various components of watershed development programmes under different institutions

Items	**Karnataka**		**Andhra Pradesh**	
	Kalvi ***(PIA: NGO)***	**Lottinikere** ***(PIA: GO)***	**Mallapuram** ***(PIA: NGO)***	**Mangampalli** ***(PIA: GO)***
Development of local institutions	High	Medium	High	Medium
Development of land & water resources	Medium	Medium	High	Medium
Fodder/ grassland development, afforestation and plantation	Low	Low	Medium	Medium
Production enhancement activities	Low	Low	Medium	Low
Increase in employment opportunities	High	High	High	High
Equity/ gender issues	Medium	Medium	Medium	Low

[#] Based on farmers response on a two point scale (Agree = 1; Disagree = 0)

Rationality analysis

Even though, the impact of watershed development can be measured, in terms of various bio-physical and socio-economic indicators the degree of impact in terms of creating economic opportunities are not strictly comparable due to variation in physiographic and demographic characteristics of the watersheds located across the state. However, the selected watersheds were compared in terms of number of issues addressed and measured by rationality analysis and it was observed that projects implemented by NGO's addressed organizational, financial and socio-political aspects in a much better manner, whereas, GO implemented programmes addressed technical aspects strongly (Table 4) but were weak in socio-economic and gender issues. This could be attributed to the government agencies being inherently structured in a manner which are gender neutral and poorly focused on socio-economic issues.

Table 4 : Rationality[€] analysis of activities undertaken under different watersheds (in per cent)

Rationalities	Karnataka		Andhra Pradesh	
	Kalvi (PIA: NGO)	Lottinikere (PIA: GO)	Mallapuram (PIA: NGO)	Mangampalli (PIA: GO)
Organizational & Financial	73	57	77	67
Technical & Economic	52	64	66	66
Social & Political	65	49	78	67

[€] Based on respondents response on a five point scale (Strongly Agree = 5; Agree = 4; Partially Agree/Disagree = 3; Disagree = 2, and Strongly; Disagree = 1)

Conclusions

The study explored the differential priorities of different componenets of watershed development programmes in semi-arid region of India. Biomass development and production enhancement (crop & livestock) activities were less prioritized and they need to be emphasized more for greater acceptance and viability of the programme. Social rationalities are very important for achieving equity; financial and economic rationalities for the performance on financial soundness whereas, technical rationalities are important for quality of works undertaken. Analysis of different kinds of rationalities showed mixed results in this study which indicate that adjustments of components of the programme based on 'on-site demands' are necessary to achieve goals such as increase in agricultural productivity, employment generation, extent of participation and equity, etc.

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