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THE IMPACT OF SMALL SCALE IRRIGATION SCHEMES ON RURAL LIVELIHOODS: THE CASE OF PANGANAI IRRIGATION SCHEME BIKITA DISTRICT ZIMBABWE.

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ABSTRACT

Although the establishment of Panganai small scale irrigation was in an endeavour to improve the welfare of the people it remains a pressing issue as economic and social problems continue to affect plot holders which results in the scheme being undermined. The purpose of this research is to assess the impact of small scale irrigation scheme on the people's livelihoods in Panganai Communal area. Both quantitative and qualitative methodologies were used in the investigation of the impact of the scheme on rural livelihoods. A sample of fifty respondents out of a total of two hundred plot holders was selected using random sampling. Data was collected using interviews, questionnaires and observation. Analyses were done using descriptive statistics. Tables and graphs were employed in presentation and analysis. Results were that the irrigation scheme has managed to create employment, income generation, supply water throughout the year, acquisition of assets such as scotch carts and livestock by farmers and school fees generation by the community as a whole. However the yields produced have not yet addressed the food security situation of plot holders. This is attributed to prohibitive water pricing and transport costs which negatively affected their desire to produce at maximum capacity. However the intervention by interested stakeholders such as non-governmental organizations and Zimbabwe National Water Authority (ZINWA) as well as economic recovery programmes like such as farm mechanization are recommended to ensure the viability and sustainability of irrigation on rural livelihoods.

Keywords: Food Security, Livelihood Diversification, Impact, Small Scale Irrigation

BACKGROUND OF THE STUDY

Mutsvangwa et al (2006) define irrigation as the ministering of land through the artificial application of water to ensure double cropping as well as steady supply of water in areas where rainfall is unreliable. Irrigation farming is another way of improving agricultural production both in subsistence and commercial farming. Irrigation schemes spread in Africa with large scale irrigation schemes such as the Kano River Project of 1970 and the South Chad Irrigation of 1974. Many Southern African governments began to embark on large and small scale irrigation schemes mainly in areas with little annual rainfall total in order to supplement water shortages. In Zimbabwe the agro-ecological zone 4 and 5 are dominated by irrigation schemes. Kadzombe et al (1973) argued that large scale irrigation schemes comparatively are more profitable and have socio-economic advantages than small ones. However Chenje et al (1998) suggest that in terms of empowering the local communal

people, small scale schemes are suitable as they occupy small land readily available in the rural areas. In Zimbabwe, irrigation schemes were established as a precaution against the inherent variability of rainfall as well as to ensure that cultivation is done all year round to boost and increase food production in the country so as to alleviate poverty. More so the government's attention to the development of small scale irrigation schemes was in a bid to meet its objectives towards decentralizing irrigation schemes mainly in rural areas for empowerment. However, despite these efforts, Panganai small scale irrigation scheme remained undermined. The efforts of the scheme are not yet fully realized since the government and non-governmental organizations are still supplying food handouts. The average rainfall of the area is between 450mm to 600mm per year. The scheme is situated thirty kilometers along the Zaka – Mashoko dusty road. It has a capacity of two hundred plot holders with each plot averaging 0, 5 hectares Therefore; it is against this background that the paper seeks to assess the impact of small scale irrigation schemes on rural livelihoods.

STATEMENT OF THE PROBLEM

Although the establishment of Panganai small scale irrigation scheme was in an endeavour to improve the welfare of the people socially and economically, it remains a pressing issue as economic and social problems continue to affect plot holders to an extent that food shortages persisted in the area. This gave the scheme a negative impression. Thus why the scheme remained undermined, resulting in its efforts unrealized. However, an assessment needs to be done on how the scheme has contributed to people's livelihoods in Panganai communal area, ward 15.

OBJECTIVES OF THE STUDY

- To give an overview of the sociodemographic profile of plot holders
- To identify the benefits derived from the irrigation scheme
- To assess the contribution of the scheme in improving people's livelihoods
- To recommend the contributions of the scheme for future policy and planning.

SIGNIFICANCE OF THE STUDY

The paper seeks to unpack the fact that although the scheme is undermined there are certain achievements it has made in influencing the livelihood activities and development. It will unveil the opportunities and constrains brought about by the irrigation scheme. The paper will give the government awareness to the hardships and the possible solutions to those which are currently faced by irrigation farmers. Ignoring such hardships would lead to the continued failure and collapse of the irrigation project. Agricultural and Rural Development Authority (ARDA) and ZINWA officials would get an insight on the problems being faced by farmers.

CONCEPTUAL FRAMEWORK

Evolution of Irrigation Farming

Irrigation is a very ancient agricultural practice which was extensively used by a number of early civilizations such as the ancient Egyptians, (Grove, 1989). Punnet (1982) argued that irrigation has been carried out for centuries around the globe and it started with traditional methods like the Sakia and Shaduf Ancient civilizations developed rivers that supplied water for

farming. Troeh et al (1980) said that as early as 500BC the Egyptians cultivated land made fertile by the flood waters of the Nile River. By about 3000BC they had built Canal system that carried water from the Nile to their fields. This was after the realization that they had been recurrent droughts in Egypt and many dry parts could not reserve enough food for the whole year. Large irrigation systems also had been constructed by that time in parts of China, India and South-west Asia. According to Miller (1982), irrigation therefore facilitated the growing of crops in the flood plains of the Nile valley so that supplementary food could be accessed. An increase in crop production in almost every year as a result became the attracting feature for the country to increase irrigated lands. Recent years has seen an increase in the use of irrigation to facilitate cultivation in semi-arid and arid regions. According to Andrew and Jackson (1996), between 1970 and 1990 the total irrigated land in the world rose from one sixth of all cultivated land to one third. From its early beginning, irrigation was slow until in the 1950s when the then Rhodesian government saw it fit to stimulate development by an introduction of low interest loans in the commercial Triangle Estates Hippo Valley Estates. According to Kadzombe (1973), the development of large and small irrigation schemes in the communal areas of Zimbabwe flourished after independence. This saw the establishment of schemes like Gache-Gache in Mashonaland Province, Chikwara-kwara in Matebeleland South and Manjinji and Mteyo in Masvingo Province. According to a report on agricultural production in communal land, irrigation schemes development as late as the 1990s with cases such as Panganai Irrigation Scheme in 1995.

The Influence of Irrigation on Livelihoods

According to Burrow (1987), small holder irrigated horticulture had proven to be a viable and attractive option for poor farmers in developing countries. He further asserted that returns from intensive irrigated horticulture even on tiny plots could greatly exceed returns from rain fed cereal production. In many developing countries, small scale irrigation schemes were counted on to increase production, reduce unpredictable rainfall and provide food security and employment to poor farmers. The same sentiments were echoed by Gor Cornist (1999) when he asserted that some of the small scale irrigation projects have been discovered primarily for income generating such as the peri-urban areas in Kumasi and Vegetable growing in Arusha Ghand. More so irrigation farming is the source of income for the disadvantaged rural people that are mostly women, widows, orphans and people living with HIV and AIDS. According to Jackson et al (1997), a survey of horticultural production in Zimbabwe showed that irrigation farming enables the growing of green vegetables, wheat, tomatoes, cotton, maize and even sugar-can among others.

According to the World Bank (2008) more than 70% of the poor people live in areas relying mostly on agricultural activities and sometimes mining and finishing for survival. Makumbe, (1996) goes on to argue that about half of the family heads in the informal sectors are employed as peasant farmers. Population is ever increasing thus land set aside for irrigation farming has been excessively subdivided rendering most units sub-economic in Gezira irrigation scheme. He also postulates that land is deteriorating very rapidly in Manicaland and in most cases farmers do not have access to or the buying power to purchase certified seeds and fertilizers.

Irrigation farming contributes significantly at the household in terms of income in rural areas. Having most of the rural household unemployed, most families' income levels are relatively low and possibly not enough to acquire basic

commodities and services. People in Mutambara confessed that their project enables members to earn an income which enables them to meet some of their basic needs, (Makumbe, 1996). Cash earned from the sale of food is used to cover household needs like cooking oil, paraffin and others. It also enables members to meet educational needs of their children such as exercise books and tuition fees. Data from previous case studies also revealed that irrigation farming has long term economic contribution on rural livelihoods. According to Kundlande et al (1994), food production from irrigated farms is a major source of wealth creation to the extent that it is the basis for economic growth in a number of localities. The income generated provide funds for purchaser of irrigation development to make up an important and growing proportion of the products used before by processing firms. In 2000 Mutare Hotel was buying 15kg pockets of caucus per week from Mutema irrigation farm in Manicaland, (Moll, 2004). It is however of importance to note that co-operation rarely exists in rural areas and where they exist they may not be productive enough to attract large firms. This should not however force one to conclude that irrigation farming does not have any positive bearing on rural livelihood no matter how small they might be.

According to Wein et al (1997) in Moll (2004), a comparison of income earned from small scale irrigation and that earned from dryland farming or from non-skilled work in Zimbabwe industries revealed that small scale irrigation farmers earned more. In comparative analysis between irrigators at Nyanyadzi irrigation scheme in Zimbabwe and their dryland counterparts, irrigators' investment was estimated to be between $150 and $200 while dryland farmers' investment was estimated to be lower than $100. This indicated that irrigators were in a better position to invest in capital items than non-irrigators because of higher incomes. Irrigation developments have made it possible for other rural infrastructure to be developed in areas which could otherwise have remained without roads, telephones, schools and clinics. According to Webb (1991), in Chenje etal (1998) in the study of irrigation schemes in Chakuda Village in Gambia, small irrigation schemes have resulted in increased income that was translated into increased expenditure, investment, construction and trade. At the village level, increased material wealth manifested in the form of construction of a large mosque built through farmers' donations and an improvement of the village clinic. At household level increased wealth could be seen in fifty-five houses built in the village and fourteen with corrugated metal roofing.

Irrigation agriculture is an essential component of any strategy to increase global food supply. The benefits of irrigation have resulted in lower food prices, higher employment and a more rapid agricultural and economic development. The spread of irrigation has been a key factor behind the rear tripling of global grain production since the 1950s. Chenje et al (1998) asserts that agriculture is the backbone of Zimbabwe's economy and as such irrigation is a very important agriculture practice to the country given that the country suffered periodic droughts in 1972, 1982/3; 1991/2 and 2002/4. Irrigation in Zimbabwe offers greater yields than dryland since more than one crop can be grown annually. According to Mushandike Irrigation scheme Annual report (1993/4) in Zimbabwe which was carried out by the department of AGRITEX for outstanding farmers, maize production on 0,5 hectares was 45 x 50kg bags, cotton production on 0,5 hectares was 27x16kg bags, wheat production on 0,5 hectares was 66x91kg bags while sugar beans production was 10x91kg beans. This bumper harvest could not have been realized without the provision of irrigation. Levels of output in terms of quantity are higher in irrigation schemes than dryland areas suggesting that there is more intensive crop production in irrigation schemes than in dryland agriculture.

Chitsiko (1999) also argue that small scale irrigation schemes are important in augmenting government policy of reducing rural to urban migration. He further stated that in his study of Hama Mavhaire irrigation schemes in Masvingo Zimbabwe, the scheme provided a source of self reliance and income to some eighteen year olds who did not intend to move to town. Roder (1965) supports this assertion by saying that irrigation schemes helped in reducing rural to urban migration by offering rural population an alternative source of employment and income and irrigators' wealth was chiefly held in the form of farm implements and in better houses. Shopping and market centres can be created as a result of infrastructural development brought by irrigation. More so they have generally been created with prospects of increasing employment opportunities. Donahue et al (1993) cited that in Zimbabwe about three quarters of the population is employed in agricultural industries. However, Moyo (1991) in Manzungu (2004) argued that small scale irrigation schemes normally depend on self employment because farming is not highly mechanized hence much of the labour is manual. Wringley (1982) gave the view that large irrigation schemes such as Gezira scheme in Sudan employs about one million landless labourers and their families to help in the planting, cultivation as well as harvesting.

According to Mutsvangwa et al (2006), vegetables and other crops affect customer's diet, health not only rural households but also to those who buy them through local markets. Makumbe (1996) argues that more nutritious food is not only difficult but too expensive for them. Food security is therefore likely to increase in households practicing irrigation farming. Fresh foods and other food crops as noted by Jackson et al (1997) have a special role in supplementing the diet of small children at weaning age and lowering the lack of protective foods. Rural people are therefore likely to fend for themselves when it comes to food requirements and thus maintain a decent health condition.

According to Mamvura et al (2006), Mutsvangwa (2006), irrigation also empowers women and emancipates them socially. Women tend to play a leading role in irrigation farming and this ensures their participation in development initiatives and poverty alleviation in rural areas. Munina et al (2000), Manzungu (2004) argue that women in irrigation farming increase income at their disposal which changes the balance of power within the household. This resultantly increases women's confidence in debates and discussions for community decision making. According to Sharma and Sharma (2004), small scale irrigation projects also supplied water for domestic purposes. They further highlighted that small scale irrigation projects brought abundant supplies of water for domestic purposes in India where cities such as Delhi and Jupor depend on canal water for public water supply. Chenje et al (1998) state that the aim of irrigation is to increase crop production and grow crops in areas where such an activity would normally be impossible due to lack of water. Punnet (1982) gave an example of the Martha Fenai Pradesh scheme in India which has been successful. Under the scheme villagers grow two or three crops instead of one and new crops that have been introduced such as onions, bananas and higher yielding varieties are common. Irrigation farming is viewed as a cheap substitute for costly disaster relief by the governments. According to Kadzombe et al (1973), instead of importing food relief thereby wasting foreign currency, farmers are assured of a constant source of food and money by establishing irrigation schemes. This is supported by Meinzen-Dick et al (1994) who assert that the greatest food deficities in Zimbabwe appear in dryland areas of Natural Region five. In their study they noted that fewer irrigation schemes ran out of food during the year than in dryland areas.

Sustainable Rural Livelihoods

Humanity has the ability to make development sustainable that is to ensure that it meets the needs of the present without comprising the ability of future generations to meet their own needs. It must go hand in hand with improved lifestyles for the least fortunate. Ellis (2000) postulates that livelihoods comprise of assets, activities and access to these that together determine the living gained by households or individuals. Rural people move regularly between rural areas and towns or cities to seek work, market their produce and buy manufactured goods. Rural families through livelihood diversification construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standard of living of which small scale irrigation schemes is one of the options. The sustainable livelihoods framework is designed to help understand and analyse poor people's livelihoods. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future while not condemning the natural resource base.

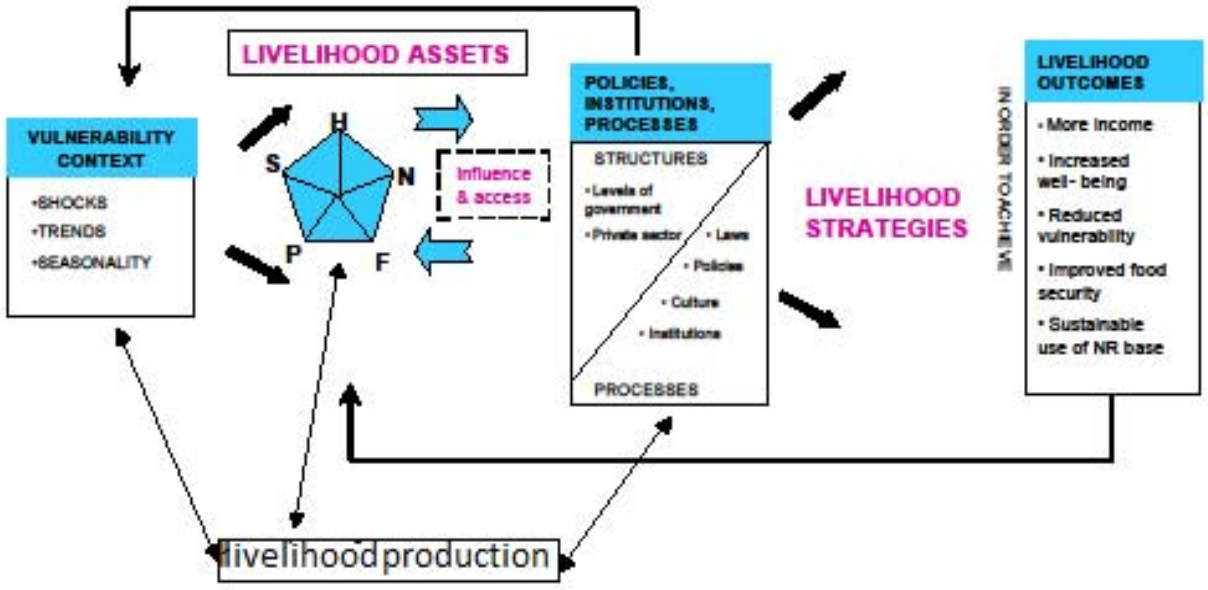

Figure 1: Sustainable Livelihoods Framework

Source: Ellis, 2000

For sustainable livelihoods to be achieved the future of irrigation farming in alleviating rural poverty lies not only in people but calls for intervention of interested stakeholders in rural development. Irrigation farming is possibly one of the key drivers to enhancing rural livelihoods if necessary support is given to it. Chambers (1983) points out that participation should not refer to mere involvement but should mean that beneficiaries of development initiatives actively take part at all levels of development projects. According to Hodder (2000), the active participation of women is critical to agricultural prosperity and policy designers should ensure that women are incorporated in all matters of life. According to Msingo (2007) Mujere, Chazovachii etal (2010) irrigation farming has become a source of income for disadvantaged people in rural areas. This means that participation is no longer limited to the well-up but also extended to vulnerable groups for example widows and orphans. Makadho (1992) is of the assertion that access to information is limited among irrigation farmers. These tend to affect their competitiveness. There is need to increase access to information on irrigation farming. This implies that agricultural workers in rural areas should work hand in hand with farmers and should offer training programmes on how to improve productivity, quality and competitiveness.

CHALLENGES HINDERING IRRIGATION FARMING

Transport

Food crops from irrigation farms are a problem for many rural people since they lack the transport to ferry their produce to the market. This tends to disadvantage communal farmers to participate in the recent boom in horticulture. Jackson et al (1997) postulates that some small irrigation scheme faces problems of roads and transport facilities. Rural areas often have gravel roads which are long and winding, some poorly maintained and inaccessible. Transport operators are in most cases reluctant to reach such areas and some of the farmers fail to get their produce to the market in time. Given the perishability of their products farmers face the risk of running a loss.

Markets

Food crops from irrigation farms are either sold in local or urban markets. Kundlande et al (1994) postulate that in Mutare, Manicaland Province, hotels and schools are targeted as markets while established ones like Dewure have had contracts for tomato production with Pizza and Chicken Inn in Mutare. Makumbe (1996) however showed that producers prefer selling to local markets in small quantities than in bulk. The reason being that, rural people could not meet commercial quantities and qualities. Markets are unreliable especially during the rainy seasons when people are self sufficient and reliant. In such times Makumbe (1996) argues that produce are bought at very low prices thus affecting producer’s income.

Labour

According to Hodder (2000) irrigation farming is extremely labour intensive. A plot needs to be maintained and thus tend to make considerable demand on the time of members. Given the demographic characteristics of rural areas, it follows that women and young children attend mostly to the plots. Watering the plots is particularly the best challenge especially in times of water crisis.

Capital

Irrigation farming like any other business requires financial capital. It is also needs chemicals, seeds, fertilizers and in certain instances irrigation pipes and sprinklers. It is unfortunate that farmers do not have money to purchase agricultural implements. Resultantly, they are forced to do away with such important inputs which negatively affect the quality of their crop. Makumire (1996) puts forward the idea that lack of inputs is a major set back. At the end these problems make irrigation farming a failure in uplifting rural people's livelihoods.

Water

Msingo (2007, Mujere, Chazovachii etal, (2010) postulated that unavailability of water affects crops. Kundlande (1994) showed that crop production in most areas is common in dark grey soils as well as brown thick soils which need large amounts of water to be saturated. In times of water crisis, the water table goes down forcing farmers to abandon their work. This possibly means that farmers will not be able to enjoy the fruits of irrigation farming and thus affecting their livelihoods at that time.

Thieves and Animals

According to Manzungu (2004), protecting the crops from dangerous animals like Hippopotamus from destroying the crops especially during the dry season when forage is scarce is a major problem to irrigation farming. Existing fences are at times destroyed and it is quite expensive to repair them. Not only animals find their ways into the fields but also human beings. Mujere ,Chazovachii etal (2010) argue that crops are targeted by thieves who do not just steal part of the fence but occasionally raid the place for the crops and this tends to draw back irrigation farming. Irrigation schemes can also be failures or be affected by internal and external, human and physical threats to their survival. This can also lead to the disfunctioning or stoppage of the scheme. More so this has resulted in some schemes not effectively addressing their intended problems like eradicating peasant and communal poverty.

METHODOLOGY

The research used both qualitative and quantitative methods of collecting and presenting data. Qualitative methods were suitable to explore the benefits as well as the impact of small scale irrigation scheme on rural livelihoods. The research used the quantitative method so as to know the assets which were bought by farmers and the number of kilograms of crops produced. Therefore interviews and observations were employed. There was also need to triangulate this qualitative methodology with quantitative methodology so that important information which could have been left out by qualitative methodology would be presented using quantitative methodologies such as questionnaires. A population of two hundred farmers is practicing irrigation at Panganai irrigation scheme. However the research used a sample of fifty (50) farmers which constitute 25% of the total population. The researcher used fifty (50) farmers as a sample because fewer farmers were easy to control and are representative of the total population. The research employed the random sampling method. After the selection process thirty five females and fifteen males were identified. Stratified random sampling method has used since it gives each sex and age group equal chances of being chosen to take part in the research. This selection criteria reduces bias and produce real representatives of the scheme. Descriptive statistics were used in the analysis of the results.

FINDINGS

Socio-demographic profile

Sex Distribution of Respondents

The majority of the respondents were females as compared to males which reflected that women are still key players in irrigation farming in rural areas .Cheater, (1996), Chenje etal (1998) confirmed that agriculture in communal areas is primarily a female duty as men are concerned with off-farm duties and are in urban areas.

Age Range of Respondents

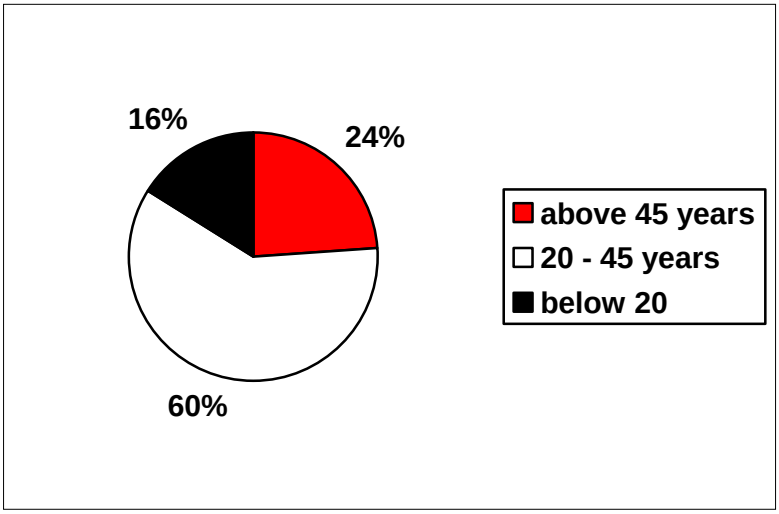

Figure 2: Age distribution of respondents

From Figure 2, the majority of the respondents fell under the age group 20 – 45 years constituting the able bodied who could economically work in the plots. The high response in the age group has been attributed to their available in plots since they spend most of their time working on the plots. Fewer children who constituted 16% of those respondents help parents in irrigating crops so that production can increase. More so the findings showed that these children worked in the absence of their parents who might be working in town or were at home busy with other commitments.

Table 1: **Marital Status of the Respondents**

Marital status	**Percentages**
Single	24
Married	36
Divorced	10
Widowed	30
Total	100

Table 1 shows that the majority of the respondents were married farmers who engage in farming to get income for the family and 30% are widowed which also means that the scheme also carters for the vulnerable groups in society. Those who are single possibly work in the plots in the absence of their parents.

Educational Level of Respondents

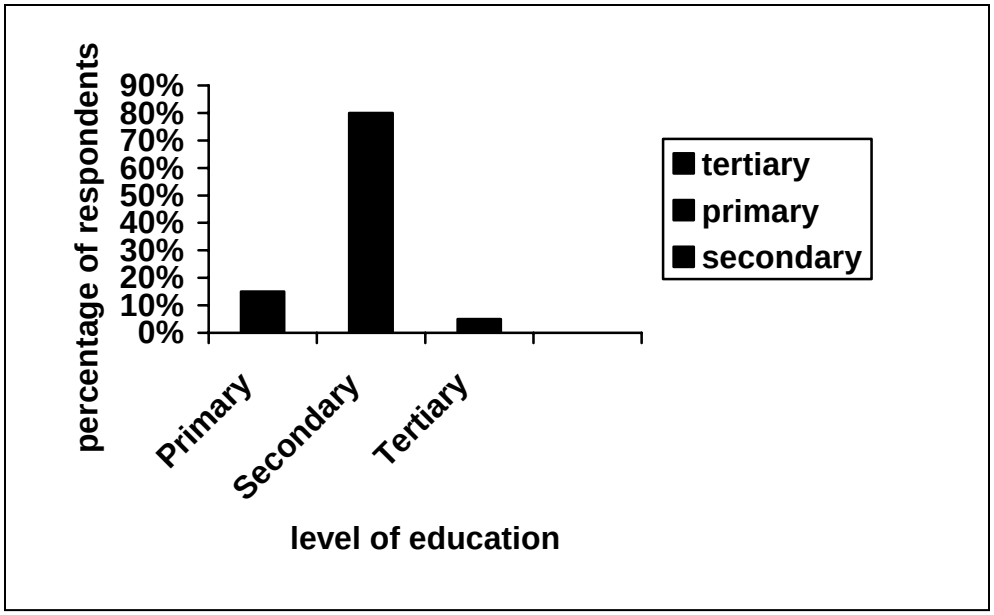

Figure 3: Educational Level of Respondents

The data in figure 3 shows that there is a relationship between educational level and irrigation farming. Irrigation is considered a form of self employment and income generating project in Panganai. This is line with Chitsiko (1999) who asserted that small scale irrigation schemes augment government policy of reducing rural to urban migration. Instead of seeking employment in urban areas they are busy in the irrigation scheme.

The Benefits of Panganai Small Scale Irrigation

Table 2**: Crops Grown and their Average Yields per Season per Farmer.**

Crop	**Kilograms/Season/farmer**
Tomatoes	60
Wheat	800
Beans	1000
Maize	400
Vegetables	250
Cotton	750

Table 2 shows that respondents who grow beans and wheat explained that the high average output would enable them to cover for losses in other crops. One farmer said she would cover her costs using income generated from cotton and beans but was quick to point out that growing more than one type of crop was no easy task since it demands both labour and inputs. The average maize yields are low since the respondents suggested that inputs were costly to procure and those who could be offered assistance by the Grain Marketing Board at subsidized rates would grow. Tomatoes have the lowest average yields and this was attributed to difficulties and expenses attached to storage since there is no ready market for the perishables. One of the farmers said, "In rural areas, favourable prices are hard to come by since the people do not have money." Chenje et al (1998) argued that without proper markets in rural areas people find it difficult to sell their agricultural products especially perishable ones. As one respondent said, "… although what we get is very little it is better to be in plots than dryland." This seems to support Wein et al (1997) in Moll (2004) who assert that a comparison of incomes earned from small scale irrigation and that from dryland farming or from non-skilled work in Zimbabwe industries revealed that small scale irrigation farmers earned more. It was also revealed that plot holders have a constant supply of water which is used for irrigating crops and other domestic purposes. This is supported by Shamma and Shamma (2004) who highlighted that small scale irrigation projects brought abundant supplies of water for domestic purposes in India where cities such as Delhi and Jupor depend on Canal water for public water supply. The majority of the respondents said that the project allowed them to send their children to school, improve their nutritional health standards and meeting some of the medical expenses. More so women who were part of the respondents indicated that they gained respect from their husbands through irrigation farming since they were now able to get some income though limited.

Table 3: **Assets Bought Since the Inception of the Scheme**

Name of Asset	**Percentage**
Scotch carts	6
Wheelbarrows	10
Mould board plough	40
Motor vehicles	00
Livestock	44
Total	100

Table 3 shows that the scheme has enabled plot holders to buy assets. Quite a number of respondents indicated that they managed to buy ploughs and livestock. However due to income limitations only 6% of the respondents purchased scotch carts. It is important to note that although income obtained is insufficient to meet all requirements no wonder why not even a single respondent managed to acquire even a vehicle ,they have managed to acquire ploughs, livestock and wheelbarrows.

Contribution of Benefits from the Scheme to People's livelihoods.

Some respondents were satisfied with the income they get from irrigation farming. Those satisfied could afford to meet some of the basic requirements like sending children to school, buying groceries for the family and income to cover some farm inputs. Other plot holders indicated that they could afford to pay a visit to their distant relatives and also affording cellular phones. However the majority alluded that the income they get was not always enough during the time of the year when the

market is flooded and the inputs are expensive. This suggests that the success of the scheme is held in obscuring thus where Chenje et al (1998) said, "…. The most successful small scale irrigation schemes have been able to churn out all year round incomes for the farmers." Therefore the Panganai irrigation scheme could not be a success.

On the other hand the acquisition of assets such as scotch carts, wheelbarrows and livestock are indication that irrigation is promoting economic empowerment. Scotch carts are used to carry produce from the plots to their homes thus ensuring that transportation of their produce is easier. The livestock in form of cattle are used for draughts power and can be sold so that they get income to cover for their basic needs. More so instead of relying on artificial fertilizers farmers can use animal manure to improve soil fertility. The respondents who had acquired assets such as livestock also reiterated that they could meet some dietary requirements from meat and milk from their livestock.

The different crops grown in the plots such as vegetables, tomatoes and beans broaden their nutritional requirements. According to Mutsvangwa et al (2006), vegetables, and other crops affect customer's diet and health not only to rural households but also to those who buy them through local markets and more so food crops have a special role in supplementing the diet of small children at weaning age and lowering the lack of protective foods. Dried vegetable would be found all year round.

Since the majority of the respondents were females, irrigation also empowered women and emancipates them socially. Women tend to play a leading role in farming and this ensures their participation in development initiatives and poverty alleviation in rural areas. This was supported by Munina et al (2000), Manzungu (2004) who argue that women in irrigation farming increase income which changes the balance of power within the household. This increases women confidence in discussions for community decision making which affect their lifestyles.

The availability of water throughout the year ensures that cultivation is done all year round. Double cropping ensures that farmers get income from the crops they grow though limited. More so irrigation farming is the source of income and dietary requirements for the disadvantaged rural people living with HIV and AIDS. More so plot holders use water for washing, for livestock and for construction purposes such as brick moulding.

Challenges faced by farmers in the scheme

If the problems faced by farmers and the benefits yielded were to be scaled, the scale would tilt in favour of the problems being faced. The major problems highlighted include lack of capital for input acquisition, markets, water pricing, labour and transport.

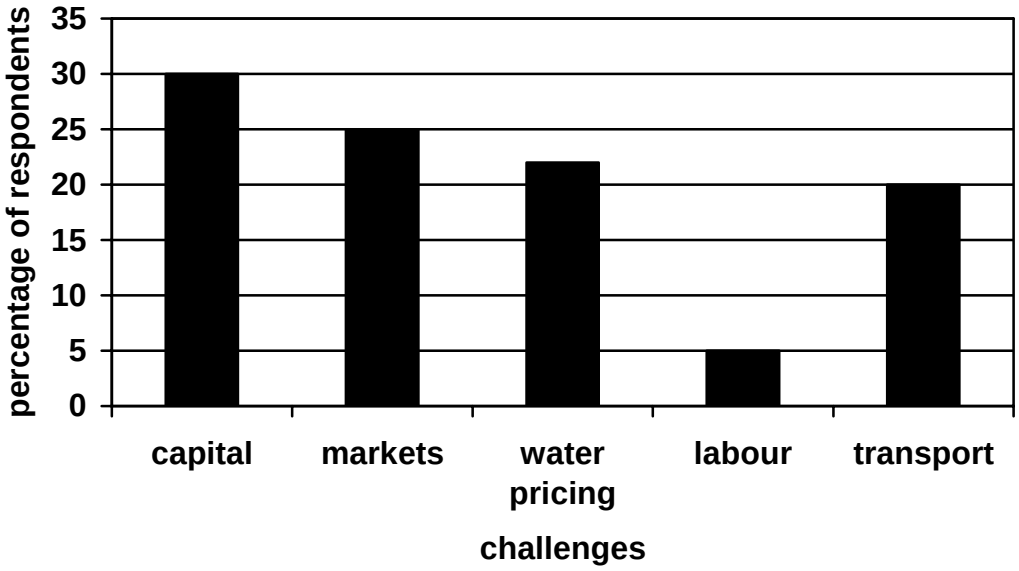

Figure 4: Challenges faced by farmers

From Figure 4, the majority of the respondents indicated that they had problems in securing capital to buy inputs such as seeds, fertilizers and chemicals. Due to such problems plot holders end up using unspecified organic fertilizers or just plant without. The results are that yields obtained fall below standard and this threatens the scheme objectives of maximizing production through irrigation. The unavailability of reliable markets to sell their produce is one of the major challenges facing farmers. Farmers who constituted 22% of the respondents complained that water tariffs charged by the Zimbabwe National Water Authority were too high. This compelled some plot holders to temporarily abandon cultivation and wait for those interested in renting or leasing. According to the scheme's annual report (June – July 2010), the respondents highlighted that it is true that irrigation land is more expensive to rent or buy and the water pricing leaves the beneficiaries with little profits which means that farmers are usually disadvantaged. Some farmers also complained about the nature of the road which forces bus operators and private vehicles to look for other routes. This affects their products which need a ready market. More so some of the challenges faced by farmers were also linked to the availability of labourers to water crops, distribution of water given the number of farmers in the scheme, it is too involving. As Hodder (2000) puts it, "irrigation farming is labour intensive."

CONCLUSION AND RECOMMENDATIONS

This study revealed that plot holders benefited from Panganai Small Scale Irrigation Scheme through various crops grown such as maize, beans, wheat, tomatoes and vegetables that improved their nutritional needs. The income obtained from the scale of their produce has enabled them to send children to school, buy groceries and even to pay a visit to distant places. The income obtained has also enabled plot holders to acquire assets such as livestock, scotch carts and wheelbarrows although it is limited. The assets enabled plot holders to diversify their livelihoods through getting animal manure, meat and milk and the sale of dried vegetables all year round. Transportation of their produce from the plots to their homes had been made easier by

the use of scotch carts and wheelbarrows. It revealed that role of women as active participants in irrigation farming which enabled them to make informed decisions which influenced their lifestyles. More so irrigation has also empowered rural people through provision of water throughout the year. However despite these contributions the output produced has not adequately addressed the socio-economic problems of plot holders due to problems of proper markets, lack of capital for inputs acquisition, prohibitive water pricing and transport which negatively affect their desire to produce at maximum capacity. For irrigation farming to be sustainable there is need for intervention by interested stakeholders such as community based organizations and co-operatives. Economic recovery programmes such as farm mechanization are also essential to address the current deteriorating outputs. The responsible authority should ensure that there are good roads and cheap transport which ferry the crops to different market places for the sustainability of small scale irrigation schemes.

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