

The Practice of Smallholder Irrigation

Case Studies from Zimbabwe



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Juggling with land, labour and cash

Strategies of some resilient smallholder irrigators

Rekopantswe Mate¹

Researchers on irrigated agriculture in Zimbabwe have often lamented the low productivity in smallholder irrigation schemes, citing inadequate resources on the part of farmers. According to Rukuni (1984c) farmers often lack sufficient money and labour to deal with irrigated agriculture. Many irrigators have dryland plots which they continue to cultivate during the rainy season. At the same time these farmers have to be seen to be doing work in their irrigated plots. Many farmers' children are in school most of the year and are not in a position to assist on the plot. Furthermore, irrigation means double cropping in any given year and this places heavy demands on a farmer's resources. These factors, according to Rukuni (1984c) seem to obliterate the possibility of irrigation schemes realizing their full potential as projected by planners and scheme designers.

Projected production levels are often set with little consideration for the local situation, that is, without taking into account the local pressures and realities with which people have to contend. These projections are therefore unrealistic. Rukuni (1984c) sees the unavailability of money for buying inputs and hiring labour as the main impediment in production, overlooking the possibilities which social relations bring into the production process. The social arrangements available to farmers offer alternatives, especially through exchange and other transactions which allow people to produce even when they lack cash. For instance, farmers with labour or draught power may not have irrigated plots but can exchange these resources for the use of irrigated plots for a specified time. This means that irrigation farmers can produce even when there is no money. Such arrangements are often not visible. Neither do they easily lend themselves to quantification.

Economic surveys of smallholder irrigators (as done, for instance, by Tiffen, 1990, and Meinzen-Dick *et al.*, 1993) provide detailed assessments of resources available to households: data on capital goods, labour, composition of the household, age structure and educational levels. Such data, however, often do not correlate with

production levels achieved by the sampled households. This is because the survey techniques are too blunt to discern certain resource use strategies followed by farmers. A research assistant tasked with filling out a prescribed questionnaire within a short period of time is not likely to get reliable data concerning those practices, or practices that the irrigator may wish to hide from the researcher. Only if an irrigator is convinced of the good intentions of a researcher will he/she provide more reliable data. Much of the juggling mentioned in this chapter goes against the rules and regulations in use in irrigation schemes.²

The resource endowment of households tends to vary with time and circumstance. It is therefore not easy to predict or determine a farmer's productivity on the basis of the resources he/she has. This is why generalizations such as those made by Dikito, (1993) and Mvududu (1993) who say that female-headed households in irrigation schemes, for example, are the most affected by labour shortage due to the absence of adult men as husbands and fathers, presuppose that female heads of households are not capable of finding alternatives and that they cannot cope with agricultural production given male absence. Furthermore, this presupposition is made without looking closely at how irrigation households (whether male or female headed) work in their plots, and therefore how they deal with resource shortages of any kind. It is argued here that individuals in households are continuously finding ways of dealing with the variations in resource endowment. The emerging coping strategies adopted are essential and unique to the situations in which they are used.

Since there is very little research done on farmers' coping strategies in irrigated agriculture, researchers first have to devise and use data-gathering methods which can tap these strategies and make them more visible. Since most such strategies are 'invisible', in that they are a deviation from the set rules and regulations, techniques for such exploratory research must typically be qualitative in nature: open-ended interviews, dialogue, observations and accompanying respondents through the day. Schwartz and Jacobs (1979: 4) note that qualitative methods are necessary when one wants to understand in greater detail the lives of people that are being studied. This enables the researcher to understand social phenomena as they happen in a particular context.

The scope of this chapter therefore is limited to opening up some of this uncharted territory on farmers' coping strategies in the context of Zimbabwean smallholder irrigation. It concerns itself with how irrigation farmers juggle with whatever resources they have in order to ensure that they continue to derive the benefits of irrigated agriculture. The main concern is how people offset the effects of inadequate cash and labour. By juggling, I am referring to the undertaking of multiple activities at any one time, and to the interdependence of these activities which sustain each other. Through this process of juggling, the farmers aim to optimize resource use, and also to maximize economic returns.

After a summary description of the research site, I briefly introduce the six households that lie at the core of this chapter. I describe in some detail the resources available to them, the circumstances they face, and how these circumstances impinge on production and the strategies deployed to optimize resource use in these circumstances. In the concluding part, I discuss some salient findings that emerge from the empirical material presented and how these impact on our perceptions of smallholder agriculture in Zimbabwe.

Research setting

The findings discussed below are based on fieldwork carried out from July to September in 1994, in an irrigation scheme in the south-east lowveld part of Zimbabwe. The area is characterized by very unreliable rainfall and hence it is generally referred to as a food-deficit area. The scheme has a gazetted area of 527 ha, although at the time of doing the research only 234.5 ha were developed. The irrigated plots are divided into three blocks of land using two types of irrigation. Two blocks are irrigated by means of an overhead (sprinkler) system, the water source being ground water. The smallest block uses flood irrigation. This block is the least productive due to severe water problems. Its water source is a nearby river which in 1994 had been dry for a number of years due to recurrent droughts. At the time of doing field work, the flood irrigated section could only be used during the rainy season (summer) when the water situation improved somewhat.

The scheme had 370 registered plottolders. Most of these people had plots of not more than 1 ha in size. This is therefore a 'comma hectare' scheme. According to Meinzen-Dick *et al.*, (1993) irrigation schemes such as these are meant to be a drought-relief measure for people in the surrounding areas. Irrigation is meant to increase people's household incomes as well as food availability.

Given the size of the scheme, it was not possible to cover more than a few of the farmers in the scheme or do any real in-depth studies. After a fortnight of reconnaissance, I decided to limit my research site to a section in one of the overhead irrigated blocks, from which location I met and chose six farmers, selected on the basis of different resource endowment characteristics - principally those of household type and type of access to irrigation plots. Of the six, three were *de jure* female-headed households, two were male headed, and the other was a *de facto* female-headed household. In *de jure* female-headed households men as husbands (to the adult woman) and fathers (to the children) are permanently absent because of death, divorce or the fact that the woman is a single mother. In *de facto* female-headed households men are away for some time. The latter can be said to be male headed but female managed, while the former are said to be both female headed and managed.

The following persons were my entry point into the irrigation scheme. Through them many other people came into the research with whom they shared land, labour and other resources necessary for agriculture. The six farming households selected

differed in age and family structure and in the resources at their disposal. These differences allowed me to explore the different strategies adopted to ensure production.

THE ACTORS; THEIR HOUSEHOLDS AND FARMING ACTIVITIES

Mr and Mrs Khoza, and their inherited estate

Mr and Mrs Khoza have two plots. One of these plots is in the overhead irrigation block, and was inherited from Mr Khoza's late father. The other is in the flood-irrigated section of the scheme. Husband and wife are in their early 50s and late 40s respectively. They were introduced to me by the extension worker. They have seven children aged between 10 and 25. The eldest is female and is now married. The two following her are working in the provincial town. Four of the Khoza children are still at home and go to school. Mr Khoza recently retired from formal employment in the city. Mrs Khoza has always lived in the rural area looking after the two plots in her husband's name as well as cultivating vegetables on the banks of a nearby river. The Khozas have neither plough nor livestock.

Mr Khoza found himself in a situation where he had to share the 1 hectare plot he inherited from his father with his siblings. His father had four wives; each with five children. Mr Khoza, being the eldest son, is the traditional heir, and became head of the family when his father died. This meant that he had to assist his siblings when they needed help. Although many of his half brothers and sisters are married and live away from the scheme, some of them are not in formal employment and have no other steady source of sustenance. In order to forestall any inheritance disputes over the use of his late father's plot he decided to subdivide it into four equal parts and allocated three parts to his sisters and brothers depending on their mothers. That is to say, siblings born of the same mother were allocated a portion of the plot. He retained the fourth piece for his own use. Some of his half sisters and brothers shared their portions of the plot. However, Mr Khoza has his other plot on the scheme which he uses himself with his family. As this plot is located in the flood section it is not of much use in the dry winter season. Mr Khoza claims that he still keeps the inherited plot in his name for his sons to inherit when they grow older. He hopes that his half brothers and sisters will get plots of their own once the scheme is extended. They are already on the waiting list for the scheme's extension which is expected to start in a year or so.

Mr and Mrs Khoza do not need to hire extra labour as the part of the inherited plot they cultivate is relatively small. Besides, in 1994 their tomato crop was comparatively poor due to the irregular water supply, so there was little to pick. The disappointing production was caused by the rehabilitation works going on in the scheme. This couple worked alone with the assistance of their children. Sometimes the girls stayed at home doing household chores. Their second son sometimes sprayed the plot against pests and crop diseases when his father could not do it. Mr Khoza's siblings, with

whom he shares the plot, also work with their children. They hired draught power jointly and shared the costs. On the other irrigated plot Mr and Mrs Khoza also worked alone with their children, but in winter it was left fallow due to the water problems referred to above.

Mr and Mrs Khoza have the husband's pension as an extra source of money. Generally the returns from the inherited plot contribute a substantial part of their income. Their other plot contributes little. However, Mrs Khoza cultivates a small garden on the banks of a nearby river in winter to grow vegetables for sale and for domestic consumption. On a good day she can earn up to Z\$15 from vegetable sales. The income thus raised is used for small but essential household goods like salt, sugar, and cooking oil. The garden is not hers though. The owner uses it in summer to grow maize. According to Mrs Khoza she does not have to pay the owner of the garden anything for using it in winter. Mr Khoza buys all household goods priced over Z\$50.³

The Khozas' major expenses are irrigation maintenance fees, school fees, food and health care (because the husband is not in good health), and, to a lesser extent, church donations. Regarding these donations, Mr and Mrs Khoza explained that they have to be seen to be contributing, weekly after service, and whenever a church member has a problem. They, of course, also use money to buy agricultural inputs and other costs related to cultivating the plot.

Mr and Mrs Moyo: exchanging draught power for land

Mr and Mrs Moyo were a young couple aged 36 and 30 years at the time of the research. The Moyo household did not own an irrigated plot, they rented one. They had five children aged between one and nine. The eldest was still in primary school. I was introduced to the Moyos by their female worker, AmaAdam (mother of Adam), who also owns a plot.

Mr and Mrs Moyo have farmed in the irrigation scheme for the past 5 years or so. However, they are not registered plottolders. They have draught power (ox team and plough) which they hire out. Inside the scheme they hire the team to other farmers in exchange for portions of irrigated land. Some of the irrigators do not have the money to pay at the going rates so they ask Mr Moyo to recover his expenses by allocating a small portion of their plots to him. At the time of doing fieldwork Mr Moyo had this type of arrangement with a farmer whose plot was adjacent to another that he rented. The farmers considered each other 'relatives'. Mr Moyo grows the crop of the season for sale or for domestic consumption in these pieces of irrigation land. This contributes to his household income. Mr Moyo provides his own seed, labour and other necessary resources.

Mr and Mrs Moyo were also renting a plot from a diabetic plottolder who had doctor's orders to rest. This farmer had to stick to a strict diet and use insulin regularly. All these conditions meant that he needed money to purchase food and medication.

The insulin alone was Z\$500 a month. So, as he was unable to work the plot himself, he received an income for his medication and other needs by renting the plot to Mr Moyo. Neither the plotholder nor Mr Moyo were willing to disclose the amount of money involved in the transaction. In fact, the registered plot holder maintained that Mr Moyo was not renting the plot but was working for him. He claimed that Mr Moyo was paid both in cash and in kind. Mr Moyo disclosed that he was renting the land only after he had proof that he was not working for Agritex. He also said that he paid the plotholder in two instalments, he pays a cash advance before the start of the season and tops it up after the harvest. The latter amount depends on the harvest.

Mr Moyo also rented another plot in the block where the owner owed him Z\$200. The plotholder got into debt when his wife fell ill after a complicated pregnancy. She needed urgent hospital attention and the man did not have the money to meet the costs. He then borrowed money from Mr Moyo after many unfruitful attempts from other farmers. In order to pay back Mr Moyo, the farmer invited him to make use of part of his plot as a way of repaying his debt.

Tomato production during the winter season is the main source of income for the Moyo household. In the picking season Mr and Mrs Moyo make use of hired labour from the female casual labourers who are constantly looking for work on the scheme. These women are also often assisted by their children, ranging in age from 7 years to the early teens. This allows the women to work faster and therefore earn more money by picking more boxes. During the period in which I conducted field work I did not see Mr Moyo picking any tomatoes himself. He usually presented himself at the plot at the time of selling the tomatoes. He paid the casual labourers, noted the number of boxes sold and the returns. He kept the money in the bank in his name. Sometimes Mr Moyo's mother assisted as well. She and Mrs Moyo were not paid for their efforts.

Mr and Mrs Moyo get a substantial amount of their income from agricultural activities. This money is used for food but also saved for future investments such as plot rentals. According to Mr Moyo it is necessary to have a bit of cash on stand-by because many people demand cash advances for plot rentals. Casual labourers are usually paid straight after sales so it is not always necessary to have cash available beforehand. Mr Moyo gets extra cash and land by hiring out his draught animals. The Moyos have no children in secondary school so they did not yet have to worry about school fees.

MaAdam

MaAdam lives next to the Moyos and introduced me to them. She was seen in the plot early in the mornings working on her own. She was sometimes joined later in the day by other women. I had befriended this woman and although she would discuss her own experiences about irrigated agriculture, she would not release any detail

about the plot, but referred me to her employers, the Moyos. She has an irrigation plot of her own in the flood-irrigated section of the scheme. She was 34 years old and separated from her husband because she was unable to have more children. She has two sons aged 10 and 12. She has neither cattle nor plough so she hires draught power when she wants to till her plot.

MaAdam sells her labour to the Moyos because she has no other source of sustenance. She usually gets to the Moyo plot before Mrs Moyo, who has to stay at home to prepare breakfast for her family before her children go to school. She works on the Moyo plot even when they are not there if they let her know there is something which needs doing. She is considered a trustworthy person and can work without supervision. She works for this couple during the peak season when there are many tasks which need doing. During the tomato picking season she earns 50 cents to Z\$1.00 per box of picked tomatoes. The boxes weigh about 25 kilograms on average.

MaAdam uses her earnings which, at the best of times amounted to Z\$10 per day, to buy vegetables for sale. She sells them at a nearby refugee camp in cash and/or in kind (maize meal, small grains and clothes). This way she can afford to feed her two children. Her elder son works also during the holidays tying tomato boxes for the tomato buyers. He earns a pittance, just Z\$3 for tying 20 or more boxes. Usually this is a whole day's work. MaAdam keeps her son's earnings and has been able to buy canvas shoes for both boys from these savings.

Ambuya (Granny) Jazi and Ambuya Nhamo: the respected grandmothers

Ambuya Jazi was always in her plot working alongside younger people whom I later gathered were in her employ as casual and/or permanent workers. Her presence in the plot made it easy for me to relate to her, and I talked to her regularly. It was while I was visiting her that I met Ambuya Nhamo, who has an adjacent plot. She quizzed me about my mission in the irrigation scheme and asked why she could not be interviewed. There was no good reason to refuse, so she effectively enrolled herself in my project. The two ladies are in their late 60s and live alone in the communal lands surrounding the scheme. They are friends too. Their children are grown up and are professionals living and working in urban areas. The children visit their mothers whenever possible. They also remit money home even though the ladies would not openly say so. Both ladies are widowed. Ambuya Jazi has her own cattle and a plough. Ambuya Nhamo's livestock perished during the 1992 drought. She was left with two cows which she cannot use for ploughing. She hires traction when she needs it.

Ambuya Nhamo and Ambuya Jazi each have one hectare plots. They inherited the plots from their husbands, and hold these in trust for their sons, who chose not to practise communal farming for a variety of reasons. They left the village preferring to work and live in urban areas. So the ladies continue to use the plots.

During the peak season they employ casual labourers. The two old ladies pick tomatoes alongside their casual labourers. They have servants in full-time employment at home. The employees do household tasks and also assist in the plot, especially when it comes to carrying irrigation pipes and spraying. The two ladies supervise their tomato sales and pay the workers. Ambuya Nhamo had an elderly man of Mozambican stock in her employ. He is the one who was entrusted with the task of supervision when she was away.

The two old ladies realize most of their income from agricultural activities on their plots. They have bank accounts in a nearby district town. Their children are adults and employed, so they do not have pressing expenses such as school fees. Instead, the children remit some money to their mothers and also pay the wages of the domestic servants. Part of their agricultural incomes are ploughed back into agriculture for the purchase of inputs, tillage and other plot developments.

Ambuya Jazi is a member of a savings club which assists her in purchasing fertilizer, seed and chemical inputs, which was the main reason for joining. The club was formed by female farmers to encourage saving among female farmers and to buy agricultural inputs in bulk. This allowed them to save on transport because if they bought a lot of produce the retailers would deliver the inputs to the scheme. Ambuya Nhamo did not join the club because she said she found it too time consuming and she could buy the inputs on her own. She goes to the district town herself. Both ladies use the remittances from their children to also purchase food.

Mrs Tsuro and her land portfolio

Mrs Tsuro is the most entrepreneurial of the six farming households in the sample. She cultivates four plots, three of them are registered in her name and the other in the name of her mother-in-law. She is in her mid-30s and was introduced to me by the extension worker. She used to be a teacher but is now a full-time farmer. Her husband works away from their rural home. They have young children in primary school. Mrs Tsuro's agricultural enterprise seems to be aimed at increasing her land portfolio, which informs the strategies she develops.

During the colonial era Mrs Tsuro's husband wanted a plot but was unable to get one because he worked for the government. Mrs Tsuro was also working as a temporary teacher at the time. She was forced to resign in 1992. In view of these circumstances the husband decided to apply for a plot in his mother's name, saying that she lived with him even though she did not. His mother lived and worked on a commercial farm somewhere else. They got the plot in the flood-irrigated section which they still use to this day. Mrs Tsuro shares the returns with her after deducting all expenditures.

She acquired another plot in the flood section after she was approached by an irrigator who was in arrears over maintenance fees, after failing to pay them for a number of years. This farmer owed Z\$700 and was on the brink of eviction or so he

thought. Unlike most plottolders on the overhead section, he did not manage to sublease the plot, as the flood section is notorious for its water problems. This person sought assistance and Mrs Tsuro wanted to know what was in it for her. The other farmer offered half of his plot as payment for the assistance. Mrs Tsuro consulted her husband on the issue but he felt that this was not a worthwhile investment. She had hoped that her husband would chip in financially so that they would jointly pay the other plottolder's arrears. She then dug into her savings and paid the arrears and got half the plot. Asked why she was interested in the plot given the water problems in that section of the scheme, she said that she had heard that the section would be rehabilitated in due course. So, she saw it as a speculative investment and did not mind waiting.

Mrs Tsuro has yet another plot in the flood section of the scheme. However after cross-checking this information with Agritex records there was no evidence of the existence of a plot in the said place. Although she has been cultivating and irrigating this piece of land, the place seems not to be recognized as a plot and hence it was not in the records. It is on the edge of the 'official' scheme and has access to irrigation water.

According to Mrs Tsuro the three plots she had until 1994 were not enough for her, so she applied for a plot in the overhead section. She got this in the winter of 1994. This does not mean that she gave up the plots in the flood section. Sometime last year a farmer was evicted for disobeying rules in the scheme and for threatening Agritex staff with physical violence. The IMC had been dissolved for a variety of reasons and hence the farmers claimed they did not know exactly why this farmer was evicted. Most irrigators heard through rumours about his eviction but no one wanted to take over his plot because of fears of witchcraft. The farmer was expected to avenge his 'unjust eviction'. One way of doing so was to make the plot unmanageable through using supernatural powers. Mrs Tsuro volunteered to use it and had a thriving tomato crop. However, an informant told me that this does not mean that Mrs Tsuro was not afraid of witchcraft: there was a rumour that she had spoken to the former plottolder about using his plot to make sure that whatever his intentions he would not harm her. She allegedly promised that if the evicted farmer made a successful appeal on his case she would give up the plot! Mrs Tsuro admitted that she asked the former plottolder not to harm her, and told him that he should not think that because she had applied for the plot she supported his eviction. She explained to me that people say witchcraft is practised in the utmost secrecy. If you tell a would-be witch that you are aware of his/her intentions then the witch is disempowered and is not likely to harm you.

Mrs Tsuro is confident that she can look after all the plots, that is weed them, apply the necessary fertilizers, spray, and pay the required maintenance fees. She does not see any reason why anyone would want to evict her. She says she has no intention of subleasing any of her plots.

Mrs Tsuro required much labour on her four plots. She had a number of arrangements going on simultaneously. She had a regular female worker who worked mornings during the week and at times during the weekend. She earned Z\$70 and a bucket of grain per month, and was allocated a portion of one of Mrs Tsuro's plots to cultivate her own vegetables. She also employed a young man whose main responsibility was to take care of livestock. He also worked in the numerous plots doing such tasks as spraying and carrying irrigation pipes. She had a child minder who looks after her baby and does other domestic chores such as fetching water, cooking and cleaning. She hires casual labour to pick tomatoes during the peak season. In most cases she works alongside her different employees. She supervises all sales, collects the money and pays the workers.

Mrs Tsuro's sources of income are diverse. She cultivates tomatoes and keeps layers that is, egg producing chickens. The chickens earn her Z\$200 a week through egg sales at 55 cents each to people who buy in bulk, and at 60 cents each locally. She also sells vegetables. In the plot that is registered in her mother-in-law's name she grew over 1 000 heads of cabbage, but unfortunately they did not do well because of water irregularities. In addition, she also has a vegetable garden on the banks of a nearby river. She gets a monthly allowance averaging Z\$400 from her husband. This is not enough to meet all her needs in the home because she has a small baby. As a daughter-in-law she feels obliged to do housework for her old mother-in-law hence she pays for the latter's domestic worker.

She uses her income for a variety of purposes. She has to buy stockfeed for the chickens at Z\$72.50 a week. Her three permanent workers cost her in total Z\$200 a month. Other major expenses are maintenance fees of about \$295 a year for all her plots (almost 3 ha), and inputs. She hires draught power at \$130 per hectare. She also hires someone to take grains to the grinding mill. Usually she tries to organize things in such a way that all the grinding is done during the weekend if there is no work on the plot. She also hires someone to fetch firewood at Z\$35 a scotch cart load. This firewood lasts 2 months.

She is investing her earnings in cattle as her own personal investment; her husband and his relatives have nothing to do with it. She has bought three beasts so far at a total cost of Z\$3,415. She says that she will have to hire another young man to look after the animals as well as the chickens. This means that sooner or later Mrs Tsuro will have four workers in full-time employment with her, three of whom will be staying in her home. One of her recent investments was a scotch cart which will enable her to ferry manure to the plots. She does not as yet have all the necessary equipment (like reins) that will allow her to use her own cattle to draw it.

Her eldest child goes to a private boarding school so there is need for school fees too. Her husband pays the bulk of the fees. She sends her son some pocket money whenever the need arises. Her church has a small fund to which members contribute Z\$10 a year for such emergencies as the death or sickness of a church member. Mrs

Tsuro is also a member of a local savings club from which she obtains some money when the profits are shared but she does not consider it very significant. Her main benefit from the club is the easy procurement of inputs, just like Ambuya Jazi.

DISCUSSION

Farmers juggle with a lot of activities in an effort to optimize their returns, as seen from the cases presented above. Indeed, if one were to ask these farmers if they have any money in the bank, many would say that they do not even have enough money to enable them to farm. This does not mean that they do not manage to farm effectively. As long as a farmer has an irrigated plot, he or she can have access to other people's labour by leasing out a small part of the plot as payment. The processes of adding value to the resources available are convoluted and not immediately obvious to a visitor. Farmers engage in a number of income-generating projects with returns being invested in the plot and elsewhere. Sometimes the earnings are so meagre that farmers fall back on barter and other informal exchanges in order to make ends meet. In the end the irrigators presented in this chapter are able at least to buy their own basic foodstuffs. The strategies show farmers' ingenuity and resilience.

There is no farmer who is self-reliant in all the necessary resources. Farmers like the Moyos have draught power but they do not have irrigated plots. Those with irrigated plots may lack draught power. In procuring that resource they allow people like the Moyos access to irrigated land. The availability and use of resources thus has to do with the pressures that individuals face in the different daily, seasonal and annual tasks. Some of these pressures render individuals completely unable to farm for long periods of time, for others the problems they face are of a more temporary nature. The ways in which farmers overcome these difficulties effectively results in the redistribution of access to irrigated land. But this may not have been anticipated by planners, and, more importantly, is often not appreciated by irrigation managers. The way in which the irrigators of this chapter 'juggle' with irrigated plots often goes against the regulations laid down.

Five of the six farming households have either been affected by or have benefitted from transactions which are supposedly 'illegal'. The Moyos illegally rent land; the Khozas subdivide the inherited plot; Ambuya Nhamo has been involved in a protracted squabble over a second irrigated plot which she lost; Ambuya Jazi lost one irrigated plot to her late husband's cousin; and the way Mrs Tsuro acquired some of her plots is questionable. One plot is not in existence according to the official records of the scheme. (See Mate (1995) for more details.)

Yet the chapter shows that the juggling of resources makes the scheme tick. This appears to be totally disregarded by the strict regulations, which are inconsistently enforced. Researchers may also be blind to the strategies deployed by farmers because of how they gather their data. What many researchers may consider to be the basic

necessities and constraints in agriculture may not be viewed as such by the rural folk.

This chapter has illustrated that the shortage of cash, which researchers assume is a prerequisite for hiring labour, draught power and others, does not actually stop them from effectively engaging in irrigated agriculture. Furthermore, the absence of men has no impact on the production process, that is, tillage, spraying, tomato picking and many other tasks because even in those households where men were present, women do most of the work. What affects the production process negatively is the availability of irrigation water, irrigation technology, the availability of land and the marketability of produce. In the case studies presented above, female-headed households managed to produce on their plots in ways comparable to the plots belonging to male-headed households. On the other hand, plots in the flood section were considered to be unproductive and unfavourable to both male- and female-headed households. This is because in this section, irrigation depends on rainfall and the resultant flush floods in river beds. Without this water even men cannot make a plot productive. It can thus be said that the absence of adult males in any household does not necessarily (and entirely) account for the standard of living in that household. There is an interplay of many other issues, which Rukuni, Dikito and Mvududu in their studies do not see.

The evidence provided above also illustrates that farmers engage in a multiplicity of activities. Irrigated agriculture is part of their livelihood struggles but not necessarily their sole source of sustenance. It enhances the viability of other sources of sustenance just as these other sources of sustenance enhance irrigation viability. For farmers, irrigation is certainly not an end in itself. This juggling results in many farmers failing to keep track of their finances, not to mention calculating their profit margins. This renders the whole issue of irrigation scheme productivity rather difficult to measure, and puts serious doubts on the ways in which researchers gather data in rural areas. For many farmers productivity, as seen and defined by researchers, is not a big issue: What matters is to produce from their plots and to be able to pay their bills. Some farmers are more enterprising though. Their calculated juggling has allowed them to accumulate significant wealth. These are the likes of Mrs Tsuro, who now owns four plots, but there is little to suggest that she will not manage to increase her land portfolio in the near future.

In conclusion then, the findings from this study show that 'resources' for production are not always quantifiable or visible. Neither can they be taken for granted. As already indicated the absence of adult males alone does not lead to poor agricultural performance. Farmers are often short of many other resources, such as money, labour and land. The adaptive measures that they use to deal with irrigation are essential for a good understanding of the productivity of an irrigation scheme, and crucial for a realistic understanding of the constraints farmers face. If indeed irrigation schemes are producing below capacity then there may be a need to explore the accessibility

to markets and credit and the constraints imposed by irrigation technologies and water availability. But such explorations should take into account the daily realities of farmers, and be appreciative of their capacity and need to use their resources creatively. Studies that conclude that smallholder schemes are not productive, based on data collected through extensive surveys and judged against criteria derived from research stations, may be considered valid in a planning environment but show little understanding of the realities and say little about the constraints felt by irrigators and the opportunities they constantly seek and make use of.

NOTES

1. I am grateful to Professor Rudo Gaidzanwa and Professor Michael Bourdillon of the Department of Sociology, University of Zimbabwe, for their valuable suggestions.
2. There are rules and regulations about land use in all irrigation schemes as stated by Derude (1993: 23). People without user rights (non-registered) should not benefit from irrigation facilities. Access to existing irrigation is through application, followed by interviews and selection by the IMC and the irrigation manager, based on set criteria. Registered users are not allowed to sublease, subdivide, or trade-in plots without informing the authorities. There are regulations concerning the crops that may be grown and any other crops are seen as weeds.
3. In 1994, Z\$50 would buy a 50 kg bag of maize meal which is a major component of Zimbabwean diet. Now (in 1996) the same amount of maize meal costs Z\$175.



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