

Management of tanks –A constraint analysis

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ABSTRACT : Community based tank management (CBTM) reforms are implemented in India to facilitate farmers' participation in tank management, through tank user groups. Although thousands of user groups have been formed, a closer examination reveals two decades of efforts only concentrated on efficient water use, irrigation water management rather than involvement of all the stakeholders related to tank *i.e.* farmers, government, groundwater users, officials, toddy keepers, washer men and farm women, goat rearers, duck rearers and brick makers. Ex-post facto research design was adopted. The state of Telangana and Andhra Pradesh, three districts (Mahaboobnagar from Telangana; Vizianagaram from Coastal Andhra, Chittoor from Rayalaseema) were selected purposively. From each district four tanks (two from project and two from non-project area) were selected randomly. A total of 240 (120 under project area and 120 under non-project area) tank users selected from 12 tanks were considered as sample for the study. The constraints elicited by the project and non-project tank users in tank management and these constraints were grouped under five categories namely tank related, psychological, situational, technical and socio-economic constraints. The constraints under each category were ranked based on frequency and percentage in case of both project and non-project tank users. Major constraints elicited by the tank users in tank management are lack of linking mechanism among the tanks (project) and lack of public private partnership (non-project).

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Community based tank management (CBTM) reforms are implemented in various states in India to facilitate farmers' participation in tank management, through tank user groups. These reforms are implemented as 'packages' that consist of policies, legislations and administrative structures. Although thousands of user groups have been formed, a closer examination of CBTM reveals inefficient use of water, an opportunity for rural elites to capture social power in the name of participation and an increased gap between the rich and the poor (Mollinga *et al.*, 2000; Swain and Das, 2008).

In essence, these outcomes have

highlighted the importance of understanding the complex linkages of the tank related, situational, socio-economical, psychological, technological constraints affecting the outcomes of the CBTM reforms in India. Taking this forward, the paper examines problems of Telangana and Andhra Pradesh from an institutional perspective to identify the barriers and opportunities presented by institutional factors in derailing CBTM. It identifies the incremental and cumulative activities of various actors and the rules they apply to claim legitimacy and competency in exploiting the CBTM reforms to (re)frame the tank management problem in the village.

Such exploitation, which facilitated an incremental increase in the tank command area without supplementing the existing water resources, has led to mismanagement of water resources and inadequate maintenance of the irrigation system. This allows the households from the village to frame a problem “inadequate availability of water in the irrigation command area” and, therefore, demand an additional irrigation scheme to supplement the existing water for growing agricultural crops.

EXPERIMENTAL METHODOLOGY

Ex-post facto research design was adopted. The state of Telangana and Andhra Pradesh, three districts of two states (Mahaboobnagar from Telangana, Vizianagaram, and Chittoor from Andhra Pradesh) were selected purposively. From each district four tanks (two from project and two from non-project area) were selected randomly. A total of 240 (120 under project area and 120 under non-project area) tank users selected from 12 tanks were considered as sample for the study. The constraints elicited by the project and non-project tank users in tank management and these constraints were grouped under five categories namely tank related, psychological, situational, technical and socio-economic constraints. The constraints under each category were ranked based on frequency and percentage in case of both project and non-project tank users.

EXPERIMENTAL FINDINGS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized

under the following heads :

Constraints elicited by the project and non-project tank users on tank management :

The constraints elicited by the project and non-project tank users in tank management were grouped under five categories namely tank related, psychological, situational, technical and socio-economic constraints. The constraints under each category were ranked based on frequency and percentage in case of both project and non-project tank users.

It is pointed out from the Table 1 that the major constraints elicited by the project tank users under tank related category are poor management of linking mechanism among the tanks (95.00%) and too many activities under the tank (89.16%), reduction in catchment area (85.00%), encroachment of the tank area (63.33%), reduction in water storage capacity of the tank due to siltation (63.33%), no cleaning or dredging activity (63.33%) and poor canal management (61.66%); encroachment of the tank area (68.33%), lack of regulatory arrangement in water distribution (66.66%), lack of maintenance of the tank (64.16%), reduction in water storage capacity of the tank due to siltation (63.33%), poor canal management (63.33%) comes under non project tanks.

The tank beds have been silted up and bunds are deteriorated reducing their storage capacity. Siltation near the sluice gates often blocks the gates partially and raises the silt level and it reduces the carrying capacity of tanks, the sluices are damaged and inoperable or leaking. Seepage rates during conveyance are high. Lack of

Table 1 : Constraints elicited by the project and non-project tank users on tank related problems of tank management

Sr.No.	Constraints	Project tank users (n=120)		Non-project users (n=120)	
		Frequency and percentage	Rank	Frequency and percentage	Rank
Tank related problems					
1.	Encroachment of the tank area	76 (63.33%)	IV	82 (68.33%)	I
2.	Reduction in water storage capacity of the tank due to siltation	76 (63.33%)	IV	76 (63.33%)	IV
3.	No cleaning or dredging activity	76 (63.33%)	IV	71 (59.66%)	VII
4.	Poor canal management	74 (61.66%)	V	76 (63.33%)	V
5.	Lack of regulatory arrangement in water distribution	71 (59.66%)	VI	80 (66.66%)	II
6.	Lack of maintenance of the tank	69 (57.50%)	VIII	77 (64.16%)	III
7.	Reduction in catchment area	102 (85.0%)	III	70 (58.33%)	VIII
8.	Lack of linking mechanism among the tanks	114 (95.00%)	I	68 (56.66%)	IX
9.	Dilapidate and breached tank bunds (NPTUs)	70 (58.33%)	VII	72 (60.00%)	VII
10.	Too many activities under the tank (livelihoods)	107 (89.16%)	II	74 (61.66%)	VI

maintenance and repairs has created breaches in the tank bunds and canal channels. On many old tanks, there are no outlets, canal channels were filled with silt and weeds; so farmers themselves make breaches and divert the flow to their fields, and frequent breaching has made the canal walls weak. Numerous smaller water-collecting structures built by villagers with the help of NGOs in the catchment area further decrease the amount of water gathering in the tanks and it effects the linking mechanism of cascade tanks. Wells that are supposed to be security against late season tank water scarcity have of late become a major threat to the very survival of the tanks. The results are inconformity with Gulati *et al.*, 2005; Peterpaul, 2005 and Palanisami, 2006. The absence of strict laws to punish the encroachers, lack of civic consciousness among the encroachers and siltation in tank bed, increased number of bore wells were the major reasons for reduction in cultivation under tank. The results are inconformity with Thippaiah, 2006.

It is pointed out from the Table 2 that the major constraints elicited by the project tank users under psychological category are easy group disintegration (90.00%), no concrete output from the deliberation of meetings (86.66 %), poor participation in group discourses (65.83%), more conflicts and rivalry among the tank users (63.33%) and lack of regular meetings by the WUAs/ TUGs; lack of public – private partnership mechanism

in tank management (93.33%), poor integration between tank users and officials (90.83%), lack of team spirit among tank users (88.33%), and lack of focussed group approach in tank management (81.66%) under non project tanks.

Lack of co-ordination between village community and irrigation department and other line departments such as revenue, irrigation, fisheries, forestry and agriculture, in guarding and protecting the tank beds (Thippaiah, 2006). Public participation needs to occur at all stages of community based tank development and implementation including information gathering, consultation, decision making, initiating action and evaluation (Campbell and Vainio-Mattila, 2003). This true public participation includes stakeholders with programmatic, operational, scientific, and legal expertise through involvement that is open, inclusive and fair (Scheberle, 2000; Gruber and Clark, 2000). Effective public participation will empower citizens and involve all affected parties, including marginalized communities (Spiteri and Nepal, 2006; Balasubramanian and Selvaraj, 2003 and World Bank, 1996). Poor farmer’s participation and inability of ground level govt staff in achieving policy framework at top level (Vadivelu, 2005). It may also include local people in programme or organization management (Hackel, 1999).

Poor involvement of project users at the planning

Table 2 : Constraints elicited by the project and non-project tank users on psychological problems of tank management

Sr.No.	Constraints	Project tank users (n=120)		Non-project users (n=120)	
		Frequency and percentage	Rank	Frequency and percentage	Rank
Psychological problems					
1.	Lack of team spirit among the tank users	63 (52.50%)	VIII	106 (88.33%)	III
2.	Poor participation in group discourses	79 (65.83%)	IV	80 (66.66%)	VIII
3.	More conflicts and rivalry among the tank users	76 (63.33%)	V	85 (70.83%)	VII
4.	Easy group disintegration	108 (90.00%)	I	85 (70.83%)	VII
5.	Lack of focussed group approach in tank management	69 (57.50%)	VII	98 (81.66%)	IV
6.	Poor integration between tank users and officials	63 (52.50%)	IX	109 (90.83%)	II
7.	Lack of regular meetings by the WUAs or other tank user groups	74 (61.66%)	VI	80 (66.66%)	VIII
8.	No concrete output from the deliberation of meetings	104 (86.66%)	II	78 (65.00%)	IX
9.	Lack of public –private partnership mechanism in tank management	59 (49.16%)	XI	112 (93.33%)	I
10.	Not following stipulated guidelines in programme formulation and implementation	69 (57.50%)	VII	94 (78.33%)	V
11.	Lack of knowledge on record keeping to document tank management activities	63 (52.50%)	IX	76 (63.33%)	X
12.	Lack of knowledge on finance management by the members in groups	61 (50.83%)	X	88(73.33%)	VI

stage, poor participation of farmers in trainings, campaigns, and meetings, poor planning at grass root level and lack of transport facility for the field work, contact farmers sometimes do not disseminate new technology among the farmers, inadequate skilled labour, lack of teamwork feeling among staff members, non co-operation from the sub-ordinate staff, and in effective co-ordination with other line departments (Sharma *et al.*, 2007).

Lack of interest to participate, unfavourable attitude towards extension personnel, not concerned to local needs, groupism and political interference, lack of free time to participate in management activities, lack of motivation from the village leaders and the implementing agency, lack of resources and poor quality of work (Golyanaik, 2008).

At the end of the project the government forced to create tank user's association for each tank, because it should be a precondition to take up rehabilitation institution in order to satisfy funding agencies. It is understandable that TUGs they created was active only during tank rehabilitation programme. After completion of modernization, officials responsible for these institutions could not follow up and failed to maintain the momentum (Jegadeesan and Fujita, 2008).

A perusal of Table 3 presents the major constraints elicited by project tank users under situational category are no clear cut demarcation of the tank area (95.00%) and lack of institutional finance support to take up income generation activities, erratic seasonal rainfall led to poor filling of the tanks (85.83%), small and marginal land holdings (85.83%), seldom tanks are filled with water to their full capacity (85.00%), often tanks are major drinking sources (85.00%), assigning land to the landless under tank jurisdiction (81.66%) and poor fund allocation by the government for tank management (78.33%); Overriding isolated approach over community spirit under non project tanks (90.00%), lack of sensitivity among officials towards tank management (85.00%), lack of continuous supervision by the government (80.83%), too many groups (79.16%), Small and marginal land holdings (76.66%), too much of political interference in tank management (71.66%) and poor fund allocation by the government for tank management (69.16%) under non-project tanks.

Increase in number of owners owing to family divisions, growing disinterest of the owners in cultivation due to lack of financial support from government and lack of a sense of responsibility among tenants for the lands they cultivate (Pant and Verma, 2010). The illiteracy

Table 3 : Constraints elicited by the project and non-project tank users on situational problems of tank management

Sr.No.	Constraints	Project tank users (n=120)		Non-project users (n=120)	
		Frequency and percentage	Rank	Frequency and percentage	Rank
1.	Small and marginal land holdings	103 (85.83%)	III	92 (76.66%)	V
2.	Too many groups	74 (61.66%)	IX	95 (79.16%)	IV
3.	Lack of marketing facilities	76 (63.33%)	X	81 (67.50%)	VIII
4.	Lack of continuous supervision by the government	79 (65.83%)	VIII	97 (80.83%)	III
5.	Poor fund allocation by the government for tank management	94 (78.33%)	VI	83 (69.16%)	VII
6.	Lack of sensitivity among officials towards tank management	82 (68.33%)	XI	102 (85.00%)	II
7.	Lack of institutional finance support to take up income generation activities under tank	108 (90.00%)	II	67 (55.83%)	XIII
8.	Erratic seasonal rainfall led to poor filling of the tanks	103 (85.83%)	III	63 (52.50%)	XV
9.	Too much of political interference in tank management	68 (56.66%)	XII	86 (71.66%)	VI
10.	Seldom tanks are filled with water to their full capacity	102 (85.00%)	IV	73 (60.83%)	XI
11.	Infestation of weeds	90 (75.00%)	VII	69 (57.50%)	XII
12.	No clearcut demarcation of the tank area	114 (95.00%)	I	79 (65.83%)	IX
13.	Most of the time the area under tank jurisdiction is assigned to the landless people	98 (81.66%)	V	76 (63.33%)	X
14.	Often tanks are the major drinking water sources	102 (85.00%)	IV	65 (54.16%)	XIV
15.	Granite quarries and other factories are established at the cost of tank catchment area	114 (95.00%)	I	73 (60.83%)	XI
16.	Tanks are being targeted to release of effluents from the factories and waste water from other places	90 (75.00%)	VII	63 (52.50%)	XV
17.	Overriding isolated approach over community spirit	64 (53.33%)	XIII	108 (90.00%)	I

and low level of education is the main reason for lack of awareness on community based tank management, reluctance of officials of I and CAD in transfer of irrigation management to farmers, inadequate water supply due to erratic rainfall, weakening leadership due to too much interference of the political parties, lack of training, lack of co-ordination between TUCs and I and CAD were the other factors in non-operationalisation of TUGs. Similarly, lack of political will, untimely water release, community and social problems also contributed towards non-implementation of CBTM (Goutham, 2008).

Revenue from the tanks goes to the departments of forestry, fisheries, revenue, mines and panchayat. None is directly paid to TUGs which is responsible for tank maintenance and even what is paid to the state revenue department is very much meagre percentage of the total revenue mobilized by fees, taxes, penalties and other tank resources (Meinzen-Dick, 2008). Sustainability of self-governing non project tanks is currently under pressure due to decreasing public financial from government. Choosing a relevant water charge does not ensures by itself the sustainability of tank management programmes, combined support providing TUGs and tank users with efficient advice regarding management and organizational skills. Farm women perceived lack of participation, lack of female trainer/facilitator, pressure of household work, male dominance at home and restriction at home as the constraints (Priya, 2010).

Budget constraints and poor community participation made the tank performance unsustainable. The immediate solution was to identify the appropriate investment strategies and make the local Panchayat responsible for the operation and maintenance of the tanks. Resource mobilization by the local bodies was very essential (Palanisami and Easter, 2000).

The Table 4 illustrated the constraints elicited by the project tank users under socio-economic category are lack of enough social organizations in the villages (84.16%), poor social and economic framework in the village (81.66%) and poor social thinking of the tank users (75.00%); low income levels (80.00%), poor social thinking (76.66%) and lack of enough social organisations (71.66%) comes under non-project tanks.

Formation and support of new collaborative partnerships is critical for leveraging resources and implementation of priorities (Barker, 2005; Butler and Koontz, 2005 and Thompson *et al.*, 2003). Partnerships can be formed and implemented through agreement among key governments, environmental, and private organization to work collaboratively and to share resources and responsibilities through formation of social organisations will create social thinking and economic framework. These partnerships could also serve as a catalyst for finding innovative strategies (Scheberle, 2000).

Table 4 : Constraints elicited by the project and non-project tank users on socio-economic problems of tank management

Sr. No.	Constraints	Project tank users (n=120)		Non-project users (n=120)	
		Frequency and percentage	Rank	Frequency and percentage	Rank
Socio-economic problems					
1.	Lack of enough social organisations in the villages	101 (84.16%)	I	86 (71.66%)	III
2.	Poor social thinking of the tank users	90 (75.00%)	III	92 (76.66%)	II
3.	Low income levels	86 (71.66%)	IV	96 (80.00%)	I
4.	Poor social and economic framework in the village	98 (81.66%)	II	78 (65.00%)	IV

Table 5 : Constraints elicited by the project and non-project tank users on technological problems of tank management

Sr.No.	Constraints	Project tank users (n=120)		Non-project users (n=120)	
		Frequency and percentage	Rank	Frequency and percentage	Rank
Technical problems					
1.	Poor formal institutional technical support and assistance to the farmers to take up activities under tank	86 (71.66%)	V	94 (78.33%)	II
2.	Poor knowledge of tank users on tank management activities	96 (80.00%)	IV	90 (75.00%)	III
3.	The skills followed in tank management are obsolete and traditional	101 (84.16%)	III	70 (58.33%)	V
4.	Lack of co-ordination among various concerned departments in tank management	107 (89.16%)	II	98 (81.66%)	I
5.	Poor knowledge on group formation and its sustainability	112 (93.33%)	I	88(73.33%)	IV

It is evident from the Table 5 that the major constraints elicited by project tank users under technical category are poor knowledge on group formation and its sustainability (93.33%), lack of co-ordination among concerned departments (89.16%), skills followed in tank management are obsolete and traditional (84.16%) and poor knowledge of tank users (80.00%); lack of co-ordination among various concerned departments (81.66%), poor formal institutional technical support and assistance to the farmers (78.33%), poor knowledge of tank users on tank management (75.00%) and lack of knowledge on group formation under non-project tanks.

The issue of constraints on demarcation of tank areas, empowering tank users on group formation and its sustainability and establishing relevant social organisations to enhance the socio-political participation should be addressed for effective tank management by the project tank users. The APCBTMP should work in tandem with other organisations like panchayat raj institutions, department of agriculture and allied aspects and NGOs to reconsolidate the needs and interests or problems by tank users like arresting the encroachment of tank area, disintegration of various groups like SHGs, CIGs and the WUAs.

Less water availability in non-project tanks might facilitated for higher yield and higher income compared to project areas. The income generating activities taken by the project such as livestock, nursery, agri-business and marketing, and other off-farm activities have contributed to their income. Further, the personal characteristics of the respondents like high scientific orientation and motivation of earning more money, risk bearing ability and timely supply of critical inputs and necessary possession of implements might have acted as incentives to the tank users and hence would have brought change in their annual income level in project and non-project areas in tank rehabilitation activities. The above findings gained support from the studies indicated by Sridhara (2002); Nirmala (2003) and Goudappa *et al.* (2012) who reported that increase in their annual income level after implementation of project. Capacity building initiatives through NGOs, governmental agencies by generating the social capital in the tanks through adequate efforts should be taken in this direction by the village panchayats and NGOs (Nanthakumaran and Palanisami, 2010). Policies provide strategic directions for actors to adopt a particular course of action. These policies include paradigms, public sentiments, programmes and frames (Campbell, 1998).

The panacea for majority of the constraints encountered by the project and non-project tank users could be establishing enough infrastructure to attend various tank management activities, providing optimum budget for tank maintenance, safeguarding the tank catchment area from encroachment, assessing the feasibility of livelihoods to be taken up under the tank, encouraging the tank users to participate collectively as a community and forming and maintaining groups among the tank users to derive maximum benefit from the tank. Establishing channels for effective interaction between project and non-project tank users. The channels could be gram sabha meetings, TUG (Tank user group) meetings, brain storming sessions, focused group discussions, panel discussions etc.

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