

**SMALLHOLDER IRRIGATION SCHEMES IN NYANGA NORTH AS
STRATEGIES FOR POVERTY REDUCTION AND SUSTAINABLE RURAL
LIVELIHOODS**

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Abstract

Research focused on three small scale irrigation projects in the northern part of Nyanga District: Nyakomba, Nyatsanza and Ruwangwe irrigation schemes. The study sought to assess the benefits of small scale irrigation schemes in dry land areas, and evaluate the effectiveness of such schemes in reducing poverty and achieving sustainable rural livelihoods. A sample of 180 households was drawn from a target population of 1128 plot holders, using a multistage random sampling technique. Questionnaires, non-structured interviews and field observations were used as the main data collection methods. Research results revealed that small scale irrigation projects in dry land areas enhance household food security and provide a regular income. The study also showed that small scale irrigation schemes can be an effective vehicle for achieving sustainable rural livelihoods. However in the study area, their effectiveness was being hampered by several factors. In all three schemes, effectiveness was hindered by the prevailing hyperinflationary economic environment in Zimbabwe, inadequate inputs and lack of access to markets. In Nyakomba plot sub-leasing was undermining the effectiveness of the scheme as a poverty reduction mechanism. Plot sub-leasing was primarily a result of high, and therefore unaffordable, water and electricity bills coupled with a weak capital base. Plot sub-leasing combined with expensive inputs and low market access has significantly reduced the effectiveness of the three small scale irrigation as a poverty reduction strategy. It is recommended that the AREX officers and the national farmers' association help plot holders secure and access bigger markets in the urban centers. Greater market access will increase the farmers' incomes. This will enable the farmers to afford the water and electricity bills, rendering plot sub-leasing unnecessary. Higher incomes will also improve the plot holders' capacity to purchase more inputs and

increase production. There is also need to create low interest loan facilities for the plot holders by financial institutions like AGRIBANK.

Background to the Study

The Food and Agriculture Organization (FAO) (1986) estimates that while 34 million hectares of Sub-Saharan African soils are potentially irrigable, only 15% of this technical potential is under irrigation. Irrigation schemes in Africa have been used by governments as a vehicle to try and achieve food self sufficiency and as a source of foreign of foreign exchange earnings from export crops (ibid). Although most of the schemes have either achieved or nearly achieved their targets, many problems have been encountered. Effective scheme operation and maintenance as well as production support services have been adversely affected by weak management and inadequate operating budgets. This has often resulted in farmers reverting to their traditionally diverse activities, eventually leading to neglect of irrigated areas and low production (ibid).

Climate variability in Southern Africa, evidenced by year to year rainfall variability ranging between 30 and 35% means that irrigation farming, is unavoidable. Rainfall in the region in the early 1990s was 20% lower than that of the 1970s, with significant droughts in the 1980s, early 1990s and in 2002 (Chenje and Johnson, 1996; Hirji et al., 2002).

Climate variability in the region is increasingly influenced by El Nino/Southern Oscillation (ENSO) events associated with the periodic warming of the tropical Pacific Ocean and related shifts in atmospheric circulation systems (Cane et al., 1994; Hulme, 1996). Due to the seasonal variations and unreliable rainfall increasingly related to

endemic drought, coupled with increasing demand for food to feed growing populations, irrigation farming is now a pressing necessity in the region. Cereal production in Southern Africa, for instance, declined by 34% during the 1994-1995 season due to drought (SADC, 1996). The 1991-1992 drought, for example, resulted in a fall in agricultural production of 45% and a decline in the aggregated Gross Domestic Product (GDP) of 6% in Zimbabwe; while cereal harvests in Namibia fell by 70% (Hirji et al, 2002). These trends underline the importance of irrigation in the Southern African region.

Southern Africa has an estimated 9.1 million hectares of potentially irrigable land with just over 1 929 000 hectares already under irrigation, the bulk of this land, 1 270 000 hectares being in South Africa (Mutepfa et al, 1998; Hirji et al., 2002). Zimbabwe has 280 000 hectares of potentially irrigable land (FAO, 1986). A total of 150 000 hectares (53.6%) of this potential have been developed. Irrigation farming in Zimbabwe is practiced in most parts of the country, even in higher rainfall agro-ecological regions I & II due to periodic dry spells during the growing season. Two basic types of irrigation are practiced: smallholder irrigation, accounting for only 6% of total irrigated land, and large scale commercial irrigation which accounts for 68% (Rukuni and Makadho, 1994). The remaining 26% is land on estates.

It is important to point out that in Zimbabwe smallholder irrigation schemes have performed below the expectations of both development planners and plot holders themselves. They have to date been characterized by low production and minimal direct contribution to the national economy (Manzungu and van der Zaag, 1996; Chancellor, 2004). In spite of their disappointing results, they are of social and political importance in that they involve the sharing of vital land and water resources. Of greater importance,

however, is the great potential smallholder irrigation schemes offer for poverty reduction (Manzungu and van der Zaag, 1996; Samakande, 2002; UNESCO, 2003; Chancellor, 2004).

In spite of its prevalence in the South, particularly in Sub-Saharan Africa where it has deepened, 'poverty' is a contested term. The World Bank definition which is widely used prioritizes income or levels of private consumption. Other institutions and authors incorporate components of human development and deprivation. The United Nations Development Programme (UNDP) human development index, for instance, encompasses measures of real purchasing power, education and health (Elliot, 2006). Other indicators of poverty have been given as land holdings, years of schooling and food security (Mehretu and Mutambirwa, 2006). Concepts of poverty in the developing world now also include environmental dimensions. These incorporate command over resources, coupled with the capacity to withstand environmental stresses and shocks, as well as the ability of people to make effective and sustainable use of these entitlements (Leach and Mearns, 1991). The World Resources Institute (WRI) maintains that dependence on natural resources is one of the greatest environmental vulnerabilities poverty engenders (WRI, 2002). Poverty restricts the choices that the poor have on resource management. It is also associated with ecological marginality since the poor are concentrated in inherently poor environments, for instance lands with low agricultural potential or areas that are subject to swings in environmental conditions. Such lands often require high investment levels to become productive - the poor simply do not have resources for such investment. Smallholder irrigation schemes can therefore play a critical role in such environments.

Since 65% of Zimbabwe's population is rural, with 64.2% of the national population living below the poverty line (UNDP, 2004), poverty reduction is crucial for sustainable development. Vincent and Thomas (1960) used rainfall amount to divide Zimbabwe into five agro-ecological zones, with region I receiving the highest rainfall and region V receiving the lowest. Regions I and II have the highest agricultural potential, while regions IV and V have the lowest agricultural potential where crop cultivation can only be viable through irrigation. Poulton et al (2002) carried out a survey of poverty prevalence in Zimbabwe by agro-ecological region (Table 1)

Table 1: Poverty Prevalence in Zimbabwe by Agro-Ecological Zone

Natural Region	Prevalence (%) of Poverty	Prevalence (%) of Extreme Poverty
I	62.4	36.2
II	71.6	41.2
III	77.3	51.4
IV	81.6	57.2
V	79.5	55.7

Source: Poulton (2002)

It is apparent from Table 1 that although general poverty and extreme poverty levels are high in all five regions, they are highest in regions 3, 4 and 5. Considering that regions 4 and 5 are characterized by high temperatures as well as low and erratic rainfall, poverty reduction is a key factor in any strategies to achieve sustainable rural livelihoods. A livelihood can be defined as the capabilities, assets and activities by which an individual or household needs for survival and self-development (Chambers and Conway, 1992; UNDP-BCPR, 2004). Such livelihood assets are used as tools, for instance skills, rights, knowledge and social capital, to enact the livelihood (UNDP-BCPR, 2004). A livelihood is sustainable when it can cope and recover from stress and shocks, maintain or enhance its capabilities and assets and provide assets for the next generation (Conway and Chambers, 1992)

Smallholder irrigation schemes in Zimbabwe date back to 1928 when the colonial government implemented small scale irrigation schemes as a famine relief strategy (Rukuni and Makadho, 1994). From 1936 smallholder irrigation farmers were made to surrender their dry land plot, and the government identified, designed and constructed new schemes without consulting the intended beneficiaries - the indigenous population. After independence in 1980, the Department of Agricultural, Technical and Extension Services, (AGRITEX) took over management of small scale irrigation schemes in communal areas (ibid). Although the main focus of post-independence smallholder irrigation schemes was poverty alleviation, they were also designed to enhance food security, create employment, curb ruralurban drift and modernize peasant farming (Manzungu and van der Zaag, 1996; Matsika, 1996; Chancellor, 2004).

Smallholder irrigation projects in Zimbabwe face several constraints. These include inadequate water supply due to increasing water demand by non-agricultural sectors and the small size of plots due to the limited availability of irrigable soils (Rukuni and Makadho, 1994). The shrinking of Zimbabwe's economy, persistent foreign currency shortages and the hyper-inflationary environment have also meant that smallholder irrigation schemes now face perennial shortages of inputs due both to the unaffordable cost and scarcity of such inputs.

Research on smallholder irrigation in other parts of Zimbabwe has shown that most plot holders are women (Manzungu and van der Zaag, 1996; Mate, 1996; Vijfhuizen, 1996; Chancellor, 2004). It would appear, however, that married women are de facto plot holders since irrigation plots are allocated to married couples with the male spouse being the de jure owner. The fact that most economically active men in rural areas

migrate to urban centers for employment may partly explain the dominance of females in smallholder irrigation schemes. Another finding of research on smallholder irrigation in Zimbabwe is the practice of plot sub-leasing (Magadlela, 1996; Matsika, 1996; Vijfhuizen, 1996). Some of the reasons for plot sub-leasing include lack of draught power by some plot holders, and high water and electricity charges as well as high input costs which force farmers to sub-lease.

Plot sub-leasing coupled with the generally low productivity of smallholder irrigation schemes seriously undermine efforts to use these schemes as strategies to reduce poverty. Low productivity is attributed to several factors. One factor is that women, who spend more time on the land than men, are excluded from the decision making process. In many cases women do not own the plots; these are registered in their spouse's name. This exclusion de-motivates women farmers (Manzungu and van der Zaag, 1996). Many plot holders are more concerned with food security than with income. In addition many plot holders fail to cover production costs due to high input costs, particularly power and water bills which negatively impact gross earnings and disposable income (ibid). Small plot sizes also mean that farmers can only farm profitably if they grow high value crops. Other factors that account for low production levels include low capital outlay, labor shortages and water conflicts with dry land farmers (Magadlela, 1996; Mate, 1996).

In spite of the constraints related to smallholder irrigation schemes, they present real opportunities for poverty reduction and the achievement of sustainable rural livelihoods. UNDP-BCPR (2004) define a livelihood as the means by which an

individual or household obtains assets for survival and self-development Livelihood assets being the tools used to enact the livelihood. A livelihood is defined as sustainable

They help to create employment, tackle hunger and malnutrition problems apart from ensuring food security and improving rural standards of living (Manzungu and von der Zaag, 1996; Matsika, 1996; Samakande, 2002; Chancellor, 2004). Chancellor (2004) also argues that where women are empowered through plot ownership in smallholder irrigation schemes, they are likely to make a greater impact in poverty reduction since they spend more time on the land. It must be pointed out that the success of smallholder irrigation schemes also depends on the level of investment, the extent to which they are able to draw on the resources of both government and aid agencies (Rowland, 1993).

Description of the Study Area

The three smallholder irrigation schemes are in the north-eastern part of Nyanga District (Figure 1), Manicaland Province, Zimbabwe. The Nyakomba irrigation scheme is the biggest of the three with 424 hectares. The other two being micro schemes: Ruwangwe irrigation scheme with just 2.2 hectares and Nyatsanza with 12.1 hectares. Due to its very small size plot holders in the Ruwangwe irrigation scheme own several vegetable beds. While Nyakomba irrigation scheme is located in Saunyama Communal Lands, Nyatsanza and Ruwangwe irrigation schemes are found in Katerere Communal Lands. Altitude in the Nyakomba Valley ranges from 800m to 950m. The Nyakomba scheme, which comprises three irrigation blocks (B, C and D) is in agro-ecological zone III where annual rainfall ranges from 650mm during a poor year to 900mm during a good year, with regular mid-season dry spells. Soils are mainly fersiallitic and suitable for a variety of

crops. The Nyatsanza and Ruwangwe schemes are in Ruwangwe Valley, northwest of Nyakomba. Altitude in the Valley varies from 760m to 1360m. Ruwangwe Valley is a semi-arid area in agro ecological zone four. It is characterized by high temperatures and low annual rainfall ranging from 550mm during most years to 750mm during good years (Ministry of Local Government, Rural and Urban Development, 1994). Ruwangwe Valley, like other areas in Region IV, is subject to periodic seasonal droughts and severe dry spells. Soils are mainly moderately leached, light to dark grey granitic sands. These granite derived sands are inherently infertile and therefore susceptible to erosion. Villagers in the study area are largely dependent on rain fed agriculture. Low and erratic rainfall, as well as inherently infertile soils, greatly limit agricultural potential. The rainfall season in the study area extends from mid-November to April during a normal year.

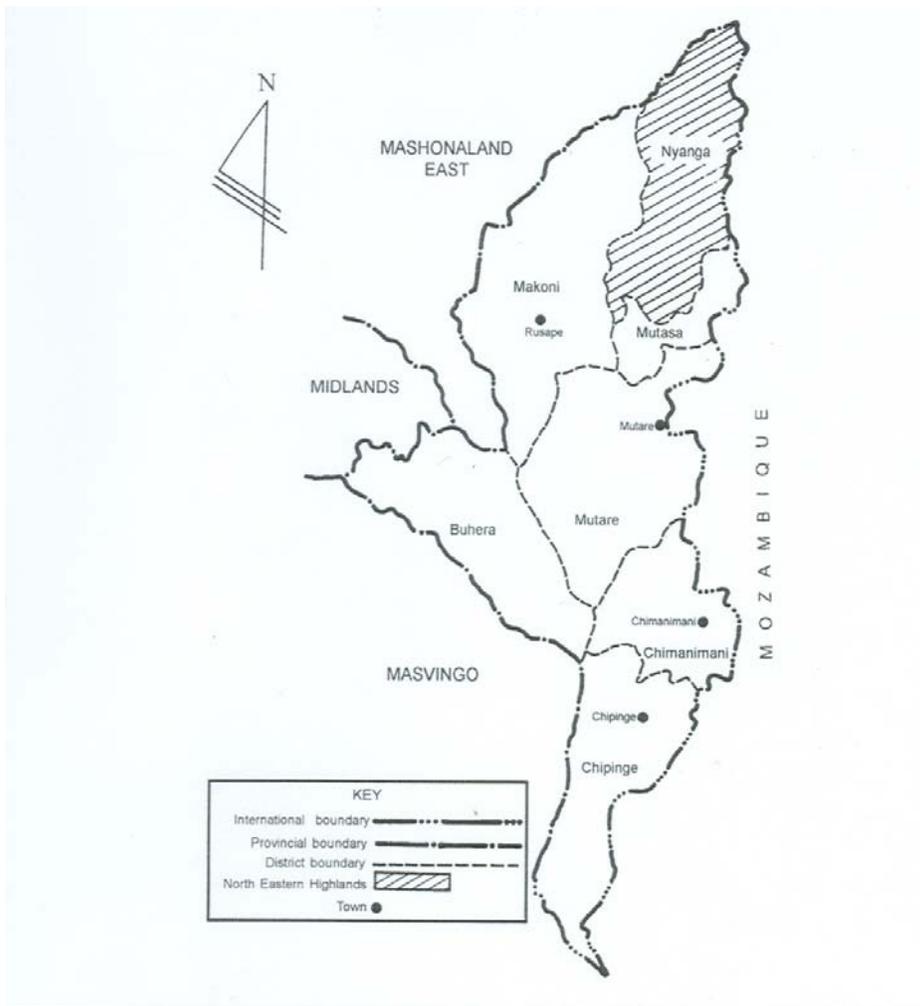


Figure 1: Manicaland Districts

Research Methodology

A descriptive survey approach was used relying mainly on questionnaires, semi-structured interviews and observation. Both closed and open ended questions were used; the former to streamline responses and facilitate results processing, and the latter to afford respondents an opportunity to express their views. Interviews were employed to complement the questionnaire and also tap expert opinion; with observations being used to verify both questionnaire and interview data where applicable.

The research subjects were mainly the 1128 plot holders in the three irrigation schemes, with government officials being key informants. At the time of study the Nyakomba Irrigation Scheme had 528 plot holders from 4 villages, with 4 officials from the Department of Agricultural Research and Extension (AREX). The scheme has three management committees each with 5 members each, all being plot holders. The target population in Nyakomba comprised four groups: plot holders, sub-tenants, committee members and AREX officials. The four groups were then categorized into three clusters. Cluster 1 comprised the ordinary plot holders and the sub-tenants, while the 15 committee members constituted the second cluster, with the 4 AREX officials making up the third cluster. A sample of 120 plot holders was drawn from the first cluster, with 40 ordinary plot holders selected from each of the three irrigation blocks (B, C, and D). Ten of the committee members were chosen as research subjects while all the AREX officials were used as research subjects due to their small size. Cluster sampling was adopted and used to ensure that the major stakeholders: ordinary plot holders, management committees and agricultural experts were adequately represented. Cluster sampling also made questionnaire administration and interviewing systematic and easier. In addition the technique enabled designing of instruments that took cognizance of the educational levels and experiences of the respective respondents. To select the 40 ordinary plot holders from each of the three irrigation blocks simple random sampling was used. Cards with plot numbers were randomly picked from a box containing all the plot numbers without replacement. The card method was also used to select 3 committee members each from blocks B and C, and 4 committee members from block D. In this way the researchers tried to reduce any systematic bias in sample selection.

The target population for the Ruwangwe irrigation scheme was all the 550 micro-plot holders from 8 villages, while that for the Nyatsanza scheme were all the 50 plot holders from 2 villages. Random sampling was used to select 50 respondents from the Ruwangwe irrigation scheme and 10 from the Nyatsanza irrigation scheme. Using the hat method, seven cards each were drawn for the two largest villages while six cards were drawn for the remaining six villages, without replacement, in the Ruwangwe scheme. For the Nyatsanza scheme five cards were picked, without replacement, for each of the two villages. Project committee members and AREX officers were used as key informants who supplied information through interviews. Data collection was done over a three week period in March/April 2007.

Results and Discussion

Survey, interview and observation results were analyzed to assess the benefits of small scale irrigation schemes. In addition research results were analyzed to evaluate the effectiveness of such schemes as tools for poverty reduction and achieving sustainable livelihoods.

Sex Composition, Age and Marital Status of Plot Holders

The bulk of the plot holders (62%) were female. Both questionnaire and interview results revealed that the dominance of females on the irrigation schemes was largely due to the most economically active men were in the urban areas for waged employment. The dominance of females is also a reflection of the overall national demographic trends where women constitute 52% of the national population (PRF, IDS and UNDP, 2003). In addition the finding confirms research results on small holder irrigation schemes

elsewhere in Zimbabwe where women are in the majority (Manzungu and van der Zaag, 1996; Mate, 1996; Vijfhuizen, 1996; Chancellor, 2004). Forty-nine percent of the sampled plot holders were aged 20-39 years, while 21% were aged 40-59, with 17% aged 60+ and the remaining 13% aged under 20. The economically active group therefore dominates on the three schemes. This finding confirms the assertion by other researchers on small holder irrigation that small scale irrigation schemes in post-independent Zimbabwe were, among other reasons, meant to create employment and curb rural-urban drift (Manzungu and van der Zaag, 1996; Matsika, 1996; Chancellor, 2004). Table 2 shows the marital status of the plot holders.

Table 2: Marital Status Sampled Plot Holders

Status	Nyakomba Scheme	Nyatsanza Scheme	Ruwangwe Scheme	Grand Total	Percentage
Single	18	0	13	31	17
Married	90	6	17	113	63
Widowed	9	1	15	26	14
Separated	3	2	5	10	6
Total	120	10	50	180	100

Table 2 shows that the majority the sampled farmers (63%) were married. This is an indication of the bias towards married couple in allocation of irrigation plots, a finding that is in agreement with that of other researchers in Zimbabwe (Manzungu and van der Zaag, 1996; Mate, 1996; Vijfhuizen, 1996; Chancellor, 2004). That 17% of the plot holders were single might be a reflection of the inability of the formal job market to absorb young school leavers. This is a result of the current melt down of the national economy which has resulted in the shrinking of the formal employment sector. The fact that 14% of the sampled population was widows seems to point towards the negative impacts of the HIV/AIDS epidemic. Since most of the respondents to the survey were

either married people or widows usually with dependents, the smallholder irrigation schemes offer much potential for poverty reduction.

Reasons for Setting up of the Smallholder Irrigation Schemes

The research also sought to find reasons for the setting up of the three irrigation schemes. Table 3 summarizes the reasons why the smallholder irrigation schemes were established.

Table 3 Reasons for Establishment of Irrigation Schemes (Percentage Responses)

	Ordinary Plot Holders	Committee Members	AREX Officers
Poverty Reduction	45	30	75
Food Security	33	50	25
Drought Mitigation	18	20	0
Employment Creation	4	0	0
Total Percentage	100	100	100

While 75% of the AREX officers considered poverty reduction as the main reason for the establishment of the irrigation schemes, 45% of the ordinary plot holders and 30% of the committee members viewed poverty reduction as the major purpose for the setting up of the irrigation schemes. This finding is in agreement with the stated aims of official post independence irrigation projects in Zimbabwe (Manzungu and van der Zaag, 1996; Matsika, 1996; Chancellor, 2004). The AREX officials being public servants should have been expressing the most important objective of these schemes which were jointly sponsored by government and development agencies. Although lower than the proportion for AREX officers, most of the ordinary farmers also considered poverty reduction as the main reason for the creation of the schemes. It is surprising that only 30% of the irrigation committee members cited poverty reduction as the major purpose for the existence of the schemes. One would have expected the committee members to be

conversant with the main reason for the setting up of the irrigation schemes. One possible explanation is that some of the committee members are children of plot holders who may not be knowledgeable about the main reason de/reform the schemes. Half the committee members viewed food security as the main purpose of the schemes, while 33% of the ordinary plot holders and 25% of the AREX officers considered food security another important objective of establishing the irrigation schemes. Once more this finding corroborates earlier research findings on stated government aims for the creation of smallholder irrigation schemes in post independent Zimbabwe (ibid). Achieving food security in dry land areas of Zimbabwe like Nyanga North is difficult without irrigation due to erratic rainfall and recurrent drought. While 20% of the committee members and 18% of the ordinary farmers viewed drought mitigation as another objective for the establishment of the schemes, none of the AREX officers considered drought mitigation as one the objectives of the schemes. Although drought mitigation might not be one of the stated objectives of these smallholder irrigation schemes, it is logical that the farmers consider drought mitigation as another objective because the area is drought prone. Only the ordinary plot holders (just 4%) viewed employment creation as an objective of the schemes. This is another surprising finding in that irrigation schemes set up by government state employment creation as one the objectives of such schemes. As for the locals it is very likely that the concept of employment is usually associated with formal employment.

Smallholder Irrigation Schemes and Poverty Reduction

The study also specifically sought to get the views of the sample population on the effectiveness of smallholder irrigation schemes as potential poverty reduction tools.

Figure 2 shows the responses of the plot holders.

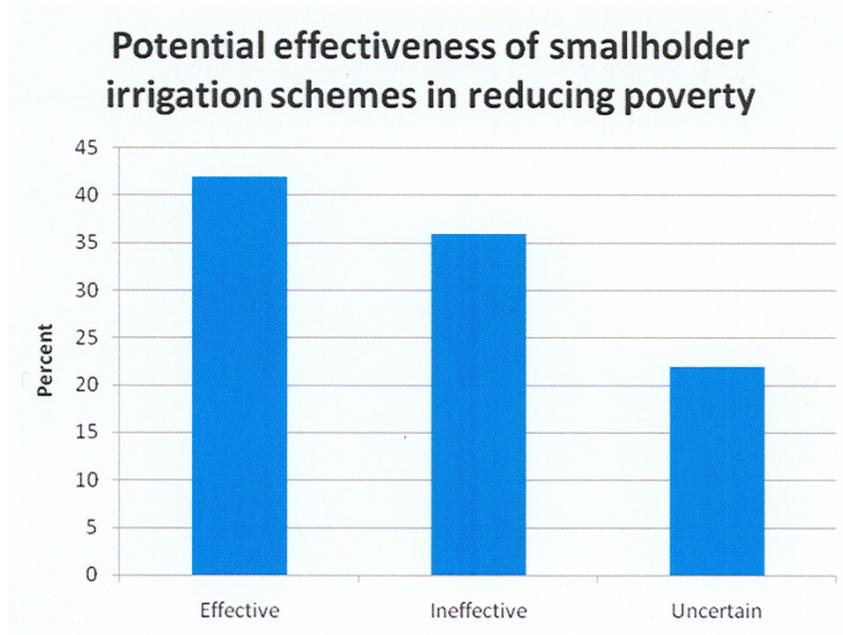


Figure 2: Potential Effectiveness of Smallholder Irrigation Schemes in Reducing Poverty

Forty-two percent of the farmers were of the view that smallholder irrigation schemes could be effective in reducing poverty. However they qualified their opinion by stressing the need for adequate input support schemes and viable markets. Of the remaining sampled plot holders 22% maintained that such schemes could not reduce poverty. Their explanation was that the irrigation schemes were created to mitigate the negative impacts of drought and to achieve food security. Inadvertently, these farmers were referring to poverty reduction, since drought mitigation would result in more reliable crop yields. In addition ensuring food security is an important tool in tackling

poverty. The remaining 36% of the sampled farmers who could not express a clear cut view however indicated that income from the schemes was spent on purchasing inputs and sending children to school. This is also an indirect acknowledgement that smallholder irrigation schemes bring real income benefits that positively impact on the livelihoods of irrigation farmers. AREX officers interviewed on the issue of poverty reduction stated that the smallholder irrigation schemes were an effective vehicle for poverty reduction. They maintained that the schemes improved livelihoods through meeting basic needs and reducing malnutrition since cropping is all year round. Both the farmers and AREX officers also pointed out that the irrigation schemes enabled farmers to earn a regular income that enabled them to build better houses and purchase livestock. It must, however, be pointed out that the benefits for the plot holders in the Ruwangwe scheme are restricted to improving nutrition since the plots are ideal for vegetable cultivation due to their small size. The results, nevertheless, indicate as other researchers have found (Manzungu and von der Zaag, 1996; Matsika, 1996; Samakande, 2002; UNESCO, 2003; Chancellor, 2004), that smallholder irrigation schemes hold real potential as a strategy to effectively tackle poverty.

Problems Affecting the Smallholder Irrigation Schemes

Survey and interview results revealed the major problems negatively impacting on the effectiveness of the three schemes as plot sub-leasing, high input costs, marketing constraints, inequitable access to decision making processes and creeping water logging and nutrient leaching.

Plot sub-leasing was only experienced at Nyakomba irrigation scheme. One reason given for plot sub-leasing was the need by the irrigation farmers to raise additional income to pay electricity and water bills. Another was inability to use the whole plot due mainly to input constraints, but also as a result of old age. The irrigation farmers in on all three schemes cited high input costs, particularly of seed, fertilizers and chemicals as an acute problem. Plot subleasing at Nyakomba was not only a response to input constraints but also an indication of the need for input support schemes to enable the farmers to make maximum use of the irrigable land. Water logging and leaching of nutrients were also given as creeping problems on the schemes.

Marketing of produce was cited as yet another problem on the schemes. Figure 3 shows the main markets for produce from the three schemes.

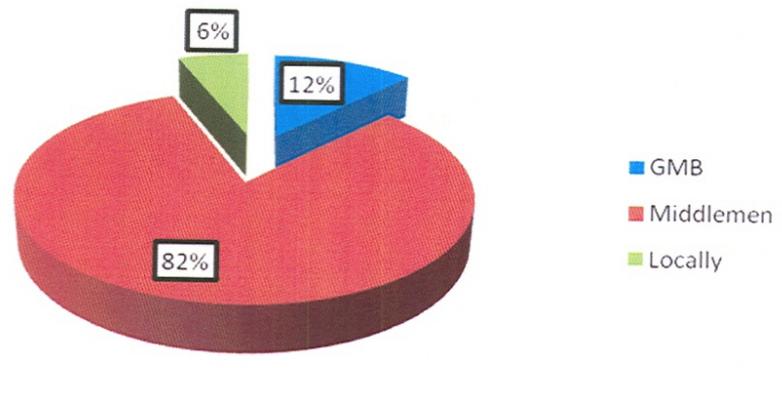


Figure 3: Main Markets for Irrigation Scheme Produce

Most of the farmers (82%) sold their produce to urban based middlemen, who in reality are black market players who will resale the produce at far higher prices in urban markets. Of the remaining farmers 12% sold their agricultural products to Grain Marketing Board (GMB), a parastatal, and 6% to local business men and schools. The majority of the farmers, on the irrigation schemes preferred to sell their produce to

middlemen because they sold at higher prices than those offered by the GMB. In addition, middlemen and came to buy the agricultural products, paid on the spot and transported the produce to urban markets themselves. The fact that if farmers opted to sell to the GMB they would have to foot the transport costs meant that only those farmers with input loans from GMB sold to the parastatal. Long delays in paying farmers by GMB also meant that the plot holders only sold to the parastatal as a last resort. Farmers only sold their produce to local businesses and to schools either because they inputs and basic necessities from local stores or due to immediate cash needs before middlemen come.

It also emerged from survey results that decision making on the schemes was skewed in favor of male heads of households. Table 4 shows the survey results.

Table 4: Individual Who Makes Important Farming Decisions

Decision Maker	Number of Responses	Percentage
Father	146	81
Mother	27	15
Other	7	4
Total	180	100

The survey results revealed clearly that the male head of household is responsible for taking the most important decisions concerning farming activities on the plot. It turned out that those women who were involved in decision making were mainly widows and single mothers. Even when the male head of household was employed away from home the spouse had to consult before making a major decision. Women are therefore marginalized in terms of decision making. Such marginalization may compromise the effectiveness of these schemes as argued by other researchers (Manzungu and van der Zaag, 1996).

Conclusions and Recommendations

Research findings indicate that smallholder irrigation schemes are dominated by women, married couples and the economically active population. The results also showed that the schemes are effective in mitigating the negative impacts of drought in dry land areas. Food security is also guaranteed; and nutrition levels raised even when very small plots are cultivate like in the case of the Ruwangwe irrigation scheme. It is clear then that the smallholder irrigation schemes are largely achieving their stated objectives, especially rural poverty reduction in dry land areas. Such schemes therefore offer a real and viable potential for moving towards achieving MDG 1 with regard to halving extreme hunger and poverty by the year 2015 at both the local and national level.

However research results also revealed problems that beset the schemes and therefore limit their effectiveness as strategies for reducing rural poverty especially in dry land areas. These problems include input constraints, market access, plot sub-leasing, unfair pricing of produce and the marginalization of women in decision making. Based on these findings several recommendations are therefore suggested to enable smallholder irrigation schemes to be effective vehicles for poverty reduction.

- There is need to empower women by allocating plots to them in their own right regardless of whether they are married or not. Since women are the majority population group in Zimbabwe, and they also spend more time on farming activities, it is logical to economically empower them if poverty is to be effectively tackled.

- As a result of Zimbabwe's shattered economy, irrigation schemes should be increased as a means to increase employment opportunities in rural areas in view of the very limited job opportunities on the formal labor market.
- There is a need for input support schemes. The Agricultural Bank (AGRIBANK) should support smallholder irrigation farmers by offering soft loans for input purchase.
- The GMB has to offer farmers realistic producer prices that will enable irrigation farmers not only to cover production costs but also to make profit. Better producer prices will also act as a means to combat the black market activities of urban based middlemen. Market based producer prices will not only ensure poverty reduction through higher incomes for farmers, but will in addition make irrigation farming more attractive than dry land farming.
- Central government, through the GMB, and relevant private sector companies should make inputs like seed, fertilizers and agro-chemicals available locally in order to reduce input procurement costs. Cheaper inputs coupled with better producer prices would also reduce the practice of plot sub-leasing.
- There is also need to complement smallholder irrigation schemes with other small scale projects like poultry, pig and goat production. Such projects will help to increase nutrition at the household level.

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