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# The Dynamics in stakeholder involvement in irrigation agriculture in Zimbabwe

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**Abstract**
Irrigated agriculture is the most viable means of reducing crop failure, hunger, and malnutrition in Africa, and an effective means for improving the competitiveness of smallholder farming in most parts of Africa. Unfortunately, smallholder community irrigation schemes have proved to be unsustainable beyond external support despite the potential benefits of this technology. This appears to be exacerbated by the involvement of multiple stakeholders in the establishment, management and rehabilitation of the smallholder irrigation schemes. The objective of this article is investigating the changes in the involvement of multiple stakeholders in the schemes with the aim of establishing the effects of multiple stakeholder engagement in the sustainability of community irrigation schemes in Zimbabwe. The study confirms that a myriad of players are involved in different aspects of community irrigation schemes. The roles of these players have been very fluid in the period stretching from 1912 to the present moment. The irrigation schemes have been victims of unfortunate historical in both the socio-economic and political fronts that compromised the commitment, capacities and resources of the relevant stakeholders. These changes did not give farmers the opportunity to be self-sustaining in the operation and maintenance of the irrigation schemes.
***Key words:*** *sustainability, smallholder irrigation schemes, stakeholder, Involvement*

## Introduction

Globally, large investments in irrigation have been an essential element in increasing food production to sustain the ever-growing population (Perry, 1997; Svendsen *et al*, 2009). FAO (1995) estimated that food production from irrigated areas needed to increase from 35 % in 1995 to 45 % in 2020, in order to meet food requirements by 2020. Unfortunately, throughout Africa, there are hardly any cases of successful and sustainable farmer-managed smallholder irrigation schemes despite efforts by Government, NGOs and private organisations (World Bank, 2008). The result has been low levels of production and rapid deterioration of the irrigation infrastructure that has required recurrent investments in rehabilitation- failing to generate returns commensurate with expectations and their design potential (Dittoh, 1991; Webb, 1991; SADC, 1992; Postel et. al. 2001; Shah *et al*,

 

2002; Shah and Keller, 2002; Denison and Manona, 2007). In Zimbabwe, irrigation agriculture is critical because 80% of its rural population live in areas rainfall is erratic and unreliable, with a success rate of rain-fed agriculture known to be in the order of one good harvest in every four to five years (FAO, 1995; FAO, 2000; Poulton et al, 2002). Considering the multiple stakeholders that have been involved in the establishment , rehabilitation and management of irrigation schemes, during both the pre- and post- Independence period, there is need to establish how the involvement of multiple stakeholder have been affecting the sustainability of these schemes.

**Justification**

The development of smallholder irrigation systems has been promoted since the pre independence period as the strategic answer to food deficit. A lot of investment has been channelled to the development of irrigation infrastructure through Government and through different Non Governmental Organisations. However, many of these schemes across the country have been facing sustainability challenges which have left some of them in a state of disrepair or operating below their design capacity despite their critical value (for both the Government and the communities) for food security, stabilisation of agricultural production, employment creation and poverty alleviation. It is acknowledged that a number of researches have been carried out on community smallholder irrigation schemes but the focus has been mainly on analysis of the design options, water management, performance of small holder irrigation systems, financial viability of different crops under irrigation schemes, the identification of appropriate irrigation technologies and the socio- economic impacts of these schemes (Makadho, 2000; Makombe, Makadho and Sampath, 2004; Makombe and Sampath, 2010; Meinzen-Dick, 1993; Meinzen-Dick, Makombe and Sullins 1993; Mupawose, 1984; Ruigu and Rukuni, 1990; FAO, 2000 and Rukuni, 1984). Little has so far been done to holistically investigate the dynamics of stakeholder engagement in irrigation schemes in Zimbabwe especially in the post inflation era. This research therefore, seeks to establish how the dynamics in the involvement of multiple stakeholders in smallholder community irrigation schemes have been affecting their sustainability.

**Materials and methods**

**Study area**

All the irrigation schemes targeted for the study are located in Natural Region V of the southeast lowveld. This Region is characterized by low rainfall, less than 450mm per annum, which is often erratic and not adequate for crop production (FAO, 2000).

The irrigation schemes were purposively selected because they were all located in an area where irrigation was critical for any meaningful harvest and the stakeholder involved were more likely to be pressured to sustain irrigation agriculture in this area than any other part of the country. Both quantitative and qualitative research methods were employed. A semi structured household questionnaire was used to collect both quantitative and qualitative data from the irrigation plot holders in 3 small holder irrigation schemes. Data obtained from the questionnaire survey was augmented by Focus Group Discussions (FGDs), key informant interviews and direct observations targeting the 3 schemes. The combination of different research methods allowed for triangulation of information. The simple random sampling method was used for selecting participating farmers and 40% of the

 

farmers were selected for questionnaire survey. Tsovani (300 hectares), Dendere (20 hectares) and Mtandahwe (23 hectares) irrigation schemes had a total membership of 120, 38 and 167 farmers respectively. In total, 130 farmers were interviewed. Three FGDs were conducted in the three schemes (one FGD per scheme). FGD participants were selected from the farmers who had not participated in the questionnaire interviews. A total of 12 farmers participated in each FGDs, to give a total of 36 participants (50% of which were females) in the study. District Heads of institutions from Agricultural Research Technical and Extension Services (AGRITEX), Department of Irrigation (DOI), Zimbabwe Electricity Supply Authority (ZESA), Zimbabwe National Water Authority (ZINWA). Six key informant interviews were conducted with these institutions, to provide institutional perspective on the dynamics of stakeholder engagement in the irrigation schemes. Three key informant interviews were also conducted with the Irrigation Management Committees (IMCs) of the three schemes to give a total of nine key informant interviews conducted in this study. The data obtained from the questionnaire survey was inputted into SPSSx version 16.0 (Statistical Package for Social Scientists). Data was subjected to both descriptive analysis, to produce frequency tables and cross tabulations and advanced statistical analysis through regression analysis and one way ANOVA.

## LITERATURE REVIEW

The historical development of smallholder community irrigation schemes in Zimbabwe can be traced back from 1912 when Zimbabwe was still under colonial rule. The main stakeholder that was responsible for establishment of schemes was the Ministry of African Affairs which assumed are more controlling stake in the affairs of the irrigation schemes from 1927 onwards (Alvord, 1933). From 1936, dryland plots for irrigation scheme beneficiaries were prohibited and the Ministry had to stipulate the type of crops to be grown in the schemes (Manzungu 2005). The tenure of the schemes was highly insecure as their stay in the scheme remained hanged on annually renewable permits which were revocable anytime. The then District Commissioner was directing the operation of the schemes at district level with the assistance of a resident scheme based Irrigation manager (Manzungu 2005). The management system survived for decades in the face serious opposition from the farmers and the raging war of liberation. When Zimbabwe gained independence, the government objective in promoting irrigation schemes was two pronged. One objective was to democratise the operations in the scheme and to enhance food security and poverty alleviation in the rural communities (Matsika, 1996).

The changes that were made to the irrigation sector since 1980 were visibly on an experimental basis as the structure and composition of Government stakeholders involved remained fluid to the present moment. The Department of Rural Development (DERUDE) was mandated with the development and management of irrigation schemes while the designing and planning was given to the Department of Agricultural, Technical and Extension Services, (AGRITEX). DERUDE introduced the concept of Irrigation management Committees to promote democracy in the running of the schemes (Chidenga, 2003) and before the concept was fully operational, the development and management responsibility was transferred to AGRITEX in 1985 until 2001. Meanwhile, the Agricultural and Rural Development Agency (ARDA) was managing an operate and transfer schemes out-grower model in which ARDA was expected to gradually transfer management and ownership to the smallholder irrigation farmers (FAO, 2001). Tsvovani was one such a scheme in Chiredzi district. During this phase, the schemes were dominated by Government stakeholders and were heavily subsidized until the

 

introduction of the Economic Structural Adjustment Program (ESAP) in the early 1990s. ESAP saw the sudden withdrawal of subsidies and even under the ARDA's out- grower model, the management transfer failed to be as gradual as was planned to the detriment of the farmers (Mombeshora, 2003). The farmers started to feel the burden of heavy operation costs especially for the pumped schemes that were using electricity.

During the 1990s, a new Water Act replaced water rights and water permits- introducing Catchment Councils to manage water leading to the creation of ZINWA (under the Ministry of water development) to manage water and the catchment councils in pursuit of the User Pays Principle (Chidenga, 2003). The Government other stakeholders that have been involved in the smallholder irrigation schemes included the Ministry of Agriculture and Rural Development(MARD), Ministry of Rural Resources and Water Development (MRRWD) and the Department of Irrigation (DOI), Agricultural and Rural Development Authority (ARDA), The District Development Fund (DDF), The Ministry of Local Government, Public Works and National Housing and the Rural District Councils, Ministry of Finance, parastatal agencies like ZESA and the Grain Marketing Board. Other stakeholder included Non- Governmental Organisations, private companies and more importantly the beneficiary farmers (Nhundu & Mushunje, 2010).

Between the year 2000 and 2009, a combination of the chaotic fast track land reform program, poor international relations, lack of direct foreign investment and hyper-inflation in Zimbabwe culminated in the general neglect of irrigation agriculture by the critical stakeholders making the majority of them non-functional (Nhundu & Mushunje, 2010 This general state of disrepair of the irrigation schemes attracted a new set of stakeholders to fill the chasm created by the Government stakeholders (Mutambara & Hungwe, 2011). These were NGOs, backed by different donor that came to rehabilitate the schemes which had suffered neglects for a decade. Unfortunately, some of the irrigation schemes that were rehabilitated during this time became non-functional hardly 2 years after rehabilitation. The study seeks to investigate how the changes in stakeholder involvement in Zimbabwe's irrigation schemes affected their sustainability.

**Results and discussions**

**Demographic characteristics of the respondents**

The majority of the respondents were between 30 and 69 years of age. Fifty eight percent of the respondents were females while 42% were males. Seventy two percent of the respondents were married, 21% were widowed while 6% and 3% were single and divorced respectively. The average household size for all interviewed households was 7 against 5 at national level (ZimVac, 2012). The sex and age disaggregation of the farmers in the schemes confirmed Muparange (2002) report that in smallholder irrigation schemes**,** the most interested people were females and that the youth were generally not interested in agricultural production. This can impose potential threats to the future sustainability of these schemes as no institutional memory will be left after the current generation of farmers got out of picture (Shah *et al*, 2002).

The farmers in the scheme had extra burdens to care for their vulnerable household members which were competing with their attention and commitment in the irrigation schemes Sixty eight percent of the households had children less than 5 years of age with an average of 3 children under 5. Twenty percent had members who were chronically ill, 3% had terminally ill patients. Four percent had at least a member who was disabled or mentally ill and 37% had orphans.

**Educational level of the farmers**

 

The level of illiteracy was on average higher than the national average, with an average of 37% of the farmers having not attained any level of education against a national average of 18.7% (ZimVac, 2012). This was especially true for Dendere and Tsvovani whose illiteracy level was 60% and 65% respectively, while at Mtandahwe only 12% of farmers had not attained any education at all. Less than 2% were educated beyond Ordinary Level against a national average of 3%.

The differences in the level of education of members in the 3 irrigation schemes were found to be significant by one way ANOVA at P< 0.005, in favour of Mtandahwe irrigation scheme which had the least number of farmers that had not attained any level of education. In Dendere, AGRITEX officers confirmed that the very low levels of literacy in the scheme affected their motivation to attend farmers' theoretical training programmes that were aimed at improving the production level. The production of high value horticultural crops in irrigation schemes is usually knowledge intensive and the level of education of the farmer can be an important variable in the choice of crop and level of production. In Sub Saharan Africa, low level of education has been blamed for limiting access to information and understanding of commercial farming concepts which are critical to sustain high production levels in irrigation schemes (Shah et al, 2002).

**Stakeholder engagement in the management of the irrigation schemes**

**Irrigation Management Committees (IMC).**

The roles of the IMC were changing with the changing of the socio-economic and political environment and some imbedded contextual situations of specific schemes. Although all the schemes had Irrigation Management Committees (IMCs) by the time of the survey, with the role of managing all the aspects of the scheme, their strength, their comprehension of group management issues and the grip they had on the farmers differed from scheme to scheme. Farmers also displayed some differences on their perception of the effectiveness of the IMC. All the respondents from Mtandahwe and Dendere felt their IMC was effective while 31% of the Tsvovani respondents felt their IMC was not very effective as shown in Table 1.

**Table 1. Perception on the effectiveness of the IMC by name of scheme**

| Name of scheme | Do you think the IMC is effective | | Total number of farmers |
|---|---|---|---|
| | Yes | No | |
| Mtandahwe | 67 | 0 | 67 |
| Dendere | 15 | 0 | 15 |
| Tsvovani | 33 | 15 | 48 |
| Total | 125 | 5 | 130 |

The differences in the perceived effectiveness of the IMCs of the 3 irrigation schemes were found to be significant by one way ANOVA at P< 0.005, in favour of Mtandahwe and Dendere irrigation schemes that had 100% of the farmers feeling that their IMC was effective.

Those who felt their IMC was effective cited smooth flow of activities (82%), peaceful sharing of water (30%), and transparent and safe keeping of money (60%), compliance of farmers to their orders (70%), limited down times after irrigation pump breakdowns (20%). Those who felt the IMC was not effective cited lack of leadership qualities as the major indicator of their ineffectiveness (30%), lack of transparency on their handling of cash (25%), succumbing to intimidation (15%) and the existence of inter personal conflicts in the scheme (15%). Some farmers no longer had confidence in the IMC as they strongly suspected some of the IMC members in

 

Tsvovani were pocketing their money. Consequently, some farmers were resisting payment of contribution towards the running of the scheme. Some blamed the IMC for lacking leadership skills and for being ineffective in containing conflicts. This negative attitude towards the effectiveness of the IMC in Tsvovani possibly explains why the members were failing to pay utility bills which according to the farmers were the major threat to the continued functionality of the scheme. Chidenga (2003) posited that if plot holders are well informed about the financial affairs of the IMC, they will have no choice but to be accountable to the members.

The enforcement of the constitution in the schemes was found to be a strong pointer of the effectiveness of the IMC to engage the farmer. All the respondents indicated that they had a constitution in their respective schemes. Ninety two percent felt their constitutions were being used and only 8% felt it was not being used, all of which were from Tsvovani. Evidence for the utilisation of the constitution includes the punishment of people whose behaviour was not in line with the provisions of the constitution and that all the farmers were contributing towards ZESA bills. Those who indicated that the constitution was not being used cited lack of compliance to the provisions of the constitution as evidence. In Tsvovani, some farmers indicated that if all the farmers had contributed towards the payment of electricity, the Zesa bill could not have reached $40 000. Some farmers were not paying up. Although it was enshrined in their constitution that if someone fails to pay utility bills he/she can be expelled from the scheme, no serious action had been taken against the defaulters. Failure to expel non payers was tantamount to rewarding of bad behaviour and setting wrong precedence in the scheme. The IMC lacked power to operationalise the constitution.

The effectiveness of the IMC in Mtandahwe and Dendere was shown by the fact that they had no problem in expelling non paying members from the scheme. In Dendere, the membership of the scheme shrinked from 96 to the current level of 38 due to the non payment of critical contributions by some members. Consequently, Dendere actually had a positive balance of around $500 in electricity bills and utility bills were the least of their worries. One striking thing about Dendere was that they had a reserved fund specifically for the repair of pumps which by the time of the survey was $900, kept in the scheme's bank account. They were all confident that after a pump breaks down, it would never have a downtime of over two days as the reserved money was used to pay for its repair. Unfortunately the farmers, having this culture of group saving, were not making group efforts to procure critical inputs like fertilizers and certified seeds to boost their production. Some of the crops were pale due to lack of fertilizer but the very farmers were boasting of having reserved funds waiting for pump break down.

Mtandahwe had no outstanding arrears but had no reserved funds; neither did they have a bank account. The advantage of Mtandahwe was that they procured their inputs in groups which allowed them to have fair uniformity and timely operations in the scheme. They were also involved in group marketing of products to far away markets, especially during times of local market glut. The most striking feature about the IMC in Mtandahwe was the presence of a marketing sub committee overseeing the marketing dimension of their farming operations. This, according to Mtandahwe farmers who participated in the FGDs, explains why they had fewer problems in marketing their produce.

The different level of success of the IMCs was consistent with Chidenga (2003) findings that other schemes have disciplinary control while others were not tight enough as their real power and duties has never been clear. Chidenga (2003) noted that the IMC never got the legal status and administrative authority exercised by the pre-Independence irrigation managers and District Commissioners. Consequently, although the IMCs had the

potential to effectively manage the scheme, they lacked power to operationalise their constitution and failed to transform the production levels, of the irrigation schemes to enhance their sustainability.

**ZINWA (Zimbabwe National Water Authority)**

Interviews with the farmers and the Agritex officers revealed that ZINWA played no role in the initial development of the scheme and only started to engage the farmer to make them pay water charges after the successful rehabilitation of the 3 schemes in 2009. Farmers in Tsvovani had not paid anything to ZINWA ever since they started receiving the statements. It was not clear how ZINWA was going to react to the non payment although they were speculations that they were going to lock off their pumps to force them to pay, a development that will threaten the functionality of the schemes. Many stakeholders from the RDC, Agritex and Department of Irrigation have however questioned the sincerity of ZINWA in its dealing with farmers. When the pumps were under breakdown, ZINWA could not be seen anywhere closer to the farmers to give a hand in fixing them. It is only after the farmers would have won their war in the pump rehabilitation that ZINWA would chip in to bill water they did not help to extract. It was revealed in the discussion with stakeholders that when disconnecting farmers from water supply, ZINWA usually plan it when the crops in the schemes will be at a water critical stage as a way of forcing them to pay. This was in line with Mombeshora (2003) finding that ZESA and ZINWA usually disconnect electricity and water summers from farmers when the crops critically needed water. ZINWA's engagement with farmers lacked materiality and farmers felt ZINWA wanted to harvest where it did not sow.

**Department of Agricultural, Technical and Extension Services (Agritex)**

Agritex had a long history of working with farmers and was mandated to manage and development skill until after ESAP when the Government felt farmers should be independent and self-sustaining. Each scheme had at least one Agritex officer to provide extension services to the farmers. In Tsvovani, there were 4 Agritex officers, one in each block. During the initial development of the scheme, Agritex was responsible for subdividing the plots and guiding the perimeter fencing of the schemes. In Tsvovani, Agritex officers got access to the scheme 3 years following the e withdrawal of ARDA. Farmers in Tsvovani felt the transition to the Agritex extension was negative as Agritex officers were said to be not as technically knowledgeable as ARDA extension officers. These shortcomings in the technical knowledge of the extension staff in the schemes was confirmed by the District Agritex officer, Chiredzi who indicated that some of them were trained through the Fast track trainings. The lack of technical capacity, according to the farmers in Tsvovani was compromising the production capacity of the schemes and restricting the type of crops the farmers could grow. In line with Denison and Musona (2007)'s finding in the South African smallholder irrigation extension support, which they rated inadequate and unreliable to sustain commercial entities, the District AGRITEX officer in Chiredzi confirmed that the extension support from the department was not adequate to leverage commercial production in the schemes.

**Department Of Irrigation (DOI)**

It was revealed that the Irrigation department was a section within Agritex since 1985 that was given the Government mandate to stand alone as a department around 2004. Unfortunately, the changing structure of these critical government departments was not matched with the necessary resources to capitalise the new arrangements. The farmers felt the Department of Irrigation was almost invisible and were not aware of its roles and responsibilities. They took no part in the rehabilitation of Mtandahwe and Dendere. In Tsvovani, they were

 

seen once when the water pumps were being installed in 2010. The district officers for the department felt the irrigation department was the least resourced Government department in the district. Their responsibility in smallholder irrigation scheme was mainly land survey, canal pegging and certification of work done by contractors. They had no vehicle and their visit to irrigation scheme was contingent upon the convergence of interests by some NGOs or other Government departments visiting the scheme in which case the officer would ask for transport assistance. When developing engagement plans it is important to consider factors that can impede the ability of key stakeholders like the Department of irrigation to engage such as the accessibility of the location, capacity to travel and availability of technology. They were largely office bound and did not have up to date information about the smallholder schemes' functionality status and requirement. The department of irrigation was poorly resourced and understaffed.

**ARDA**

As was highlighted in the literature review, ARDA was operating an out-grower scheme in Tsvovani where it was supposed to gradually handover the management of the scheme to the farmers and eventually withdraw after being satisfied that the farmers had capacity to manage the scheme on their own. It unfortunately had an abrupt and unceremonial departure from the scheme as a reverberation of ESAP. Although ARDA had long left and was no longer managing any of the 3 irrigation schemes by the time of the survey, its role in Tsvovani left a legacy that was worth exploring. The Farmers in Tsvovani indicated that when ARDA was still managing the schemes, it was doing everything for them on the scheme ranging from the provision of inputs, tillage, planting, weed management, nutritional management, harvesting and marketing. The farmers were at times asked to weed and provide manual labour in their plot and would just be treated like farm workers. For harvesting of maize and wheat, the farmers narrated that ARDA had combine harvesters which were rotating all ARDA estates during harvesting time to harvest maize or wheat. Fertilizer and seeds would come in 30 ton trucks for the farmers and all the cost were deducted from the farmers' cheques after every cropping cycle. ARDA would also arrange loans from AgriBank for the farmers. ARDA owned the engagement process for stakeholders in the input and output supply market, the financial resources and general farm management. Farmers were very happy with the arrangement and would have wanted the arrangement to last for ever as they were now failing to manage the scheme on their own- pushing them into grinding poverty. One farmer said *"…that is the arrangement that bought us the tractors we have but now I am failing to buy diesel for the very tractor to till my land*". The arrangement was good for them but its exit strategy was not well managed as ARDA suddenly withdrew from the scheme without proper handover takeover of the management of the scheme. Its major weakness was its failure to involve the farmers themselves in the process to preserve institutional memory and for the sustainability of the scheme beyond the management of ARDA. The ARDA management left a dependency syndrome in the farmer, that was not seen in Dendere and Mtandahwe, which is threatening the functionality of the Tsvovani scheme as farmers still expected outside assistance in the payment of utility bills and procurement of inputs. What was probably lacking in the engagement process of the ARDA's operate and transfer method was an empowerment element as it was devoid of plans about farmer's future after ARDA's departure. The arrangement was also a victim of unfortunate economic dynamics in the national economy, particularly the aftermath of ESAP. By the time of the assessment, the farmers in the formerly ARDA managed Tsvovani were

 

managing the scheme on their own through their IMC and the departure of ARDA opened way for the entry of Agritex and Department of Irrigation for some specialised services.

**Zimbabwe Electricity Supply Authority (ZESA)**

ZESA's role in the scheme was to supply and bill electricity used by farmers in the scheme. Although its mandate never changed, ZESA faced some challenges during the period of hyperinflation when it was failing to supply adequate electricity to its consumers. It had to introduce load-shading to share the little available amongst the customers. Farmers were not spared and the power cuts affected their irrigation schedules and at times translated into water shortages for the crops. Farmers felt they were charged too much by ZESA and that the bill they were receiving was not commensurate with the limited power they receiving. ZESA confirmed that it was charging commercial rates on the smallholder irrigation schemes and farmers felt ZESA was not fair in its billing system. The ZESA bill was the major operation cost and burden especially against the background that such charges used to be subsidized by the Government. Tsvovani owed ZESA almost $40 000 by the time of the survey and farmers were getting overwhelmed by the bill. All the schemes felt the billing system was unfair and was short-changing farmers. In Mtandahwe, farmers were collectively paying around $900 per month for electricity and although the farmers were fully paid up, farmers complained that there were no variations in the electricity charges to reflect the different electricity utilisation pattern of the different cropping cycles and watering intervals in the scheme. This was believed to be caused by the use of estimates to bill farmers as ZESA officials rarely visited the scheme to take actual readings. Even if they later discovered that they had overcharged farmers, the rectification of the problem was never done and explanations to it were not convincing to the farmers. Dendere farmers had similar experience with the farmers having about $500.00 positive balance due to previous overcharge by ZESA which took a long time to rectify. In both schemes farmers reported that ZESA would be very quick to disconnect the supply without verifying the accuracy of their bills.

**Non-Governmental Organisations (NGOs)**

NGO assumed critical roles following the withdrawal of government assistance, neglect of irrigation schemes and the general state of disrepair of the schemes. The farmers' engagement strategies of the NGOs were never uniform and this translated into different impacts in different schemes. They moved in to fill the void created by the compromised capacities of government stakeholders. It was revealed that NGOs were major players in the establishment of small-scale irrigation schemes and in their rehabilitation. They provided funds for the scheme establishment and in the rehabilitation of the schemes. Mtandahwe and Dendere were established through NGOs, World Vision and Red Barna respectively. After the pegging by Agritex, the NGO would oversee the engagement of the community, consultants, contractors/ service provider and all the relevant Government stakeholders. The meetings, workshops and trainings linked to the establishment and rehabilitation of the schemes were all financed by the NGO. The NGO was also responsible for hiring an engineer who did pump installation at the schemes, procuring the pump and paying for the perimeter fencing of the scheme. For Dendere the Agritex officers who participated in the perimeter fencing of the scheme were paid travel and subsistence allowances by Red Barna. After successfully establishing the scheme, the Red Barna grew crops for two years providing farmers with all the inputs at zero cost. The scheme was handed over to the community in 1997 and Red Barna left.

In Mtandahwe the NGO that rehabilitated the scheme also constructed a grading shade, a 3 roomed office, a plinth and a summer season pump house to prevent the pump from damage by floods. It also procured all the

 

fencing materials for the 23 ha scheme. The fencing was done by the community under the supervision of Agritex and Mercy Corps. The chairman of the scheme had records on the costs of the rehabilitation cost and the cost of material and labour contributed by the community. The organisation also gave farmers seed and fertilizer for the first two cropping cycle after rehabilitation as a way of jump starting them into production. All the Zesa bills and installation costs were covered by the organisation and farmers started on a clean sheet. This helped to unleash the potential of the farmers as production cost at the initial stages were reduced to a minimum and would face actual cost when they have fully recovered. The variety of activities or intervention implemented by Mercy Corps in the rehabilitation of Mtandahwe irrigation scheme confirms (VanSant, 2003) argument that the sustainability of NGO efforts in rural development depend on the program quality and diversification.

This was in sharp contrast to the experiences of Tsvovani and Dendere after rehabilitation in 2010 where they were not assisted with input by the NGO that helped them to rehabilitate the scheme. In Tsvovani it was just the replacement of the pumps, no perimeter fencing and canal rehabilitation was done. Farmers struggled to finance their first cropping cycle without fertilizers and sufficient seeds. The poor yields that ensued set the tone that perpetuated up to date and farmers were never given a chance to unleash their potential. Their ZESA bill that had accumulated over the period of breakdown welcomed the farmers after rehabilitation. They described the bill as the ghost that is haunting the scheme, threatening the sustainability of the scheme. This explains why the Common Wealth of Australia (2003) cautioned that, if donors wish to see benefits sustained, they should, on a case-by-case basis, also consider taking on responsibility for contributing to solving operation and maintenance cost problems in a more direct way. The approach used by the NGOs who rehabilitated the Tsvovani and Dendere schemes lacked materiality and responsiveness as they failed to address the crucial and most important concerns of the farmers they were trying to assist.

**Community/ beneficiary farmers' participation**

The farmers in the scheme were the major stakeholders in the puzzle and the changes that were taking place within the economic and physical environment made them to assume different role and responsibilities. Discussion with farmers and other Government stakeholders revealed that beneficiary farmers mainly provided labour for their scheme initial establishment and rehabilitation. The following were the specific contributions made by farmers in the different schemes:

**Tsvovani**

In Tsvovani few farmers contributed labour during pump installation with one farmer who participated in the FGDs acknowledging that farmers in the scheme did not contribute anything of material value towards both the establishment and the rehabilitation of the scheme. The different times farmers joined the scheme and their differences in the possession of lease agreements together with unequal accessibility to water by different groups of farmers challenged farmers' cohesion in the scheme and everything that required unity. Farmers inherited high fixed cost from ARDA mainly in the form of electricity charges from very big pumps and several pumping units in the scheme.

Tsvovani's future was dangling in the air due to the ever ballooning electricity bill. Like in the other 2 schemes, charges were accumulating during the decade of disrepair. When the scheme was successfully rehabilitated, the farmers had over $10000.00 outstanding electricity bill. When they commenced production, the farmers were consuming electricity worth around $6000 per month but were only able to pay $1200.00 per month which was

 

only 20% of their monthly consumption. Consequently, the charges accumulated to around $40000 (from the main pumping unit, 3 sub pumping units at reservoirs and 2 disused borehole pumping units) by the time of the survey for this study. The scheme was once disconnected only to be connected after the intervention of the political leadership after which a contract was reached to extend the grace period for the payment to 6 months. Approaching the deadline in October 2012, farmers were nowhere closer to half full payment of the bill and expect another extension by 6 months. In order to convince ZESA, the farmers had agreed to pay $100 each per month for the month of August and September which could raise them $24 000 if every member paid up. Asked why they have not been making such big payments, farmers indicated that they expected to raise enough money to pay the ZESA bill from the sale of cotton but when the cotton price dropped by over 260%, during the 2011-2012 season, farmers resorted to the alternative debt settlement plan. ZESA indicated that disconnecting farmers from the electricity grid was the last option if they prove to be uncooperative and uncommitted to the settlement of their bill. Farmers indicated that they would not be able to pay the electricity bills without external assistance, making it a major threat to the future functionality and sustainability of the scheme.

Farmers in the scheme seemed to lack a sense of ownership that was evident in the other schemes. The Commonwealth of Australia, (2000) hinted that people who are excluded from participation in planning or in the irrigator's organization are likely to be bitter, disillusioned, and far less likely than others to cooperate in properly operating and maintaining the scheme, thereby reducing prospects for sustainability. It was certainly not by coincidence that where farmers had not been making meaningful contributions towards the rehabilitation of the schemes like Tsvovani, the farmers were struggling to pay their utility bills. It has been shown in several researches that the greater the number of people and the number of social groups who participate in all the stages of program development, the greater the probability that the benefits of a rehabilitation project will be sustained over time (Dzinavatonga, 2008; Bodibe, 2006).

**Dendere**

In Dendere, farmers who participated in the FGDs chronicled the farmers' participation in the establishment and rehabilitation of the scheme which made them more committed to their scheme than the other schemes. During the same year when they were handed over the scheme from the management of RED Barna, they experienced a pump break down which was fixed after farmers had contributed Z$5000. Those who failed to pay the Z$5000 lost their membership to the scheme and the membership dropped from 96 farmers to 54 farmers. After frequent breakdowns, farmers resolved to buy two new sets of pumps in 2007, with each farmer contributing 100 Rands. The membership shrunk further to the current number of 38 farmers in 2007 after the other members failed to raise the 100 Rands needed for the replacement of the old pumps. The plots size was 0.18ha and has since increased to at least 0.4ha. Farmers felt the plots were theirs and indicated that they would remain in the scheme as long as they were paying up needed contributions for the scheme to remain functional and as long as they abide by the laws governing the scheme as enshrined in their constitution.

It can be deduced from the discussions with the farmers in Dendere that although, they had no documentation to support their ownership of the land, what they went through to have their schemes functional (especially payments and punishments for non payment), made them feel like people who had title deeds to their plots. This is consistent with the FAO (2000) finding that projects that were viewed by farmers as being their projects perform better than projects that were viewed by them as belonging to the government. According to Tushaar et

 

al (2000) payment is an expression of value, if farmers are willing to pay for their scheme it shows that they need and value their scheme. Therefore the demonstrated demand in Dendere was a positive indicator of likely sustainability of the scheme.

**Mtandahwe**

In Mtandahwe, 157 farmers were admitted to the scheme during the establishment of the scheme and provided labour for the stumping, clearing of the scheme and perimeter fencing of the scheme. During the rehabilitation of the scheme between 2008 and 2010, the NGO that helped them, Mercy Corps, only brought off site rehabilitation material with the farmers contributing all the locally available materials and labour requirements. This arrangement saw the farmers moulding all the bricks needed for the construction of the pump plinth, pump house, packing shade, offices and toilets. They also dug the trenches for the main delivery pipeline and did the laying of pipes. They fenced the scheme with barbed wire and lined the perimeter boundary with vegetative fence as well as providing food for other service providers at the scheme. The farmers at Mtandahwe expressed that they shed sweat towards the rehabilitation of their scheme and the monetary value of their contributions towards rehabilitation amounted to about 30% of what Mercy Corps contributed. Such contributions were very critical in inculcating a sense of ownership amongst the participating farmers. Experience in farmer contributions in Mtandahwe and Dendere affirms Muparange's (2002) assertion that community participation increases the prospects for social and economic sustainability because it gives people a greater understanding of how the rehabilitated scheme will work technically, how they can avoid breakdowns, and how everyone's contributions to good maintenance and proper operation can increase benefits for all.

**Conclusion**

The study confirms that the stakeholders that are involved in the affairs of smallholder irrigation schemes was been changing in structure, composition and roles. Even the beneficiary farmers, who are the critical stakeholders, have been forced to assume different roles and responsibilities with changes in the operating environment. The IMC in Tsvovani had problems in bringing farmers together and make them contribute towards utility bills due to group differences. As a result the scheme had over $60 000 outstanding electricity and water bill which was a major threat to the scheme's future functionality. Where the IMC was relatively strong, the scheme had no outstanding bills and their operations were fairly uniform. Lack of effectiveness of the IMC was a major threat to the future functionality of the scheme as it compromises their resilience in the face of a dynamic socio-economic and political environment. It also had multi-pronged knock-on effects on a number of systems and sub-systems that made up the schemes.

ZESA and ZINWA were blamed for not being very sensitive to the changing needs of the farmers in the schemes and for failing to assist the farmers when their schemes where under breakdown. The billing system was rated unfair as it was riddled with insensitivities, inconsistences and unprofessionalism. Farmers felt the utilities bills from these organisation was a major threat to the schemes' sustainability.

The NGOs that rehabilitated the schemes had different practices and different levels of community engagement but what was common with them was that they never engaged farmers beyond provision of labour in the scheme. They never planned with the farmers, neither did they share critical information about the critical assets bought

 

for the scheme or contractual agreements with service providers. This level of engagement was not ideal to inculcate as sense of ownership and independence from external support on the farmers.

The critical Government departments (Department of Irrigation and Agritex) for the scheme were shown to be seriously under resourced to support commercial production and technical backstopping support in the schemes. The responsibility to oversee the sustainability of the schemes is split amongst different stakeholders and there was no one with the responsibility to bring the stakeholder together to enhance cohesiveness, responsibility and accountability in their service to the smallholder irrigation scheme. It was unfortunate that the over changing composition of government stakeholders was not being matched with the commensurate change in resource and capitalisation needed to operationalise the new structures.

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