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Prospects and challenges of management of smallholders' Wovwe Rice Irrigation Scheme in Malawi through participatory approach

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The concept of participatory approach in irrigation management was adopted in Malawi in the mid 1990s, but fully implemented in early 2000. This research was designed to analyze the challenges and benefits which Water User Associations (WUAs) encountered during implementation of irrigation projects using Wovwe Water User Association (WWUA) as a case study. The study thus examined the legal framework of WUAs in Malawi, their performance in water distribution, operation and maintenance, farmers' participation in WUA activities and how gender is addressed. Data was collected through questionnaires, which were administered to 290 farmers distributed in 15 blocks each comprising of about 20 to 25 ha of irrigated land. Qualitative information was also obtained through focus group discussions with farmers, and by interviewing officials of Water User Associations and those of the Irrigation Department in the Ministry of Irrigation and Water Development. Information sought included a wide range of issues including management of WUAs, participation of the farmers in WUA activities and women participation in decision making processes. The results indicated that 86.6% of the farmers are aware of the important by-laws of the Association, out of which 77% were satisfied. In spite of farmers` satisfaction, the constitution of the association is not effectively reinforced and followed. Water distribution is rotational and on supply-driven criteria. However, inefficiency of water use both on farm and in conveyance system was observed. Gender composition in key decision making positions is appalling with no women representation in the current WUA executive committee. The farmers have developed sense of ownership of the Association, but it was observed that limited financial resources, lack of technical and managerial skills and financial imprudence by the Association`s executive were the major challenges that derail WUA`s operations.

Key words: Community participation, irrigation management transfer, participatory approach, Water User Associations (WUAs), water resource management.

INTRODUCTION

Irrigated agriculture contributes significantly towards socio-economic development of the rural communities. It is estimated that about 40% of the world's food crops are produced by irrigated agriculture, which is significant to

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the food supply and to farmers' incomes (Peter, 2004). In accordance with International Water Management Institute (IWMI) (2007), African countries, especially Sub-Saharan Africa, have demonstrated commitment in investment, development and management of irrigated agriculture as a contribution to economic growth and food security. However, increased cost of irrigation development and management and international calls for implementation of effective and efficient water management practices has obligated developing countries to adopt participatory approaches in its irrigation schemes, which is conceived as the thrust area in effective irrigation management. This approach includes involving and associating farmers in planning, designing operation, maintenance, financing, decision making, monitoring, evaluation of the irrigation system and sharing responsibility in management of canal irrigation systems (Peter, 2004; Sushanta, 2007; Gondwe, 2008).

At a global level, the transfer of ownership and management of irrigation schemes to the Water User Associations (WUAs) or non-governmental organizations (NGOs) constituted the major irrigation reform since the mid-1980s (Shah et al., 2002). In accordance with Belsare (2001), there is a general acceptance all over the world that farmers through WUAs manage and operate irrigation systems, regulate and distribute water more efficiently among users. WUAs are used for irrigation management in more than 60 countries around the world (International Network on Participatory Irrigation Management (INPIM) and International Commission on Irrigation and Drainage (ICID), 2007; Belsare, 2001).

Management and development of irrigation schemes in Malawi after post-colonial era and before the new winds of policy changes that led to the establishment of Water User Associations was largely controlled by the government. Since the early 1980s, State run schemes have experienced several problems that have led to a substantial decline of the crop productivity and the state nearly stopped managing the schemes (Gondwe, 2008). The result was that most of them were in a state of inactivity with dilapidated infrastructure (Mulwafu and Nkhoma, 2003), which caused inequality in allocation and distribution of water, retarded water conveyance and increased water losses due to seepage in the broken canals and overflowing in canals. It was generally accepted that the State could no longer efficiently manage irrigation schemes alone, which led to irrigation policy reform. The introduction of water and irrigation policies gives farmers greater participation in management of the irrigation schemes, which is expected to improve efficiency of water distribution and crop productivity.

In recent years, the Government of Malawi has instituted a new irrigation policy, which has significantly departed from the past emphasis on costly government-supported smallholder irrigation schemes to participatory approach (Ferguson and Mulwafu, 2005). The new policies provide for stakeholder participation in the management of irrigation schemes, and the transferring of entire management into the hands of the beneficiary farmers. Although some aspects of Irrigation Management Transfer were adopted in the mid-1990s, it was not until 2000 that more fundamental measures were taken towards implementation (Ferguson and Mulwafu, 2005). By 2008, eleven Water User Associations were formed, Wovwe inclusive, under Smallholder Flood Plain Development Program (SFPDP) with funding from the International Fund for Agricultural Development (IFAD). Participatory approach in Malawi is implemented through Irrigation Management Transfer (IMT) that entails the formal handing over of control or management functions from Department of Irrigation (DoI) to Water Users' Associations (WUAs), which is a community-based organization owned, controlled and operated by user members for their benefits in improving water delivery, water use and other organizational efforts for increasing their production possibilities (Abou-Seida, 2001). Participatory approach encourages community partnerships with the government, builds community ownership of irrigation schemes and permits the communities to take on responsibility of maintenance and operation of their systems, as well as reduces the government expenditure on rehabilitation of irrigation systems (Cornwall, 2001).

It is the objective of this study to analyze the constraints and benefits of Water User Association (WUA) to a sustainable irrigation water management using Wovwe Water User's Association (WWUA) as a case in focus. The specific objectives of this study were to determine effectiveness of WUA in management of operation and maintenance of the project, assess participation of the farmers in WUA activities and investigate how gender issues are addressed in the Water User Association in operation and maintenance as well as decision making processes.

MATERIALS AND METHODS

Description of Wovwe Rice Irrigation Scheme

Wovwe Rice Irrigation Scheme is located in Karonga district, one of the six districts in the northern region of Malawi (Figure 1). Karonga district covers an area of 3,355 km^2 with a population of 250,775 with intercensal annual growth rate of 3.3%, which is above the national intercensal annual growth of 2.8% (National Statistics Office (NSO), 2008). The population density of Karonga district has increased dramatically from 44 people/km^2 in 1987 to 58 and 80 people/km^2 in 1998 and 2008, respectively (NSO, 2008). The district is hot and dry from September to December, rainy from January to May, and cool and dry from June to August (Gondwe, 2008). There are several rivers, running through the district from the Matipa Complex Forest and Nyika Highlands to the west, which include Kibwe River, North Rukuru River, Lufira River, Remero River and Wovwe River. Songwe River forms an international boundary between Kyela district in Tanzania and Karonga district in Malawi. The population consists primarily of Tumbuka and Nkhonde

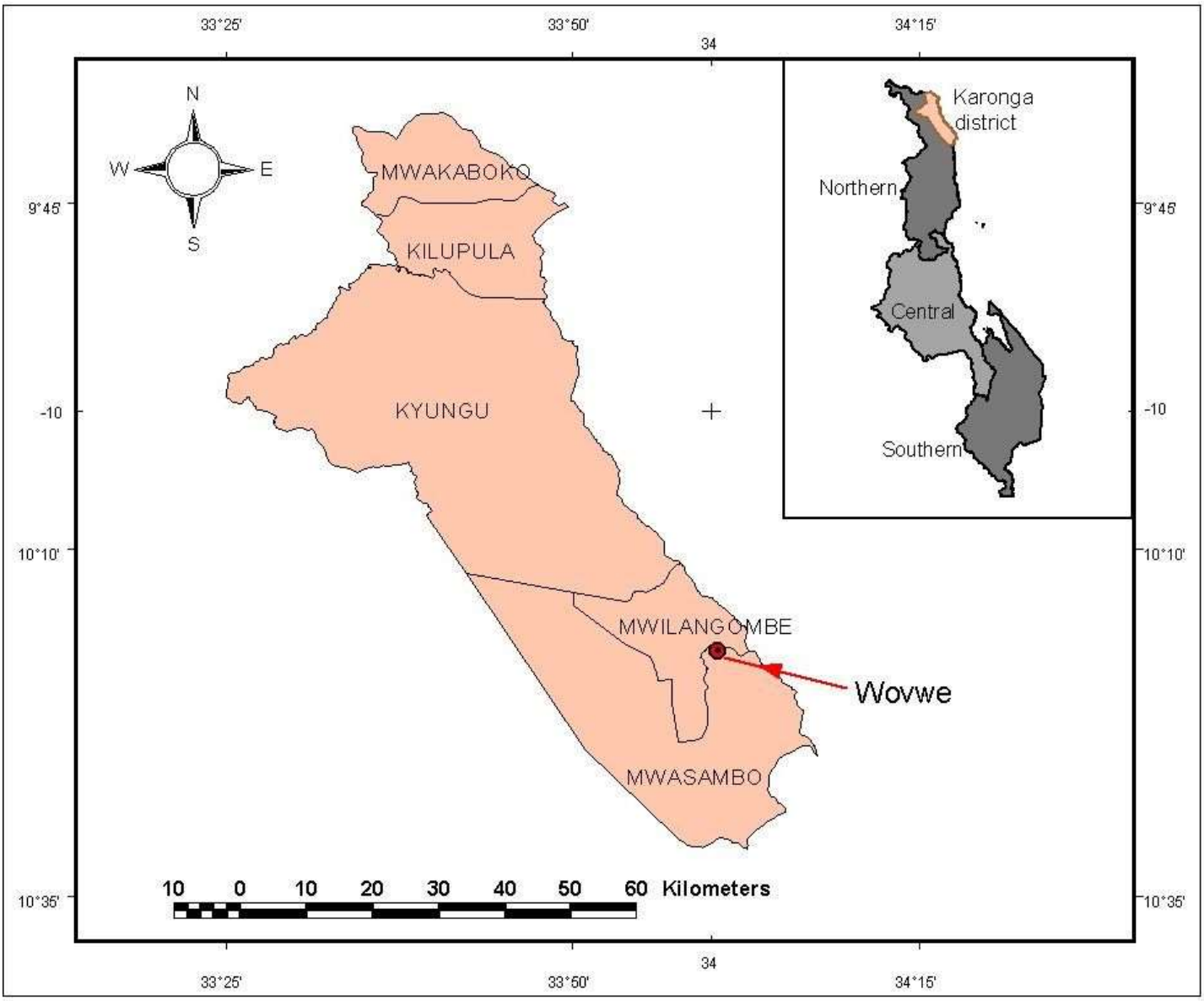

Figure 1. Location of Wovwe Irrigation Scheme.

speaking people, with small number of other language groups represented. Culturally, the population believes in male supremacy in decision making, which bestows women less opportunity to fully participate in all socio-economic endeavours.

Wovwe Rice Irrigation Scheme was developed in 1974 with an initial irrigable area of about 170 ha. This scheme, along with other 15 smallholder irrigation schemes in Malawi were financially supported by British Aid and Chinese Agricultural Technical Mission (CATM), which was funded by Taiwan Assistance Technical Programme (Mphande, 1984). The average farmers' land holding size is 0.25 ha. The main type of soil is sandy clay and the main crop grown is rice with sweet potatoes, vegetables and maize grown in places where water is inadequate particularly between August and October. The main distribution system is a 3.7 km lined canal diverted from Wovwe River, which also supplies water to a 4.5 MW Wovwe mini-Hydro-electric power plant and two other rice schemes at Fuliwa and Mphinga upstream of Wovwe. Wovwe irrigation scheme was later expanded to 365 ha in the 1980s. This are demands water consumption of 40,320 m^3/day of water during dry season although 39,440 m^3/day of water permit was issued (Gondwe, 2008). The Government of Malawi is planning to rehabilitate 3100 ha of existing irrigation schemes, including schemes at Bua (340 ha), Wovwe (365 ha), Hara (230 ha), Manthimba (250 ha) and Dickson (100 ha) (Government of Malawi (GoM), 2012).

Wovwe Water User Association (WWUA) was established in 2002 with a view to transfer of functions and control of Wovwe Irrigation Scheme from Government of Malawi to WWUA, an exercise that was officially completed in 2006. The Association covers 13 villages with 1500 registered members of whom, 1165 are men and 335 are women. The farmers were distributed in 15 blocks each comprising about 20 to 25 ha of irrigated land. The main objectives of WWUA were to increase farmers' income through more productive and sustainable irrigated agriculture and to

reduce the government budget, through farmer participation in operation and maintenance of the irrigation scheme. In the area of maintenance, the government shall be responsible for the maintenance and repairs of weirs, main canal, sand traps and main roads; whereas WWUA shall be responsible for minor works including secondary canals, earthworks to restore protective bands, removal of weeds from all water courses, maintenance of service roads around the schemed-silting and cutting of grass. In addition, the agreement provides the handing over all equipment, plant, machinery and facilities to the Association.

As a legal entity, WWUA was granted water right in 2005 mandating it to abstract a volume of 3,944.6 m^3/day from Wovwe River for irrigation purposes at an annual rental of Malawi Kwacha (MK) 41,025, which is equivalent to US$ 295. This area demands water consumption of 40,320 m^3/day of water during dry season although only 39,440 m^3/day of water permit was issued (Gondwe, 2008). Each member of the Association is allocated a share of the water fee based on the size of his/her farm. Each farmer is required to pay MK 500 (US$ 3.6)/plot/season in addition to a membership fee of MK 250 (US$ 1.8) annually. Water right application was facilitated by the government through its implementing partner, Concern Universal, who was given the authority to process water rights applications. Water management, which includes allocation and distribution, is the core function of the Association in accordance with WUA constitution. Water allocation and distribution is primarily on rotational basis to blocks, which is done by a Water Guard, an appointee of WUA, in consultation with block committees. The Block Committee is responsible for allocation of water to block units on rotational basis. Individual farmers also get water on rotation to their plots through block units committees.

Data collection

Data collection involved desk top studies, questionnaire survey, and observations. It also involved interviewing officials from responsible Ministries at district and national level, traditional leaders, WUA Board members and selected registered farming families. Farming families for questionnaire survey and group discussions were sampled using probabilistic sampling approach, which utilizes some form of random selection. The sample size for the study was determined using Equation 1 (Krejcie and Morgan, 1970):

$$n = \frac{\chi^2 \times p \times (1-p) \times N}{e^2 (N-1) + \chi^2 \times p \times (1-p)} \quad (1)$$

where N is the total population size; n is the sample size; e is the degree of accuracy expressed as a proportion (0.05); χ^2 is the chi-square for 1 degree of freedom at the desired confidence level (χ = 1.96 at confidence level of 95%); p is the population proportion (assumed to be 0.50 since this would provide the maximum sample size.

The sample size for the population of 1500 and a margin of error, e of 5% is 306 farmers. It was intended to administer questionnaires to 21 farmers in each of 15 blocks, but owing to some difficulties in the field the number of administered questionnaires in each block varied from 18 to 21 and a total of 290 questionnaires were administered. In each block, farmers were selected randomly with an assistance of village and WUA leaders taking into consideration the location of their farms within each block across the entire scheme. To be able to identify equality of water distribution in the blocks, seven respondents each were randomly selected from the head, middle and tail of the irrigation canal, respectively. This was in line with the hypothesis that farmers from each of these three sections experience diverse water level satisfaction. Five to six women farmers in each block of 21 respondents were selected in order to follow the proportion of women to men farmers in the WUA of approximately 1:3 in accordance with the statistics of membership of WUA.

Key interviews and focus group discussions (FDG)

Qualitative information was obtained by way of participatory rural appraisal tools such as focus group discussions with farmers. The interviews were arranged and conducted to collect information from Irrigation Water Management Specialists, Divisional Principal Irrigation Officer, District Agricultural Development Officer, District Agricultural Extension Officer, The Wovwe Irrigation Scheme Manager, Water Users Association President, Chiefs and members of WUA standing committees (This list did not necessarily focus on what was done and/or gathered).

Focus group discussions with farmers involved to a total of 90 farmers, 6 farmers in each block. Suitable participants of the FDG in each block were identified and participation was voluntary. The discussion for each group was held separately in variety of locations convenient to farmers of the block in question. A moderator introduced the topic for discussion, which included the aims and agenda of the meeting, and encouraged the group to participate in the discussion openly. The discussions involved wide range of aspects including how they access water at their individual farm, issues of conflicts and how they relate with their neighboring farmers, how they participate in WUA activities and decision making, their willingness to pay for water and membership fee, women representation in standing committees, general satisfaction about WUA operation (resource mobilization, leadership, structure maintenance, water distribution), their involvement in WUA elections and attendance at the meetings. In terms of capacity building questions were asked about the trainings they had been provided, whether the trainings were effective in terms of efficiency of water utilization and crop productivity.

Questionnaires and observations

To get information from WUA members, a structured questionnaire containing both open and closed-ended questions were formulated to permit the respondents to articulate their views and knowledge on different aspects of the project. Households, who were beneficiaries of the schemes, were interviewed in a variety of locations convenient to an individual. Respondents were selected at random within each block across the entire scheme, but gender was taken into consideration. The questions were designed to seek respondents' views of how water is accessed at their individual farm, issues of conflicts and how they relate with their neighboring farmers, participation in O & M and decision making in their in WUA, willingness to pay for water and membership fee. Information was also sought on women involvement in farming and WUA activities, women representation in management standing committees, general satisfaction about WUA operation (resource mobilization, leadership, maintenance of irrigation structures and water distribution), involvement in WUA elections and attendance at the meetings. In terms of capacity building, questions were asked on the effectiveness of the training they have received.

Specific questions were designed for women farmers, which were tailored to gather information relating to challenges women face and whether the challenges were related to their spouses, society or WUA executive. The respondents were free to give their views and perception because each respondent was interviewed alone to avoid interferences from others, despite the fact that the method was strenuous and time consuming. Another set of structured questionnaire was designed and administered to both

former and current WUA presidents to collect general information on Association and specific information on O & M, achievements and constraints of their operations, training provided to them, relationship of WUA with government department and chiefs, water distribution and allocation measures, procedure to resolve water related conflicts, collection of water charges and fund raising and composition of committee in terms of gender.

The questionnaires were designed in English, but were administered in Tumbuka, a widely spoken local language in the study area. The respondents were generally able to responds to the questions, but where necessary respondents were assisted by research assistants who have received instruction and guidelines on how to administer and fill questionnaires. The majority of the respondents were literate.

Direct observations across the entire irrigation scheme were carried out in the field simultaneously with questionnaire survey. Observations focused on the operation and maintenance of the irrigation structures, protection bands service roads and gender involvement in both farming and WUA activities. Observations were made to cross check with the information obtained from the Ministry officials and from beneficiaries.

Data analysis

The qualitative information collected during the discussions with different sources outlined was grouped together according to specific questions and summarized in percentages and tables. Qualitative data was analyzed based on specific concepts that were derived from the set objectives such as conflicts resolutions, legal framework, water access, operation and maintenance and so forth. Microsoft Office Excel 2007 was used to tabulate the variables and for analysis data.

RESULTS

Water allocation and distribution

About 15.6% of the farmers were not satisfied with water allocation, but the remaining 84.4% reported different level of satisfaction from acceptable to very high satisfaction (Table 1). Those who are satisfied indicated that the schedule of water allocation allows farmers to plan for absence of a clear schedule of water allocation potential that may give rise to water related conflicts in the long run. It was also noted that the level of farmers' satisfaction to water access has decreased after the establishment of Water User Association. For example, while 71.1% of farmers rated the services as high to very high before WUA was established; the same level of satisfaction was reported by only 36.7% after WUA was formed. On the other hand, only 8.9% were not satisfied before WUA was established, but post WUA dissatisfaction increased to 15.6%, which is inconsistent with the objectives of establishment of WUA. Some of the reasons brought forward by the respondents included insufficient water in the river due to inadequate rainfall the region was experiencing at the time of the study. Other reasons included illegal water abstractions from Wovwe River into informal rice schemes at Mphinga and Fuliwa, which were commissioned upstream of Wovwe Irrigation Scheme. Water shortage is particularly experienced during dry season from August to October.

Although some farmers were dissatisfied with water availability, the majority (97.6%) of them reported that WUA have established good water distribution plan measures, although this does not necessarily provide equal water distribution to farmers. In accordance with all respondents, equal allocation of irrigation time favors farms that are geographical closer to water distribution canals. About 58.5% of the respondents reported that farms near secondary canal have unfair advantage partly because they have an opportunity to use water more than allocated time and because they are not affected by the hydraulic efficiency of the canals. However, 37.2% of the respondents did not see any difference while 4.3% were non committal. The shortage of water was evident at the tail end of the distribution canal where about 45 ha of rice fields were converted to less water demanding maize crop.

It was also observed that illegal diversion of water is practiced by some farmers against the planned water allocation schedule because of insufficient quantity of water received from Wovwe River, which cannot meet water demand of all farms. WUA may improve availability of water to farmers by increasing hydraulic efficiency of the secondary and tertiary canals and reduce seepage loss and by implementing efficient on-farm irrigation practice. At the time of study, only 22% of the farmers had good supply, 30% considered supply was manageable, but 48% had insufficient water within the past 5 year's period. It is evident that decentralization of irrigation system did not result into greater equity of water supply.

Operation and maintenance

Operation and maintenance (O & M) is fundamental for the sustainable operation of the irrigation scheme as it promotes water use efficiency and hence increased crop yield. All respondents confirmed that they are involved in operation and maintenance of irrigation scheme, but provision of manual labor was the most common form of participation. About 87.2% of the respondents participated through manual labor, which is often limited to minor works such as slashing and removal of weeds in canals, earthworks and de-silting sand especially at the head works. With regards to WUA's effectiveness on operation and maintenance, about 45.5% considered it to be average, 34.1% said it was good while 18.2% rated it as poor (Table 2).

Some of the weaknesses reported by respondents include inability to enforce by laws to ensure clean canals and failure to repair some service roads, which limit accessibility during harvesting. It was further observed that the presence of aquatic weeds in the tertiary canal affected water distribution, which limited water supply into

Table 1. Farmers' satisfaction on access to water (%).

Water availability	Very high satisfaction	High satisfaction	Moderate satisfaction	Acceptable	No satisfaction
Pre WUA	23.3	47.8	13.3	5.6	8.9
Post-WUA	8.9	27.8	41.1	5.6	15.5

Table 2. Association's effectiveness in O & M.

Quality	Good	Average	Poor	Not sure
%	34.1	45.5	18.2	2.2

the fields at the tail end of the canal. In view of O & M training, about 91.7% of respondents did not receive any training because training was offered to the members of Irrigation Committee responsible for O & M of canals.

It was observed that women were involved in all maintenance activities such as canal cleaning and carrying material for canal maintenance, just like men except de-silting sand at the head works. The participation of women is encouraging as many scholars have emphasized the need to integrate women not only into farm activities, but also into agricultural investment programs including right to land as it relates to the irrigation development (Belsare, 2001; Poutiainen and Mills, 2014).

Operation and maintenance plan is important to ensure the sustainability of the irrigation schemes as it affirms the required stages with specific responsibilities and technical and financial obligations of both parties involved. WUA had no O & M plan, but operation and maintenance of the scheme was scheduled twice every year between cropping seasons. Unfortunately, stakeholders were not involved, which means financial compulsion and responsibilities for the sustenance of the scheme was not known to them.

Conflict resolution and management

With regard to WWUA, respondents identified four areas of conflicts, namely; illegally blocking entry of water to other farmers' fields against water allocation schedule (83.2%), secretly opening water through a band from a neighbor's farm (11.4%), livestock entering into somebody's plot (4.7%) and witchcraft accusations (0.7%). All conflict cases are handled by WUA through its standing committee known as Jury, but minor cases are resolved either by the Block Committee or amicably between conflicting parties themselves. Those involving witchcraft, depending on their severity, were sometimes referred to the Chiefs. In accordance with the 56.8% of respondents, there were fewer conflicts before than after establishment of WWUA. The potential reasons are that farmers are now taking farming as business, which has increased cultivated land area, consequently increasing water demand. It was also noted that water supply from the Wovwe River has decreased because of draught and increased abstraction by upstream water users. However, some farmers have expressed dissatisfaction with WWUA`s conflicts resolution body because decisions on conflicts resolution are based on favoritism (21.9%), which are influenced by social relations and corruption practices.

Relationship with government departments

In accordance with the respondents, only the Department Of Agriculture through Extension Officers supports the farmers well in matters of agronomy, but the Departments of Irrigation and Public Works were rated poorly. In accordance with the transfer agreement signed between the government and Wovwe Water User Association, the government is responsible for the maintenance and repairs of major works which include main canals, weirs, head works, main roads, sand traps and overpasses. Former WUA president recalled some rehabilitation works was done once on tertiary and secondary roads two years earlier, when the Head of State visited the scheme. Otherwise, governments departments have seldom fulfilled their responsibilities, which suggest that decentralization of Wovwe Irrigation Scheme was done to shift the recurring cost of irrigation from the government to the farmers. It is important to recognize that straightforward decentralization of irrigation schemes may not effectively work in smallholder developing countries, majority (75%) of who own less than 0.5 ha farms. Vermillion (2005) and Giordano *et al.* (2006) observed that even when all preconditions for a successful irrigation management transfer (IMT) are met; it is unlikely that IMT will work for smallholder farmers if government shifts all recurring costs of irrigation to the poor farmers.

Role of traditional leaders

Since the irrigation schemes are operating within the

administrative areas of Chiefs', it was felt important to establish how WUA relates with the traditional leaders. In general, both traditional leaders and the Association members reported the existence of good relationship between them. This is substantiated by the support the Chiefs extend to WUA in mobilizing farmers on their behalf for WUA activities, playing an advisory role, presiding over WUA election together with government officials (District Agricultural Development Officer, District Commissioner etc) and assisting in resolving disputes beyond the WUA structure such as disputes between the WUA and a farmer who is not a WUA member. However, some chiefs feel that their control has been taken over as WUA constitution does not allow them to be part of the executive or any other WUA committee. One chief recommended their inclusion in Jury rather than being involved to resolve complex cases only, which suggests that potential conflicts may arise in the future between the chiefs and WUA executives. The fear on the part of traditional leaders in losing their control and decision on land and other related issues have also been observed in Zambia (Poutiainen and Mills, 2014).

Financial resource mobilization and management

Financial resource is necessary, but not sufficient factor for the sustainability of Water User Association. The major financial resources mobilization is largely through WUA membership entry fee of MK 250 (US$1.8), which is renewed annually and a seasonal water subscription fee of MK 5,000 (US$ 36) per ha of land owned by the farmer members. In addition, the Association may also raise funds from fines, loans from the bank, grants and donations. The Association fines are levied from non payments of water fee, non attendance of association meetings, damage to irrigation structures, illegal use of water, non participation in maintenance work and from livestock, which are damaging fields in the scheme.

However, only 22.7% of the respondents rated the financial management of WUA as good, but 40.1% rated performance as average and 32.2% as poor. It was observed that only 53.2% of the respondents were willing to contribute water user and membership fees largely because the collected funds are feared to be diverted for unintended purposes. Even those who are willing to pay do so because of fear of their land being confiscated by the local government. It was noted that fees were collected without issuing receipts and even the amount collected was misappropriated. For example, audit report revealed misappropriation of about MK 1 million (US$ 7,205) leading to the change of WUA executive. Financial accounts indicated that annual water and membership fee were not collected in 2004, 2006 and 2007. However, all farmers interviewed reported that they were contributing both water user and membership fees annually. It is estimated that at least MK 1,537,500 (US$ 11,077) was collected annually and misappropriated by the Association executives.

The capacity of an Association to effectively carry out its operation and maintenance of the irrigation scheme depends largely on its stable financial status, which according to Nelson (2002) is determined by WUA`s water fee collection performance. Fee collection performance (FCP) is defined as the ratio of the annual amount of water charges collected to the annual amount of water assessed (FCP = FC/FA). With regard to Wovwe Water User Association, FCP increased from 39% in 2003 to 48% in 2004 (International Fund for Agricultural Development (IFAD) Supervision Report, 2004). Additionally, FCP calculated in 2005 was about 67%, which is relatively above the minimum requirement of 60%, but dropped to 0% in 2007 as water charges were not collected.

The survey observed that 59.1% of the members of the Association lack confidence in their executive committee and want the government to take the responsibly of O & M of the scheme because of poor financial management of WUA executives. Some farmers proposed that the government should manage funds on their behalf because their leaders are not trustworthy, which is contrary to the participatory irrigation management principle. The performance of the scheme was considered to be moderate to high by 84.1% of the respondents before WUA was established, but the same has decreased to only 63.6%. In fact, 59.1% of farmers had high satisfaction of the system before it transferred to WUA, but only 25% share the same opinion after WUA was established, which indicates that WUA`s performance is declining. It is thought that financial management aspect had attracted disapproving comments from the beneficiaries of the scheme. To build their capacity by way of sharing experiences, members of the Association have opened up links with other WUA both internally and outside Malawi and have had some exchange visits to Zomba, Hara and Chonanga all in Malawi as well as Italy and Tanzania.

Crop productivity

With regard to crop productivity, the farmers were asked to compare the level of yield pre and post formation of WUA. It was observed that about 59% perceived that crop yield have decreased after WUA was formed against 25% who perceived that the crop yields have increased. About 5% of the respondents were non-committal and 11% did not perceive any change in crop yield. However, the major problem appears to be inadequacy of farming inputs such as fertilizers, which is considered expensive, compared to the value of the crop yield they get from the market. It was noted that previously farmers sold their crops to Agricultural Development and Marketing Corporation immediately after harvesting, but excess

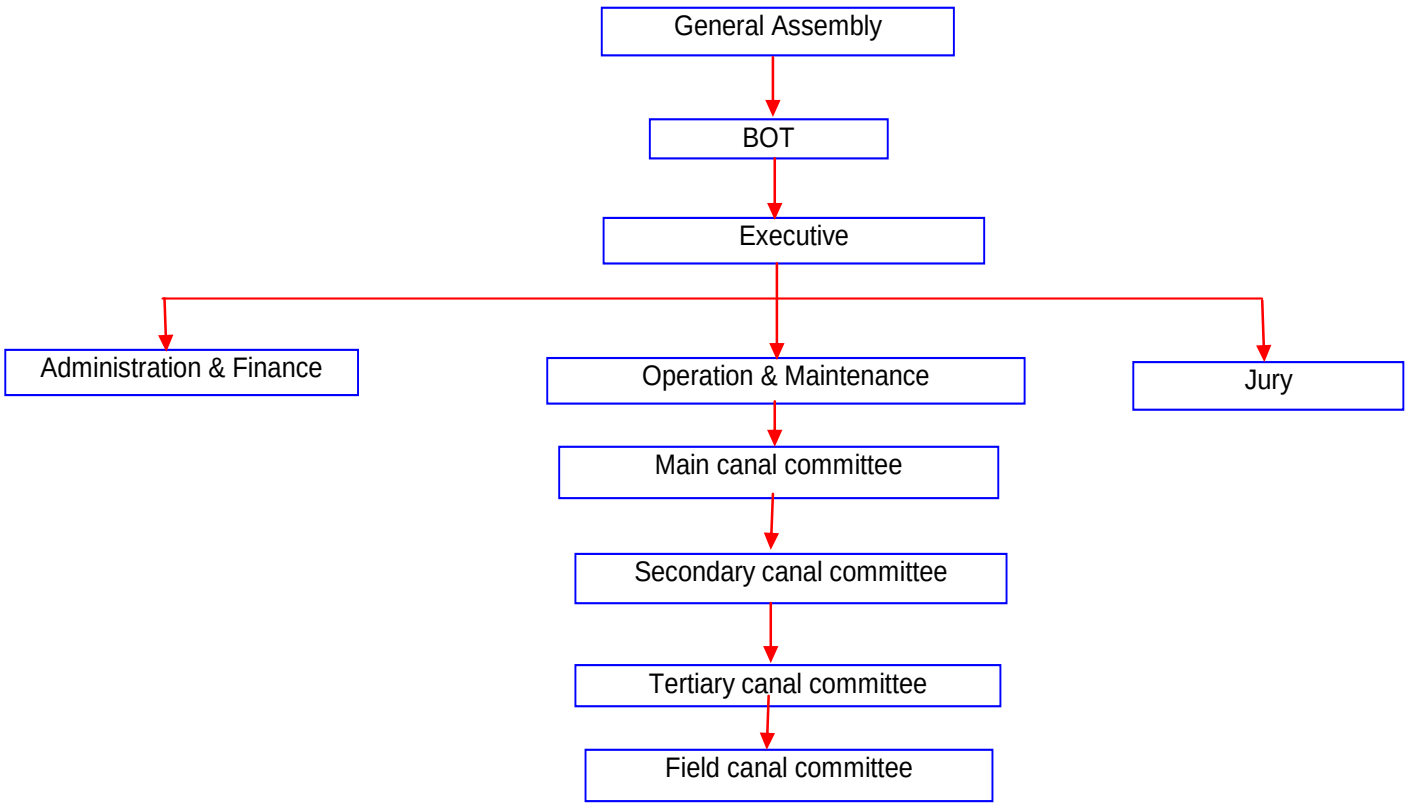

Figure 2. Organizational structure of WUA.

produce is now sold to individual buyers at a cheaper price. Elsewhere, case studies of participatory irrigation management around the world has shown that farmers' participation in water management had led to efficient water use, which increased water supply to tail end users, resulting into improved net farmers' income, increased crop intensity and yield (Vermillion, 1997; Ghosh and Kumar, 2012; Sam-Amoah and Gowing, 2001; NIACONSULT, 1993).

Constitution, organization and management of the association

WUA structure is the basic organizational relationship of committees that form part of the Association with specific roles and responsibilities with different reporting lines (Figure 2). The General Assembly at the summit is responsible for electing the Executive Committee and any other committee, taking on all policy decision, adopting or amending the articles of by-laws of the Association, acting and exercising final authority in all matters affecting the Association and hearing and passing on the reports.

It is worth mentioning that 86.6% of the respondents know some of the existing by-laws, but 13.3% did not know any by-law. In general, 77.3% of the respondents were satisfied with the existing by-laws, but 13.6% were not satisfied and 9.1% were non-committal. Therefore, it can be concluded that by-laws are not effectively followed by WUA, but farmers practice what they prefer and not what constitution demands. This may threaten the sustenance of the Association and irrigation scheme in the long run unless farmers and WUA executives are educated on the importance of abiding with by-laws.

The selection of The Executive Committee of the Water User Association is critical to successful implementation of IMT. Constitutionally, it is required that the President, Vice-President, Secretary, Vice Secretary, Treasurer and 13 other members of the WUA be elected by all members through a secret ballot at the annual general meeting and that the members so elected should hold office for three years until the next election of a new committee. All members of WUA are eligible to vote. With regard to farmers' participation in the election, the study considered the previous and current executive committees. About 63.3% of the respondents voted for the previous executive, but only 34.5% of the respondents voted the current Executive Committee. These statistics show that farmers' zeal of participating in election is dwindling.

It was observed that education, good behavior, trustworthiness and good interpersonal relationship were

the main qualities which members look at when they elect members of the Executive Committee. For the President, wisdom, being calm and courageous, having leadership skills, and having another responsibility in the society are some of key qualities. A Treasurer is also expected to have knowledge of record keeping, enough personal resources, fear of being jailed and corruption free reputation are some of the key advantages. In general, education is a key factor (61.4%) for being elected to WUA executive. However, only 19.5% of the farmers have education beyond primary school level. In accordance with EMIS (2009) report, the drop-out rates for girls in primary schools sharply increased in Standard (Grade) 7 and 8, reaching rates nearly six times higher than that of boys. This sharp drop-out rates in higher primary schools in Malawi may be gender related (Mwamsamali and Mayo, 2014). As a result, primary school completion rate in Malawi is higher for boys (53%) than girls (45%), which means women are less educated and are therefore more disadvantaged to compete for similar positions with men.

It is noteworthy that 52.3% of the respondents would vote for anyone with required qualities regardless of the gender, but 31.8% would only vote for a man and 15.9% would only vote for a woman. Surprisingly, out of the 15.9% of those who said they would vote for a woman, only 14.3% of them were women, suggesting that women are not confident in themselves. These results suggest that there are not enough gender sensitization programs regarding women involvement in decision making positions. Building gender responsive WUA needs to be encouraged as it promotes women voice in water governance. There is a general agreement that women play a central role in provision, management and safeguarding water. On the post of Treasurer, about 61.4% of the respondents preferred a woman, but only 4.5% preferred a male treasurer. This implies that women are more trusted than men in financial management. Those that said they would vote for a woman highlighted several grounds including being able to keep money, rarely use of alcohol, trustworthy, less corrupt and they are afraid of being imprisoned.

It was appalling to learn that about 63.6% of the respondents have never attended to any WUA meeting over the last year. In fact, only 4% have attending more than one WUA meeting, while 27.8% have attended only one WUA meeting, which suggests that only a few farmers are committed and actively involved in decision making process. The information on calls of meetings is done through chiefs, posters and letters through block committees who inform their members in person in the fields. The majority of the farmers (87.3%) preferred getting the messages through chiefs who use their messengers to publicly announce in the village early in the evening when everybody is expected to be at home.

Smallholder Flood Plains Development Programme (SFPDP), under which WWUA was formed, advocates participatory approaches that promote farmers participation in the overall management of the irrigation system upon equipping them with skills through various trainings to be organized. However, the Association is constrained with poor attendance of farmers during training sessions, which implies that only a few farmers are reached out and consequently affect the implementation of on-farm water management techniques as well as the overall participation in operation and maintenance work. Of the 90 farmers involved in focus group discussion on water management techniques being applied on farm, only 25 (27.3%) were at least able to mention some. Only one farmer confidently stated the water requirements at varying crop stages. Poor attendance was revealed when asked to give turnout details at the meetings for both male and female members (Table 3).

The performance of local institutions (WUA) can best be evaluated by the extent to which their capacity is built and how they competently undertake all the essential tasks involved in irrigation management thereby smoothly implementing IMT. It was observed that 59% of farmers received training in crop management, but only 13% were trained in water management. Both groups perceived that the training was effective and satisfactory although they were learning so many modules within a short time, which gave them difficulties to implement what they had learnt in WUA activities. It should be understood that successful capacity building requires prolonged and patient process of learning taking into consideration the farmers understanding especially when majority have low literacy level.

Gender mainstreaming in the association

Water User Association offers an opportunity for mainstreaming women's participation and gender equity in irrigation and water management thereby reducing the risks of gender biases as well as improving the performance at all level. For instance, Peter (2004) observed that involvement of women can make activities more effective, inclusive and equitable as women undertake most agricultural occupations as men, in addition to other livelihood activities. The findings of this study indicate that in all families, women are involved in farming activities just like men including harvesting, transplanting, weeding and canal clearing, although they are seldom involved in decision making process. It was observed that 83.3% of women interviewees reported that they are not allowed by their husbands to sell the produce alone because their husbands fear that they will mismanage accrued funds. On the contrary, men mismanage funds themselves through drinking alcohol. The majority of women who sell the produce without interference of men, do so if the crop was harvested from their personal plots.

Table 3. Turnout of members at AGM and maintenance work.

S/N	Sex	Annual general meeting	Maintenance work
1	Men	200-250	600-700
2	Women	60-70	150-200

The SADC Declaration on Gender and Development (1997) in which Malawi government is a signatory, advocates for a 30% share of women representation in decision making positions. With this in mind, it was deemed essentially creditable to also ascertain gender representation in Water User Association's standing committees particularly in key positions of president, secretary and treasurer in both new and old executive. In an old WUA executive, women constituted 20% of the members, but women are not represented in the new WUA executive, which require devising mechanisms of deliberately incorporating women in the executive committees. WUA Executive Committee being on the driving seat of all operations including making decision as well as implementing government policies, women inclusion should be a must. Low or lack of women participation in this committee could also be understood from the social and cultural perspectives particularly in societies where male dominance is highly respected. On the other hand, all six standing committees have male presidents and secretaries, but 50% of the treasurers are women.

DISCUSSION

An independent WUA needs to have a legal identity that empowers it to undertake its mandate in order to serve its members. Legislations provide legal support and backing to take over control and functions previously assigned to government agency. Malawi government developed various legislations in water resources management that includes National irrigation policy and development strategy (2000), National Water Policy (2005), Water resources Act, Lands Act and Tenure, Water right, handover agreement and Environmental Act.

The National Irrigation Policy and Development Strategy (2000) emphasizes on the development of irrigation schemes with full participation of the farmer beneficiaries from the identification through planning, design to implementation, operation and maintenance. Broad development strategies were developed to realize the policy statement, which includes assisting smallholder farmers to develop and manage new and existing irrigation schemes through establishment of legally constituted local farmer organizations that can assume full ownership of existing irrigation schemes and oversee all matters related to operation and maintenance of these schemes. Secondly, transferring ownership of existing government schemes to the beneficiaries, through participatory methods and sensitizing rural communities through public awareness campaigns, gender roles training programs to encourage them to incorporate female members in their local organizations management committees, ensure that women have equal access to ownership of land.

The sense of ownership of the project is developing among farmers following the establishment of Wovwe Water User Association. The Association has increased farmers empowerment in terms of decision making as major benefits. However, the Association's operations are limited by lack of technical and managerial skills, shortages of water in winter cropping, limited financial resources, low attendance of farmers at WUA meetings and financial imprudence by WUA executive.

The Association constitution defines the main responsibilities and obligations of each tier of the Association within the scope of the Trustees Incorporation Act under which it is registered. The existing operation laws include payment of membership and water fee by all members, membership requirements, rights and obligations of members, termination and suspension of membership, functions and powers of the Association and its standing committees and general provisions, such as disputes settlement. It was observed that the existing laws are not effectively followed by WUA members although 86.6% of the members have admitted that they are aware of their existence. For example, a provision under section 10(6) states that "*Any individual found misappropriating funds of the Association will be requested to pay back immediately and shall automatically lose the office he/she was holding"*. Unfortunately, Association funds were misappropriated by the Association's executives. This led to dissolution of the whole executive, but funds were not repaid to the Association. It was further noted that some members of the Association still wanted to vote back into the office the Association president who mismanaged Association funds against the constitution. Fortunately, the government officials who were presiding over the election refused to allow the constitution to be breached, which resulted in some members boycotting the elections.

The success of WUA depends to a large extent on their ability to raise funds for operation and maintenance and other activities such as provision of training to its members. Misappropriation of funds reduces WUA's ability to fund maintenance of the facilities and promote potential conflicts between the executive and farmers

over contributions. Additionally, further training is required on financial and records keeping. It is worth mentioning that the levels of consumers' satisfaction have a major influence on consumers' willingness to pay for water services (Bhandari and Grant, 2007). Mayo and Nkiwane (2013) reported that Uroki-Bomang'ombe and Lawate-Fuka water supply trusts in Tanzania were able to collect more than double of the funds required for operation and maintenance because the systems were efficiently managed to the satisfaction of water users. Similarly, Behçet and Akin (2014), in their work on Bursa-Karacabey irrigation scheme in western Turkey observed that the effectiveness of fee collection averaged 103%. This means that Wovwe Water Users Association needs to restructure their financial management system in order to improve user satisfaction and willingness to pay for water services.

It is evident from poor attendance of the meetings (20-30%), training and voting that either the majority of farmers are not well informed on the importance of WUA or they have developed negative attitude towards it. In principle, participatory irrigation management (PIM) is an approach for management of irrigation system in which members of WUA share views and management responsibilities for sustainable development of the system (Francis, 1993; Anwar et al., 2008). It is well documented that PIM is all about farmers, and their attitude towards participatory approach is crucial factor that influences their action and behavior while implementing this approach (Mohan and Reddy, 2012; Khalkheili and Zamani, 2009).

Owing to inadequate supply of water from the source, the distribution of water to the blocks and later to the individual farms is intermittent. Therefore, water distribution and delivery is done on rotational basis and is supply driven. However, it was observed that water was used inefficiently both on farm and in conveyance system. As a result, only about 41.1% of farmers showed moderate satisfaction as regards to water access. In a study in Mexico, Wilder and Lankao (2006) observed that irrigation management transfer did not result in greater equity, efficiency or sustainability of water use, although it promoted more farmers' participation. This is contrary to observations made in Philippines where it was reported that participatory approaches has led to more equitable water distribution (Araral, 2009).

Efficiency of on-farm water management may be improved by providing training to farmers in order to boost farmers' motivation, increase water management and crop productivity. For example, in Egypt the training of water users was changed from low priority activity to one which is part of the process of management (Abu-Zeid and El Assiouti, 1997). They further reported that an extensive training program for farmers in WUAs and Irrigation Advisory Services staff was carried out in order to build capacity of WUAs, which was seen as a precondition for sustainability of Participatory Irrigation Management (PIM). Several scholars have observed that manpower planning and systematic training programs are some of the root causes of problems of participatory irrigation management (Adeniji, 2001; Dossah et al., 2003). Adewumi (1990) reported that for sustainable participatory approach to irrigation management, training should be seen as a continuous process. This is because knowledge is dynamic and new techniques and systems are continuously emerging (Saravanan, 2010). It is therefore very important that farmers and WUA executives are trained and re-trained for sustainable development and effective management of irrigation schemes (Dossah et al., 2003).

Men and women participate fairly in farming and WUA's maintenance activities regardless of gender in form of contributing labour. However, women are not involved in key decision making positions because they are not represented in the current executive committee and only 8.3% of the standing committees members are women. Low women representation in water committees were also reported elsewhere (Tadesse et al., 2013; Mwamsamali and Mayo, 2014, Kwangware et al., 2014). In Mbire district, Zimbabwe, Kwangware et al. (2014) reported that women representation in Water Committee is only 25.8%, which was perceived by majority of the respondents (76.3%) as adequate. In majority of cases, social, economic and cultural reasons limited the women participation in the committees. Positive response with respect to gender balance in WUA was reported in Uswaa village in Tanzania where a women chairperson leads a village WUA consisting of 40% of women members (Mayo and Nkiwane, 2013). In Wovwe, women are also denied right to ownership of land and crop produce, which is clear violation of human rights. In neighbouring Zambia, Poutiainen and Mills (2014) recommended to integrate women's land rights, including enforcement of statutory legal target of 30% of land allocation to women and inheritance in the irrigation policy development. They further recommended development of by-laws that will guarantee land ownership/access rights to women, something which Malawi should also adopt.

Similarly, the study has noted some socio-economic implications determining the election of members into these key positions. It was noted that the socio-economic status of an individual to some extent determines the opportunity for an individual to be elected into WUA committees with good education preferential in all the three key decision making position. For example, the new WUA president is a retired scheme manager while the former is a pastor. Similar findings have been observed in other researches both in Malawi and elsewhere. For instance, Kadewere (2005), in his study done at Chingale and Mwamsamali (2007), in his study at Mzimba in Malawi found out that socio-economic status of an individual had an implication on the position one gets in a committee. Mwamsamali and Mayo (2014) in their work

at Mzimba, Malawi reported that those who are elected to the decision-making positions in water point committees were perceived to have high economic and social status within the community. Similarly, Cleaver (1998) found out that a similar criterion was used to get people elected into position of responsibilities in rural areas of Zimbabwe.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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