

An investigation into food plot production at irrigation schemes in central Eastern Cape

Executive summary

1. Introduction

Irrigation schemes in former Ciskei and Transkei did not bring about the expected social and economic development. This raises doubts about irrigation being a suitable option for rural development in these regions. Internationally, on the other hand, irrigated agriculture is still recommended as an appropriate way of addressing rural poverty and unemployment in areas where sustained rainfed production of crops is limited by water deficits (Lipton, 1996). Land reform is an integral part of the rural development policy of the South African Government. In a rural context, providing access to land will bring about economic development only when it is accompanied by productive use of the acquired land resources by the new holders. Providing rural households with access to small parcels of irrigated land is one of the models that could be considered by the South African land reform programme. One of the main apparent advantages of the food plot scheme model is that relatively small areas of land can be of benefit to a large number of households. This enables distribution of the capital expense incurred in the development of an irrigation scheme over a substantial group of beneficiaries. At present, little is known about the factors influencing food plot production and about the benefits food plot holding households derive from their plots. For this reason the present study was initiated.

2. Objectives of the study and the research approach

The objectives of the study were:

- * To determine the physical, infrastructural, economic, institutional and social factors of food plot production at irrigation schemes in central Eastern Cape.
- * To analyse and assess the above factors, including economic feasibility, in order to identify potential practical applications of these to irrigation scheme planning.
- * To formulate guidelines for irrigated food plot policy.

These objectives were pursued by means of an investigation consisting of two phases. During the first phase secondary sources of information were consulted with a view of identifying the range of factors that influence food plot production. This information was updated by means of field visits and interviews with key informants. The results of the first phase were used in developing the research tool for the second phase of the study, which consisted of a questionnaire survey administered to 269 plot holding households. The survey covered six irrigation schemes in central Eastern Cape where small scale crop production is being

practiced, namely the schemes at Tyefu (TIS), Shiloh (SIS), Upper Gxulu at Keiskammahoek (KIS), HACOP near Balfour (HAIS), Zanyokwe (ZIS) and Horseshoe (HOIS). The results of this survey were analyzed and this analysis forms the main body of the report.

3. Content of the report

The report consists of seven chapters. Chapter one is a brief sketch of irrigation developments in South Africa in general and the former Eastern Cape homelands in particular. Chapter two presents a summary overview of literature related to factors influencing small scale irrigation developments. The methodology used in the study is explained in chapter three and a general overview of the six irrigation schemes covered by the study is presented in chapter four. Empirical findings based on the questionnaire survey are discussed in chapter five and chapter six presents a critical assessment of irrigated food plot production as an agricultural development model. In the last chapter an attempt was made to formulate recommendations for existing schemes, future irrigation developments and for additional research work.

4. The schemes

Table 0.4.1.1 presents some important characteristics of food plot developments at the six irrigation schemes that were investigated.

Table 0.4.1.1 Some important characteristics of food plot developments at six irrigation schemes in central Eastern Cape.

Scheme	Scheme area (ha)	Area under food plots (ha)	Number of food plot holders	Mean size of food plots (ha)
TIS	644	279,9	1 487	0,1882
KIS	805	22,0	88	0,2500
SIS	455	113,8	455	0,2500
HAIS	81	81,0	81	1,0000
HOIS	50	36	18	2,0000
ZIS	412	34,8	174	0,2000
Total	2 447	567,5	2 303	

5. Main findings

Farming systems at the schemes

Overall, 90 to 95% of the food plot area at the six schemes was planted to three crops only, namely maize, potatoes and cabbage. At schemes with small plots (0,25ha or less) all three crops were prominent and often grown as part of a rotation. At schemes with large plots cabbage was usually the main crop.

Under irrigated conditions in central Eastern Cape it is possible to grow two crops per year, which would result in a land use intensity of 200%. The overall land use intensity on the food plots was about half of that. The overall mean yield of maize was 3,6 tons per ha, cabbage 30,1 tons per ha and potatoes 9,5 tons per ha. With the exception of cabbage yields, the average crop yields were well below potential.

On nearly all food plots (97%) the land was prepared by means of a tractor. Food plot production systems resembled those used in the medium to large scale commercial sector. This appeared to be caused by the relationship between food plot production and the activities and services at the central unit of the schemes. Most food plot sections of schemes were designed to be supported in terms of services by a central unit. At inception of the schemes, the central unit was mainly responsible for market oriented production using labour and management and modern technology. Access to the use of this modern technology was extended to food plot holders on the scheme. The centrally controlled, market oriented component of the scheme used an estate approach to production, and was designed to be the economic component of the scheme. The food plot section was referred to as the social component. At all five schemes where a central unit formed part of scheme design, centrally controlled estate farming has been discontinued. At one scheme some of the vacated estate land has been converted to food plots. In recent years, farmer support services provided by the parastatal managing four of the six schemes have declined, because of financial difficulties. In response to a decline in services, food plot holders modified their farming system by reducing use of external inputs. Most respondents (88%) identified weeding as the activity demanding most labour.

The study identified the main constraints in irrigated food plot production to be delays in ploughing (causing long fallow periods), theft of produce, ineffective plant pest control, water supply problems, absence of effective extension and in some cases limited access to markets.

Physical factors

At this stage of its development, food plot production generally did not appear to be constrained by physical factors. Exceptions were saline water at TIS and damage caused by insects, birds and fungi at most schemes.

Social factors

The mean household size of food plot holders was 5.45. Heads of households were mostly male (68%), old (59 years) and had spent an average of 4 years at school. Amongst plot holders the main household needs were good quality housing, livestock and access to water and electricity. The main community needs were access to electricity and water.

Work on food plots was done mostly by husband, wife or a combination of both. Children contributed labour, but their importance in agriculture on the plots was secondary. Men appeared to be relatively more involved in irrigated crop production than is reportedly the case in rainfed cropping. Generally, hiring of labour by plot holders did not contribute meaningfully to employment in the area around the scheme.

Institutional and organizational factors

Inadequate security of tenure was found to be a source of conflict at some schemes. At all schemes tenure security problems appeared to prevent the development of a market for land rentals, TIS being the main exception. As a result, there was little evidence of plot holders enlarging their land holding by renting in additional plots.

Past institutional arrangements have resulted in farmers developing a high degree of dependency on scheme services with respect to water supply and land preparation. Restructuring of the parastatals threatens delivery of these services and deterioration in the quality of these services is of great concern to farmers.

CAB was found to be the main source of formal credit, but was accessed mainly by holders of large plots (HAIS, HOIS).

Schemes services were found to play a supplementary role in marketing of produce and provision of transport. Marketing by plot holders themselves was the main channel of marketing at the schemes. At this stage, the role of scheme services in the input market is considerable, but there was evidence that this function could be taken over by other suppliers, including local shops and farmer co-operatives.

The performance of extension at schemes with small plots was found to be very poor, but extension services appeared to be more appreciated by holders of large plots.

Membership of farmers organizations was generally low (17%) and the main functions of these associations were farmer representation and access to finance.

Infrastructural factors

Local irrigation schemes tend to be well supplied with agriculture-related infrastructure. Whilst deterioration has occurred over time, most infrastructure was in reasonable working order, tractors being the main exception.

Amongst farmers, the sense of ownership and responsibility for the available irrigation infrastructure was found to be extremely low, and its maintenance was considered to be a government function.

Economic factors

Overall plot holding households were found to be poor, the weighted mean gross cash income being R5717 per annum, which for an average family size of 5,45 is below the poverty line (May 1996). Cash income derived from food plot production amounted to 11% of total household income, pensions 52%, remittances 1% and salaries, wages and other off-farm activities 35%. Households reported to spend their income on food and groceries (57%), furniture (10%), home maintenance (9%), clothing (7%) and agricultural inputs (6%).

At all schemes farmers apportioned produce obtained from the plots to sales, home consumption and gifts (see Table 0.5.1.1). Home consumption of produce was more important at schemes with small plots than at schemes with large plots, where most of the produce was marketed. Generally, there was a positive relationship between plot size and the contribution irrigated agriculture made to household income (in cash). At HOIS, where plots are 2ha in size, irrigated cropping was the main source of household cash income. It appears, therefore, that an increase in plot size is an important factor influencing the shift in production objectives of farmers from mainly subsistence to mainly market oriented production.

Table 0.5.1.1 Apportioning to sales, donations and home consumption of crops produced by plot holders at six irrigation schemes in central Eastern Cape (proportions are based on the monetary value of crops as determined by the sale price) .

Use	TIS n=156	KIS n=30	SIS n=33	H AIS n=30	HOIS n=7	ZIS n=13	ALL n=269
Sales	41%	48%	70%	83%	98%	69%	52,9%
Donations	3%	10%	2%	7%	1%	4%	4,1%
Home consumption	56%	42%	28%	10%	1%	27%	43,0%

The original food plot concept was aimed mainly at enabling farmers to produce food for their households, with maize being the main summer crop. The results showed that not all food requirements of the plot holding households were being met by crop production on the plots, but the amount of produce consumed by the plot holder households was considerable, and contributed significantly to household food security, as is shown in Table 0.5.1.2.

Table 0.5.1.2 Mean quantities of plot produce of maize, cabbage and potatoes plot holding households at six irrigation schemes in central Eastern Cape consumed at home (1995/96).

Crop	TIS n=149	KIS n=29	SIS n=33	HAIS n=28	HOIS n=7	ZIS n=13	ALL n=259
Maize (kg)	363	260	208	33	0	286	282
Cabbage (kg)	241	155	67	182	52	84	190
Potatoes (kg)	197	90	42	492	0	107	187

At this stage, the subsidy requirements of irrigated food plot schemes that are managed by parastatals are too high to warrant continued existence of these schemes. In some instances the annual subsidy exceeded the combined gross income of all farmers. Generally, the high subsidy requirements relate to political decisions, which prevented the parastatal from reducing staff working at the scheme, when the decision was made to discontinue production by central unit. Reduction of scheme staff to the numbers required to maintain an effective water supply, land preparation and advisory service to farmers would limit the subsidy requirements of the schemes. This would contribute in a major way to making food plot schemes financially more desirable. It is, however, unlikely that any of the schemes covered by the study will ever achieve full financial self-sustainability.

6. General assessment and recommendations

Conceived as the social component of irrigation scheme development, food plot sections were introduced into irrigation scheme design primarily to compensate land right holders for making available their land for the development the scheme. Yet, food plots have been one of the relatively successful aspects of irrigation scheme development in central Eastern Cape. Food plot developments offer a high degree of equity. This makes them attractive under conditions where land earmarked for irrigation is pre-owned and held under communal tenure or a modification thereof.

In schemes developed on land held in common property there is a need to strengthen the security by which food plots are held. This can be achieved by addressing limitations in the breadth, duration and assurance of the rights plot holders have over their plots. Enhancing security of tenure may lead to the development of a market for land rentals. Land transaction through rentals preserve equity and are expected to increase allocative efficiency (Thomson and Lyne, 1995).

The results of the study suggested that an increase in the size of land holdings would be accompanied by a shift in the production objectives of farmers from subsistence to market oriented production, and a concomitant increase in the proportional contribution of agriculture to household income. This shift was found to expose farmers to a number of new challenges,

of which production practices, marketing and financial management were the most important. The shift was also found to create new demands in terms of scheme organisation and supply of support services. Factors such as ready access to inputs, good quality land preparation, a reliable water supply and expert extension co-determine successful small scale irrigated cropping. Well organised farmers organisations were found to be able to handle many of these new challenges, and their development needs to be encouraged and supported.

Designed to be a trap, by failing to incorporate the progression of farmers from subsistence oriented to market oriented producers into their design, food plot schemes do offer the possibility for progression. For progression to occur at these schemes suitable institutional reforms with respect to land tenure will need to be developed and adopted by land right holders.

Whereas food plot schemes appear to be a suitable model of introducing irrigation on land held under communal tenure, it is not recommended for settlement schemes. The size of standard food plots (0,25ha or less) is just too small to make irrigated agriculture a viable livelihood option. From the study it appeared that a minimum plot size of 2ha is required in order for agriculture to become the main source of income for farming households.

On settlement schemes farmer selection is of major concern. The experience at Horseshoe Irrigation Scheme showed that a system of voluntary entry and exit, whereby participation in the scheme demands farmers to make regular financial contributions towards the cost of water supply and its maintenance, had the desired results without causing undue social conflict. The success of this self-regulating system of farmer selection appeared to be heavily reliant on the presence of experienced farmer trainers and a good overall support system at the scheme.

Generally, timely access to good quality land preparation services and to a ready supply of irrigation water were the two most important factors determining success in food plot production.

At present, water supply is subsidized at all six schemes. At the two schemes with large plots, farmers contribute meaningfully towards the cost of in-scheme water supply and its maintenance, but not to the cost of water itself. At the four schemes with standard food plots, farmers do not pay at all towards this service. Considering the economics of irrigated crop production on schemes with standard food plots, and the prevalence of poverty amongst plot holding households, it is unlikely that farmers could contribute anything more than a token fee at this stage. It is, therefore, recommended that state subsidization of water, its supply and its maintenance is continued and is considered as being a social welfare service. It may be desirable to introduce a system of payment for water. This might be in the form of water right vouchers. It is important that farmers are introduced to the idea that water is a scarce resource and needs to be paid for. Plot holders could be required to purchase water right vouchers annually for a small fee. Such a system would make water rights transferable. However, the cost of implementing the required administrative and monitoring system may prove prohibitive, adding further to the cost of irrigation water, without much hope for higher levels of recovery in future.

Timely access to good quality land preparation is a major concern in food plot production. At present the use of tractors prevails at all schemes. At some schemes, including the standard food plot scheme at Upper Gxulu, farmers were able to secure this service without outside assistance. At the other standard food plot schemes intervention (and subsidy) by the parastatal is necessary to maintain the service. Institutional reforms aimed at making the tractor service self-financing are certainly possible and should be pursued. In the mean time, it is crucial that this service is maintained at those schemes where parastatals were responsible for offering the service. Alternative systems of land preparation, involving systems based on animal draught, have not received much attention at the schemes. A feasibility study of these alternative systems based on on-farm experimentation is urgently needed.

7. References

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