Challenges of Implementing Participatory Irrigation Management for Food Security in Semi-arid Areas of Tanzania

Pilly Joseph Kagosi

Tanzania Forestry Research Institute, P.O. Box 1854, Morogoro, Tanzania

Abstract: Participatory irrigation management (PIM) is theoretically assumed to reduce poverty significantly, but its practical experience and challenges are yet researched and documented in Tanzania. The study aimed at assessing challenges observed during implementation of PIM approach for food security in semi-arid areas of Tanzania. Data were collected through questionnaire, participatory rapid appraisal (PRA) tools, key informants interview, Focus Group Discussion (FGD), observation and literature review. Data collected from questionnaire were analyzed using SPSS. Data from other methods were analyzed using content analysis. The study revealed that PIM approach has contribution in improving food security at household level due to involvement of communities in water management activities and decision making, which enhanced availability of irrigation water and increased crop production. However, there were challenges observed during implementation of the approach, including the minimum participation of beneficiaries in decision making during planning and designing stages, which means that inadequate devolution of power among scheme owners, inadequate and lack of transparency on income expenditure in water utilization associations (WUAs), water conflict among WUAs members, conflict between farmers and livestock keepers and conflict between WUAs and village government leaders regarding training opportunities and status. The rules and regulation of WUAs were not legally recognized by the national courts and few farmers who planted trees around water sources. However, it was realized that some of the mentioned challenges were rectified by farmers themselves and facilitated by government officials. The study recommends that the identified challenges need to be rectified for farmers to realize more on the importance of PIM approach as it was realized in other Asian countries.

Key words: Challenges of PIM, PIM, food security, semi-arid areas, Tanzania.

1. Introduction

Water bodies play important role in food security and livelihood of the people surrounding them. However, people surrounding water resources have been blamed for the mismanagement and therefore the destruction of the existent water sources important for various livelihood activities, including irrigation activities. Uncontrolled harvest of trees for timber, fuel wood and poles and some time the deforestation is done along/around water bodies and catchment areas for expansion of agricultural land. On the other hand, drought and climate change effects also have negative impact on forestry and water availability [1].

According to United Republic of Tanzania (URT) [1], the rate of deforestation stands at between 90,000-130,000 ha per year. Since independence, water and forest in Tanzania have been managed by states' regulations [2]. The state water ownership system was due to the notion that local people cannot manage water and forest resources sustainably. However, currently, it was realized that state is not effective, as the government failed to enforce rules and regulations in conservation and management of these important resources (water and forest) for Tanzanian livelihood. The failure of the government alone to manage water and forest resources included high costs of natural resources management and lack of peoples sense of ownership. Besides, few government staff and these natural resources were

Corresponding author: Pilly Joseph Kagosi, Ph.D., research fields: agriculture and socio-economic.

viewed as the state property, hence there was no incentive for the local people to conserve them [3]. Government interventions acquired dominance, which is top-down approaches status in development of common pool resources management institutions [4]. Despite of this approach, the problems of water resource management and its access by local communities persisted. For example, in water resources management prior to ending of agricultural cooperatives and state farms, irrigation departments at district level were in charge of: (1) distributing irrigation water up to the tertiary level; (2) maintaining all primary and secondary canals, including structures in tertiary canals; (3) operating and maintaining most irrigation and drainage pumping stations, reservoirs, roads, flood and riverbank protection works; (4) collecting water charges and coordinating water requests and water distribution; (5) entering into contracts with public system rehabilitation and expansion. Water distribution and canal maintenance at the tertiary and quaternary level were handled by cooperatives and state farms.

The increase of people and higher demand of forest and water leading to deforestation and inadequate water resources for livelihood activities aroused people's thinking on alternative management approach on management of water and forest resources, thus participatory approaches were created. Following, the government realized the need to involve community to manage natural resources [1]. In line with government failure to manage water and forests, the government of Tanzania proposed the need to involve people in water and forest management for livelihood and sustainable natural resources management. Several studies have proved that local people can manage natural resources by establishing their rules and regulations [5]. It is believed that community participation enhances sense of ownership among the community, hence increases commitment in water and forest resources management. Community participation also reduces government burden in terms of finance and manpower

in management. Since communities are the ones who directly benefit from natural resources, their involvement is an incentive for effective participation in conservation and management of water and forest resources. The participatory irrigation management (PIM) was initiated in order to conserve water resources for irrigation to reduce poverty among community members. The PIM is believed to provide people with enough capacity of water resources management, which in turn helps to reduce poverty through crop production in irrigation schemes. Despite, PIM theoretically is assumed to reduce poverty significantly, but its practical experience and challenges are yet researched and documented in Tanzania. Specifically, this study aims at assessing challenges of implementing PIM approach based on the following items: community participation, transparency in scheme activities, equity in water distribution and rule of law governing water management.

2. Materials and Methods

2.1 Study Area

The study was carried out in three districts—Babati, Nzega and Igunga. These districts were purposively selected, since they were among the 12 districts of semi-arid areas where the participatory irrigation development programme (PIDP) was operated. These sites were selected based on their long experience in PIM schemes, and few researches have been done in these areas [6]. These sites permitted collection of sufficient data important for the study. The PIDP was selected as a case study, because the programme emphasized on participatory approach among stakeholders, especially water user's association members in management of irrigation schemes. Smallholder development project in marginal areas of Tanzania (SDPMA) schemes were selected to represent the schemes, which started without PIM and then implemented PIM for comparison with PIDP and non-PIDP. Non-PIDP schemes were selected to compare the performance of the schemes with PIM

and without PIM approach.

The PIDP covered 12 districts in six regions of marginal areas in central plateau regions of Tanzania, namely, Dodoma, Mwanza, Singida, Shinyanga, Tabora and Manyara. The regions and their districts in brackets are as follows: Dodoma (Dodoma and Mpwapwa), Singida (Manyoni and Iramba), Manyara, (Babati and Mbulu), Mwanza (Misungwi and Kwimba) Shinyanga (Maswa and Shinyanga) and Tabora (Igunga and Nzega). In the districts covered by the programme, it was estimated that about 21%-49% of the population live below the basic needs poverty line, mainly because of poor soils and erratic rainfall. Marginal group, such as poor farmers, had limited access to agricultural resources [7]. Traditionally, local people in the study area were farmers and livestock keepers. Main crops grown were maize, beans, paddy and pigeon peas for food and cash.

2.2 Data Collection

Data collections for the study were both primary and secondary. The primary data were obtained mainly using qualitative kinds of data. The data were collected using key informants interview method, participatory rapid appraisal (PRA), focus group discussions (FGDs) and observation and secondary data. The secondary information obtained from various sources, including village district offices, libraries and internet searching. Data from PRA were analyzed with the help of local communities during PRA exercise. The PRA tool includes time line and oral history. Content and structural-functional analysis was used to analyze data from discussion during key informant interview, secondary data and participant observation.

3. Results and Discussion

3.1 Food Security Situations in the Study Area

The study findings showed that the majority (70.4%) of the respondents under PIDP schemes did not experience food deficit problems. This was revealed

during PRA when the respondents reported that 29.6% of farmers under PIDP schemes experienced food insecurity situation in 2007 and 2008 (Table 1). The high proportion of the respondents with enough food was attributed by various reasons, including participation of the respondents in irrigation scheme activities, well organized water utilization associations (WUAs), education level, labour availability and household sizes. Other reasons included the adoption of improved agronomic technologies, land and water management activities, and participatory approach training. Main problems which lead to food insecurity to about 29.6% of total respondents were poor planning on use of produced food, alcoholism, poor implements and unequal water distribution among WUAs members. Other challenges included reluctance on using improved technologies, laziness, drought and poor irrigation structures. During PRA, FGD and key informants interviews, it was revealed that most of the household members had three meals per day after crop harvest, while during land preparation season, they had two meals per day. This was justified when the respondents mentioned different types of meals they took in three days including weekends. This was further confirmed, as the questionnaire results indicated, that most of the respondents ate three meals per day and few reported to take two meals per day under PIDP schemes which were performed better than other schemes (Table 1).

3.2 Participatory Decision Making

The study findings showed that participation of farmers in planning and designing of the irrigation activities was at minimal level. Larger numbers of WUAs participation in activities and decision making were under maintenance of scheme activities. Decision on what to be done and how it should be done, was made mainly by district staff, zonal engineers and PIDP staff during planning and designing of scheme activities (Fig. 1). For this case, it implies that WUAs members had less power in decision

Table 1 Numbers of meals for adults and children (%).

Item/statement	PIDP <i>n</i> = 80	SDPMA <i>n</i> = 80	Non-PIDP <i>n</i> = 80	Total <i>N</i> = 240
Food insecurity	17.5	18.8	52.5	29.6
Food security	82.5	81.3	47.5	70.4
Numbers of meals per day for adult in 2007 during normal days				
Once	0.0	0.0	1.3	0.4
Twice	17.5	36.3	22.4	25.4
Three times and more	82.5	63.7	76.3	74.2
Numbers of meals per day during normal day for adults in 2008				
Once	0.0	0.0	0.0	0.0
Twice	7.5	16.3	17.5	13.8
Three times and above	92.5	83.7	82.5	86.2
Numbers of meals per day during normal days for children in 2007				
Twice	1.3	12.5	23.2	12.3
Three times	50.0	71.0	60.5	60.5
Four times and more	48.7	16.5	16.3	27.2

Source: the author's own illustration in 2009.

Fig. 1 Participation level of local people in decision making on scheme activities under all stages of scheme development.

in management of scheme activities. Eliminating beneficiaries from decision making can threaten the sustainability of irrigation structures and water availability in future. Local people have a significant role to play in improving water availability, and their full participation can therefore contribute significantly to effective management of irrigation structures and water resource. According to water resource management policy act [8], the role and responsibility of government institutions, leaders and non-governmental organizations (NGOs) are to assist local communities in terms of technical advice

(facilitation) and not to make decision on their behalf. However, making decision does not mean farmers do not need government support, government should support farmers in case of disaster which causes destruction of scheme structure beyond their capacity, like flood effect. The flood effect destruction needs government support, so the irrigation department should not leave the entire burden to farmers with participation concept.

Although, it has been reported that PIDP was among successful programmes in semi-arid areas of Tanzania regarding implementation of participatory

approach [9], the author observed that during initial stage of programme, decision making in scheme activities was provided by engineers, district staff and PIDP staff and farmers had low participation level in scheme activities, because at that time they had less negotiations skills. The real participation of beneficiaries in the project or programme activities is when the needs and interests of people can be taken on board. The involvement of communities in irrigation scheme activities in the study area with time created beneficiaries' sense of ownership of irrigation system and water resources. The study findings further showed that women were less involved in WUAs members and women were marginalized; decision making mostly done by men despite that about 73% of farmers were women. The committees members were democratically elected and comprised of both women and men, however, few women were in that committee (Table 2). Various reasons have been provided about little women to participate in WUAs organization, such as women had many responsibilities and were afraid to take leadership positions; water conflict resolution was time consuming and women did not have time for this important activity tackled by WUAs leaders; they did not know how to write and read, so it would be difficult for them to take leadership positions. Among WUAs members, the numbers of males were higher than that of females [8]. This also explains why there were more men than women in the leadership positions. Some schemes had conditions that women leaders should be female headed households and in studied communities female household heads were very few. Married women had a problem of not being allowed by their husbands to take leadership position.

Poor representation of needs and interests of ones

who are participating in PIM threatens the irrigation structures and water resources. Women and poor people are the ones who depend most on water resources for development, excluding this group from participation in decision making on water management, meaning their interests are foregone for others interest. Likewise, even their access to water resources will be marginalized and lead to slowing down their strategies on poverty reduction.

3.3 Transparency

The process of decision making, rules and regulations pertaining water management and utilization need to be known by WUAs members, and should be in the form where everybody understands. In study area, people were aware of different issues, including rules and regulations, responsibility of WUAs and PIDP activities. However, some farmers did not understand well various basic issues regarding their schemes during interview. For example, farmers were members of WUAs, but did not understand if he/she is a WUAs member. Others did not even know their leaders, indicating that they are not participating in scheme activities especially in meetings. One of major problems mentioned mostly was lack of transparency in the fund contributed for operation and maintenance of scheme structures. In most cases, lack of transparency on how much money collected and how much spent has negative effect to commitment of farmers in contribution of operation and maintenance funds. In some schemes in the study area, lack clear information on how much money collected per year and expenditure. Due to failure to explain income and expenditure of collected income, it is difficult to expect members to participate fully in scheme activities, including contribution of operation

Table 2 Composition of WUAs leaders by sex in each scheme (frequency).

Sex	PIDP	Non-PIDP	SDPMA	Total
Female	9	8	6	23
Male	21	21	14	56
Total	30	29	20	79

and maintenance cash and idea.

3.4 Equity in Water Distributions

Equity in water distribution poses one of the most difficult challenges, especially in imbalance on water distribution in the implementation of irrigation activities [10]. Continuous flow of tangible benefit and its fair or equal distribution is one of the major factors for the success or failure of PIM, for example, rules and regulations concerning access of water resources should be exerted equally to all people. During FGDs, it was revealed that despite of presence of water distribution time tables and adoption of water management technologies, water conflict among WUAs members still exists. The main mentioned reasons were inadequate water, corruption of water distribution between some farmers and WUA leader existing at scheme areas leading to inadequate water and unequal water distribution. Water allocation sometimes is influenced by relationships with block/section/furrow leaders friendship, family ties or leaders in the village and muscular people. Increase of population in scheme area was also mentioned as the main source of high water demand and hence water conflict. The same was identified by Kadigi [11], who explained that irrigation is crucial for future food production, but increasing competition for water is a major constraint. Morgan-Brown et al. [12] commented that natural resources can only provide safety net to rural poor and protect water bodies for irrigation and hence poverty, only if water sources were managed and distributed equally.

3.5 Rules and Regulations

A fair legal framework is needed to enforce law, protection of human rights and minorities. This will help in provision of water resources access equally to all WUAs members. For the rule of law to work, there must be rules and regulations, law and bylaws, and they must be enforced. Obedient one is rewarded while offenders are punished [13]. In PIDP schemes,

WUAs had rules and regulations however till phasing out of the programme (PIDP), they were not yet enforced and not yet recognized in the district legal organizations, like courts, despite that just after registration of WUAs constitutions to ministry of home affair constitution was submitted to the courts and local resolution groups at village level. Minor resolutions and water distribution in most of scheme committee members are performed by block leaders, section leaders and water man. One who commits offence related to the user rights, was either fined at scheme level using resolution committee or at court district level, but it was difficult at court district level due to unrecognized bylaws, rules and regulation at government legal organization. Another reason for breaching rules is due to the higher dependency of water resources for irrigation by local people and higher benefit from water for irrigation, which motivates and gives people temptations to violate rules and corruption problem.

The problem of law enforcement comes in when individual refuses to be punished, especially in fine payment. When one is taken to the court, most culprits escape from the hand of the law. This is because most of the bylaws were not legally accepted, known or accommodated in the ordinary laws. This situation makes it difficult to enforce bylaws, as offenders were not be punished accordingly while obedient people were demoralized. However, in the study area, few offenders of the law exist, which suggests that rules and laws were working to some extent. However, livestock keepers once break the law, they tend not to pay fines, instead they bribe leaders offices at district level.

3.6 Conflicts

The conflict was observed between farmers and livestock keepers regarding livestock destruction of scheme structures. Conflict among farmers on water distribution happened during water scarcity period where water distribution was in favor of relative relationship, leadership and muscular or powerful

people. Conflict was also observed between WUAs leaders and village government leaders. This was caused by jealousy when WUAs leaders gained popularity in the village due to training received and allowances received during training trips. The training received by WUAs leaders empowered and encouraged them to even contest for the political leadership at ward and village level. It was further found that the programme was operated in the study area for a very short time such that farmers were not yet well familiarized with the PIM approach.

4. Conclusions and Recommendations

PIM approach has great contribution to food security in the programme areas. However, the approach used in Tanzania is increasing at a slower pace, probably because the PIDP operated in the study area for a short period of time for the farmers to gain enough experience in implementation of the PIM approach led to unnecessarily challenges, which could be avoided if the programme was operated for more than three years. The main challenges observed were the minimum power devolution to community, especially in decision making during planning and designing stages in scheme activities. Regardless of that PIM has not been able to deliver perfectly, its intended goal, specifically perfect water management food security was realized in schemes with PIM than the schemes without PIM approach. Thus, the PIM approach needs to be used, but demands time, compassion and commitment, whereby people are recognized from the beginning as equal partners and not as receivers of the imposed ideals. This will reduce identified challenges and hence production will increase food security. The study recommends capacity building to farmers on PIM approach before introduction of project/programme to give farmers power of negotiation skills during planning and designing of scheme activities.

References

[1] United Republic of Tanzania (URT). 1998. "What Is

Good Governance?" National Forest Policy, Ministry of Natural Resources and Tourism, Forest and Beekeeping Division, Government Printer, Dar es Salaam. Tanzania. Accessed August, 2015. www.unescap.org/huset/gg/governance.htm.

- [2] Kajembe, G. C., and Kessy, J. F. 2000. "Joint Forest Management in Urumwa Forest Reserve, Tabora, Tanzania: A Process in the Making." In *Forests, Chiefs and Peasants in Africa: Local Management of Natural Resources in Tanzania, Zimbabwe and Mozambique*, edited by Virtanen, P., and Nummelin, M. Finland: University of Joensuu, 141-58.
- [3] Kajembe, G. C., and Mgoo, J. S. 1999. *Evaluation Report on Community Based Forest Management Approach in Babati District: A Case of Duru-Haitemba Village Forest Reserve*.
- [4] Ostrom, E. 1994. *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press.
- [5] Ostrom, V., Feeny, D., and Picht, H., ed.. 1993. *Rethinking Institutional Analysis and Development: Issues, Alternatives and Choices*, 2nd ed.. San Francisco: ICS, 486.
- [6] Sokoine University of Agriculture (SUA). 2000. "Research Achievements of SUA in Agriculture, Forestry and Animal Health." In *Proceedings of the First University-Wide Scientific Conference*, 120.
- [7] International Fund for Agricultural Development (IFAD). 2007. *United Republic of Tanzania: Participatory Irrigation Development Programme (PIDP)*.
- [8] United Republic of Tanzania (URT). 2009. *The Water Resources Management Act*.
- [9] Kagosi, P. J., Kapinga, D. S., and Mwageni, E. A. 2009. "Participatory Irrigation Management and Food Security in Semi Arid Areas of Tanzanian Tanzania." *Journal of Development Studies Institute of Development Studies* 9 (1-2): 20-33.
- [10] Samra, J. S., and Sharma, K. D. 2009. "Watershed Development: How to Make 'Invisible' Impacts 'Visible'?" *Current Science* 96 (2): 203-8.
- [11] Kadigi, R. M. J. 2006. "Evaluation of Livelihoods and Economic Benefits of Water Utilization: The Case of Great Ruaha River Catchment in Tanzania." Ph.D. thesis, Sokoine University of Agriculture, Morogoro, Tanzania.
- [12] Morgan-Brown, T., Susan, K., Kenneth, W., and Brian, C. 2009. "Quantitative Assessment of a Tanzanian Integrated Conservation and Development Project Involving Butterfly Farming." *Conservation Biology* 24 (2): 563-72.
- [13] Mgunia, F. H., Mombo, F., and Zilihona, J. E. 2008. "Good Governance and Participatory Forest Management in Tanzania: Lessons from Duru Haji Temba Forest Reserve." *Rural Planning Journal* 10 (2): 1-11.