ARDRI FSR-E UNIT

1996/97 A EPORT

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South African Breweries

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1. INTRODUCTION

ARDRI FSR-E is the research division of ARDRI. Major financial support for this division is received from the Department of Agriculture and Land Affairs of the Eastern Cape, which covers salaries and a major part of the running costs. Support is also received from South African Breweries.

The focus of the FSR-E team is small scale farming in the communal areas of central Eastern Cape. A core research programme dealing with land use systems in these areas has been developed and considerable progress has been made. The team is also involved in the assessment of specific sub-systems of the farming systems employed in the communal areas. These include small scale irrigation farming, small scale broiler production, tick control, use of manure as a fertilizer and cattle health. Many of these programmes are on-going. In 1997 the team will pay attention to small scale pig production and community garden initiatives. The team intends to develop a proposal for a follow-up study to the WRC project on irrigated food plot production.

2. CORE RESEARCH PROGRAMME

The Communal Land Use Systems Research Project

2.1. INTRODUCTION

During the second half of 1995 the ARDRI FSR-E team launched a new research programme aimed at developing a better understanding of land use systems in the communally managed areas of central Eastern Cape.

The programme was made possible by an initial grant from the national Department of Agriculture and subsequent funding received from the Department of Agriculture and Land Affairs of the Eastern Cape.

2.2. PARTICIPANTS

Sivanathan Yoganathan:	Crop production
Wim Van Averbeke:	Crop production
Joyce Mafu:	Animal production
Patrick Masika:	Animal production
Phumla Mei:	Socio-economics
Thembakazi Nqodi:	Socio-economics
Peter Sogings:	Rangeland ecology
Mthozami Goqwana:	Rangeland management
Mzingisi Mbuti:	Rangeland management

2.3. 1996/97 PROGRESS REPORT

2.3.1 Target areas

Three target communities were selected using agro-ecological conditions and the type of range management system practised by the target community as the main selection criteria. These target areas are:

Hlosini, a settlement that forms part of the Tyefu tribal area in the Peddie District, was selected as the very dry semi-arid research site and is characterised by little, if any, formal management of the available rangeland.

Koloni, in the Middledrift District, planned through Betterment Planning around 1955 and situated in typical semi-arid country, has maintained a high degree of control over livestock movement and range management and was included because of the superior condition of the rangeland.

Guquka location is situated in the upper subhumid parts of the Tyume Valley, Victoria east District, where the potential for crop production is high. In the absence of effective camps, continuous grazing is practised.

2.3.2 Research process

Several meetings were held with residents of the target communities. In these meetings, the objectives of the research programme were explained and residents were asked to decide for themselves on whether or not to participate. Community meetings were organised and all three communities expressed an interest in the programme. Subsequently, a number of participatory rural appraisals were conducted at the three settlements. During the appraisals, farmers explained the farming systems in use. The objectives of the different components of these farming systems and the constraints that farmers experience in realising these objectives were assessed and prioritised by means of matrix ranking. Perceptions of researchers and community members were compared and discussed in round-table talks. These informal talks were very useful in guiding the research team away from developing interventions which are not supported by local farmers.

At present, work in the three settlements is at different stages of progress. A lot has been achieved at Koloni, but work at Guquka and Hlosini is still in the early stages. Where needed, communities are brought in contact with other organisations. Such action led to a fence at Koloni being repaired with materials donated by the Department of Public Works. Land preparation constraints have been addressed through demonstrations of animal traction equipment by Bruce Joubert of the Animal Traction Centre at Fort Hare.

2.3.3 Description of crop production systems

People in rural areas can have access to two types of land for cropping, namely an arable field, usually ranging in size between 1 and 2 ha, and a home garden, which forms part of the residential site. Of the 116 farmers who participated in the Participatory Rural Appraisal (PRA) on crop production, 67 % had access to a field and 86 % had a home garden.

At Koloni and Guquka, home gardens are not very large (usually about 500 m2). At Hlosini, where the settlement pattern is dispersed, households have more or less decided for themselves on the size of their residential site, and home gardens of 0.5 ha may be found. The large gardens compensate for the total abandonment of field crop production. Field cropping was discontinued, because soils have been eroded away and there are no fences to protect field crops from being damaged by livestock.

Participants grow a narrow range of field crops and a relatively wide range of garden crops. Eight crops were identified as being grown in fields and eighteen in home gardens. Maize is the main field crop followed by beans, peas, pumpkin, potatoes and melons. In gardens, the most important crops are potatoes, cabbage, maize and onion. Crop selection is influenced by agro-ecological conditions. Potatoes, for example, feature most prominently at Guquka, the wettest site. Sorghum is mainly grown at Hlosini, where the climate is very dry.

Land preparation in field cropping is mainly by tractor (65 %) and oxen (35 %). At Koloni, where a large number of cattle are held, land preparation by means of oxen prevails. At Guquka, where cattle numbers are small, tractors are used by 95 % of participants.

The mode of land preparation in gardens is closely related to garden size. Overall, 53 % of participants make use of a tractor, but at Hlosini, where gardens are large, tractors are used by 69 %. Use of animal draught in garden soil preparation is rare and practised by 4 % of participants only. Many participants (43 %) prepare their garden soil by hand. Male participants make use of a spade or garden fork and females prefer a hand hoe.

In the fields, soil nutrients are replaced by manure applications by 88 % of participants. The use of chemical fertilizers is rare and used by 2 % only. The remaining 10% does not fertilize their fields. Manure is applied annually by 43 %, bi-annually by 25 %, every three years by 26 % and every four years by 6 % of participating farmers. Fertilizing gardens by means of manure is done by 85 % of participants, 10 % uses compost and 5 % does not use any fertilizer. No one uses chemical fertilizers in gardens. Most participants (81 %) fertilize their garden annually, 13 % bi-annually and the remaining 7 % applies fertilizers every three years or less frequent.

2.3.4 Description of livestock production systems

Livestock production systems in the rural areas are fairly complex, involving the keeping of various livestock species and breeds. The general husbandry of these animals varies from species to species. Generally, cattle are grazed day and night, but milking animals are kraaled at night. Small stock are grazed together with cattle, but are kraaled and counted every day. Cattle are usually counted at dipping sessions, which occur fortnightly in summer and monthly in winter. High mortality rates, especially of pre-weaned cattle, lead to a deficiency in replacement stock. As a result, individual owners buy replacement animals from commercial farms that are often involved in dairy production. The performance of such animals in the communal areas is yet to be determined.

Most people would like to own more stock than they have. Ownership of livestock is mainly by men, while women inherit stock from their husbands, in most cases. Men prefer owning large numbers of cattle, sheep and goats, but few pigs and chickens, which are thought to be for women.

Most people prefer one or two pigs only, because of the high costs involved in feeding pigs, as compared to cattle, sheep and goats.

The benefits from livestock are numerous. One of the main benefits is food obtained as milk or meat from both cows and small stock. However, at Guquka, the milking of small stock was perceived as an indication of poverty and generally looked down upon. Other benefits are money from the sale of livestock and their products such as sour milk, meat, wool and skins. Dung, especially fresh cow dung is a valuable by-product which is used to smear floors and walls of the home and as a source of fuel when it is dry. Kraal manure is an important by-product, which is used to replenish fertility of field and garden soils. Another benefit derived from livestock, especially cattle, is draught power. Prestige is enjoyed by the owners of livestock when numbers increase. Several authors have remarked that the most important reason for the excessive numbers of cattle is in the fact that their value is measured not in their capacity to supply milk or meat but in terms of numbers.

The importance of cattle as dowry is declining and it appears that cash has effectively replaced livestock as the form of payment. Rural areas in central Eastern Cape, through its strong linkages with urban areas, have become an informal market place for some people to generate income from livestock sales. Stock is bought from commercial farms and kept on communal rangelands. Access to rangeland is crucial for animals to gain weight or maintain condition while a suitable buyer is identified.

When asked to prioritise the reasons for keeping livestock, many respondents found it difficult to single out specific reasons.

2.3.5 Description of range management systems

Access to grazing by new residents, is not restricted in any of the three locations under investigation, especially if the new people are descendants of community members. Introduction of animals by new residents who are not descendants of community members can be settled in community meetings without much trouble. At Guquka and Hlosini, the grazing resource is generally shared with neighbouring settlements and there is little control over access by non-residents. At Koloni, however, residents make an effort to limit access by non-residents.

Range management concepts such as stocking rate, veld condition, overstocking, etc., are generally not familiar to the pastoralists in any of the settlements. From the PRA, it transpired that quantity rather than quality of forage is the most important factor in livestock management decision making. There is little understanding of the forage value of different grass species for livestock and there is a perception that, during periods of fodder shortage, even the less acceptable species will be grazed, thus acting as a fodder reserve. Some of the less acceptable species, however, are desirable for purposes other than grazing, such as Hyparrhenia hirta, which is used for thatching.

Most residents of Koloni see a system of rotational grazing and resting as necessary and claim to maintain such a system. The present status of the camp fences is relatively poor and they can no longer fully restrain animals within one camp. The camps are used almost simultaneously, with only differences in stocking intensity being evident. Since the main intention of the residents is to conserve fodder in at least one of the camps for periods of scarcity, the current management is

basically rotational resting, with the remaining camps being used simultaneously and continuously. This practice is not systematic. Individual livestock owners take their own decisions or make proposals to the community as regards where to graze their animals. However, given the laissez faire approach of surrounding communities, Koloni has many management challenges.

At Guquka and Hlosini continuous grazing is practised. Livestock owners at Guquka graze their animals in the mountains during mid-summer droughts. In the mountains, animals are allowed to graze freely without interventions such as night kraaling. Animals are checked occasionally, usually once a week. Mountain grazing conserves forage on the lower slopes for the cold winter months, when animals cannot access the mountains. This form of management is presently hampered by frequent incidents of stock theft.

2.3.6 Description of fodder flow management

During times of fodder shortage, individual farmers search for alternative resources, such as grasses growing on the roadside, purchased fodder, as well as vegetation patches that still look good. In all the settlements, stover left in the lands after harvesting crops is seen as a valuable source of fodder during the dry winter months.

Guquka residents depend on stover left in the arable lands after harvesting the crop, because of the limited extent of rangelands and the inaccessibility of the mountains in winter. Decisions regarding access by animals to arable lands are taken jointly by the community. No one is allowed to contravene the rules. The Guquka residential area is positioned between two blocks of arable land, which offer the settlement two separate sources of fodder for winter. Apart from access to arable lands by livestock, decisions on where to graze animals at any given time remain the responsibility of individual livestock owners.

At Hlosini, individuals manage their animals and decide on where to graze them by herding animals to patches where grazing is perceived as being superior. In this settlement, individuals still have the opportunity to put their animals in an area that they perceive as the best and most convenient. Fodder reserves are considered less critical since there is access to grazing land on neighbouring state farms

2.3.7 Perceived constraints in agriculture

2.3.7.1 Crop production

The major constraints in field crop production are land preparation (28 % of respondents), lack of labour (25 %), drought (19 %), security against theft and damage by animals (18 %) and pests (13 %). In garden cropping the major constraints are crop pests (68 %) and drought (16 %). As a result, more than half the arable land is left fallow.

2.3.7.2 Livestock and range management

Community interventions in fodder flow are highly dependent on the presence and condition of fences separating resources. Problems with fencing are considered as more important than the condition of the resource. Degradation is not seen in botanical species composition, but in loss of soil through erosion and is only taken seriously when the condition of the animals deteriorates

severely.

At Koloni, the condition of the perimeter fence determines the effectiveness of the community in preventing animals from neighbouring settlements from exploiting their grazing resources. The preferred rotational grazing system within the settlement can be sustained only if fences keep animals in a camp. Effective fences also reduce labour, since herding and night kraaling are no longer critical. At Guquka and Hlosini, however, emphasis is placed more on the condition of fences around arable lands and gardens.

Other perceived constraints in livestock production are:

- diseases like redwater and gallsickness
- drought and lack of water
- limited grazing land
- stock theft
- lack of cattle grids
- lack of breeding stock
- lack of money to purchase new stock (as a result of high unemployment)

One possible cause of some of the perceived constraints in livestock production in the communal areas is that the number of animals on the rangelands is too high, leading to problems typically associated with high population densities. Apart from the PRA sessions, quantitative data were collected for Koloni and Guquka to determine whether or not the rangelands were overstocked.

Koloni

Three vegetation units were identified in the four camps at Koloni: Acacia woodland, grassland and mixed bush. The woody layer of the Acacia woodland ranges from open, almost pure, Acacia karroo on the ridges, to denser Acacia karroo, mixed with some other woody species, in the valleys. The mixed bush is a broad-leaf dominated, semi-deciduous woodland.

Recommended stocking rate for grazers was estimated by assessing range condition in February 1996 according to Trollope et al. (1992). Botanical composition and standing herbaceous biomass were measured by dry weight ranking ('t Mannetjie & Haydock, 1963) in February and August 1996. The condition of the grazing resource at Koloni is relatively good and scored 78 % on average, ranging from 32 to 100 %. Average herbaceous biomass ranged from 1300 kg/ha in summer to 1035 kg/ha in winter. The basal cover of the herbaceous vegetation is generally good, with limited soil erosion.

The recommended stocking rate at Koloni is 4 ha/AU, according to commercial livestock production objectives. The recommended number of stock for the area of 650 ha is therefore 160 AU. There are approximately 40 livestock owners at Koloni and about 410 cattle (410 AU), 810 sheep (130 AU) and 320 goats (55 AU). Rangeland at Koloni is therefore 3.7 times overstocked, compared to commercial recommendations.

Guquka

Apart from the forests, two vegetation units were identified: grassland with Karoo shrubs on the bottom lands and lower slopes, and grassland on the middle and upper slopes at higher altitude. Although the grazing area is divided into two camps, the area is not managed according to the camps and they were ignored when surveying the vegetation.

During September 1996, range condition, botanical composition and biomass were determined at Guquka using the same techniques applied at Koloni. The condition of the grazing resource in Guquka is relatively poor and scored 51 % on average, ranging from 45 to 60 %. The grazing capacity, calculated Average biomass was 2285 kg/ha, but much of this (up to 20% on average) is contributed by the Karoo shrub, *Chrysocoma tenuifolia*. The basal cover of the herbaceous vegetation is generally good, with isolated evidence of soil erosion.

At Guquka, the recommended stocking rate is 6 ha/AU and, based on a grazing area of approximately 400 ha, the recommended number of stock is 65 AU. The last figure is difficult to accurately ascertain because of the lack of a clearly defined grazing area, and is based on what the livestock owners indicated to be the main grazing area. There are approximately 30 livestock owners in Guquka and about 230 cattle (230 AU), 400 sheep (65 AU) and 120 goats (20 AU). Based on the assumed grazing area of 400 ha, rangeland at Guquka is 4.9 times overstocked, compared to commercial recommendations. The level of overstocking, however, may be reduced by as much as half if livestock range substantially further than the indicated area.

2.3.8 Future research

2.3.8.1 Crops

The results of the PRA on crop and garden production suggest that research into crop production in central Eastern Cape should focus initially on land preparation, management of on-farm sources of plant nutrients (mainly manure), maize management practices with an emphasis on weed and pest control and water conservation practices.

With regard to garden production it appears that research work should address plant pest control problems and water supply. The need for cheap, preferably home-made but effective crop protectants or pest repellents is acute. On-station and on-farm testing of disease resistant varieties is another major research need. The development and testing of appropriate garden irrigation systems also requires research attention.

2.3.8.2 Livestock and range management

Research on livestock needs to consider systems of disease control and stock replacement. Both problems require research into the suitability of different livestock breeds for communal rangelands and stock management systems aimed at reducing disease and improving reproduction. The treatment of disease requires research as well. Hand in hand with livestock research, is research into appropriate range management systems that accommodate the livestock management systems.

Future research over the longer term should address the relationships between actual livestock numbers, desired livestock numbers and the number recommended according to commercial

production systems. Where imbalances are found, reasons for their occurrence should be sought and the implications for future livestock production should be considered. Since one of the main issues to emerge is the desire to own more livestock, there is scope for establishing a long-term, participatory experiment that serves as a demonstration of why there is a limit on stock numbers in a certain area. Perceived and real constraints may be thus prioritised or reduced.

The research conducted so far highlights difficulties in obtaining relatively basic, yet essential data such as grazing area and numbers of livestock and owners. Without a simple figure for grazing area, it is very difficult to assess whether or not an area is overstocked. One way to estimate the extent of the grazing area could be to apply techniques used for determining the home ranges of wild animals. Radio-tracking of animals with surgically implanted transmitters is one such technique. Such data will also reveal patterns of resource utilization by livestock and give insights into livestock survival strategies.

Short to medium term research aimed at alleviating more immediate problems might focus on using arable lands for reserve fodder production. Growing fodder crops in support of livestock production has not been adopted by local communal farming communities. Use of improved or planted pastures, preferably incorporating legume species, could address protein deficient diets of animals, especially in winter. Resulting improved animal condition would be accompanied by benefits such as higher milk yields and healthier animals. Cut and carry systems of fodder production, whereby animals are fed in the kraal, would result in enhanced net flow of nutrients from rangeland to kraal. This, in turn, would increase the amount of nutrients available for use in crop production. Including leguminous species in the fodder is expected to improve the quality of manure by increasing its nitrogen content.

2.3.8.3 Mapping of natural resources: A planning and educational tool

With the assistance of the GIS staff and equipment in the Department of Land Surveying maps depicting the natural resources of Koloni and Guquka were compiled. These maps will be used to assist local communities in decision making and to introduce the local youth to mapped information about their own environment by means of class room demonstration. The aim of the class room demonstrations is to encourage local youth to develop an interest in their natural resource and the way it is being used by their parents.

3. OTHER RESEARCH PROGRAMMES

3.1 AN INVESTIGATION INTO FOOD PLOT PRODUCTION AT IRRIGATION SCHEMES IN CENTRAL EASTERN CAPE.

3.1.1 Introduction

This project consisted of a co-operative programme between ARDRI and staff of the Faculty of Agriculture, was funded by the Water Research Commission and was aimed at documenting prevailing food plot production systems, providing qualitative and quantitative information about benefits participants derive from these systems and identifying factors which contribute to success in the food plot model of irrigation scheme development. Two types of small scale irrigation developments were studied, namely standard food plot schemes, where participants have access to plots of 0,16-0,25ha in size (Tyefu, Shiloh, Zanyokwe and Upper Gxulu (Keiskammahoek) and

schemes were participants are involved in small scale commercially oriented production and have access to 1-2ha of irrigated land (Horseshoe and Hertzog Agricultural Co-operative).

3.1.2 Participants

Professor Chris O. Igodan:	Dean of Faculty of Agriculture
Dr Abernet Belete:	Department of Agricultural Economics
Mr C.K. M'Marete:	Department of Agronomy
Dr Dennis Eaton:	Department of
Mr J.L.H. Williams:	Agricultural Extension
Mr M. Coleman:	and Rural Development
Dr Wim Van Averbeke:	ARDRI FSR-E
Miss Thembakazi Y. Nqodi:	WRC and appointed to ARDRI FSR-E
Miss Joyce, V. Mafu:	WRC and appointed to ARDRI FSR-E
Mr Sivanathan Yoganathan:	ARDRI FSR-E
Miss Phumla Mei:	ARDRI FSR-E
Mr Sebenzile Tuwana	WRC project appointment
Miss Fundiswa Blie	WRC project appointment

3.1.3 Progress

At the end of February 1997, the draft final report was submitted to the Water Research Committee for approval. The final steering committee meeting was held on the 13th of March 1997. The final report is due by the end of July 1997.

3.1.4 Main findings

Irrigation schemes are referred to by the following acronyms:

KIS:	Upper Gxulu (Keiskammahoek Irrigation Scheme)
TIS:	Tyefu Irrigation Scheme
SIS:	Shiloh Irrigation Scheme
ZIS:	Zanyokwe Irrigation Scheme
HAIS:	HACOP Irrigation Scheme
HOIS:	Horseshoe Irrigation Scheme

- Heads of plot holding households were generally old, 59 years being the mean age over all schemes. Mean *de facto* size of households was 5,5. Most work on the plots was done by husband or wife or a combination of both. There was more male involvement in irrigated crop production than has been found to be the case in rainfed agriculture in the region. This was especially so at schemes with large plots. Small scale irrigated crop production was found to be mainly a family affair and hiring of labour by farmers was rare, especially at schemes with small plots. Hiring of labour did not appear to contribute meaningfully to the economy of the region.

- Irrespective of the size of the plots, small scale irrigation farmers direct production partly at supplying their household with food and partly at producing crops that can be marketed thus generating cash income. A trend for the importance of supplying the farming household with food to be reduced as plot size increases was evident .

- All schemes were mainly involved in the production of maize, potatoes and cabbage. Maize, being essentially grown for home consumption, was the most important crop at schemes with standard food plots. At all schemes cabbage was grown mainly as a cash crop whereas potatoes performed the role of a dual purpose crop, being grown for home consumption and for the market.

- The mean total amount of money derived from sales exceeded mean total expenditure on total variable costs at three of the four standard food plot schemes resulting in small mean net cash returns of R415 at KIS, R383 at SIS and R803 at ZIS and a small net loss of R122 at TIS. As could be expected mean net cash profits at schemes with large plots were higher than those with standard food plots (R2411 at HAIS and R10620 at HOIS).

- Small scale irrigation is highly dependent on State subsidy of water supply services and on the availability of affordable mechanised land preparation. The importance of access to information with regard to production practices was expressed at schemes where plots are large and most produce is sold. Generally, farmers assessed the services of extension staff as leaving a lot to be desired, especially at the schemes with standard food plots.

- At schemes with small plots most marketing is done locally and in most cases farmers did not appear to have much problems with selling of produce. At schemes with large plots marketing of produce becomes a crucial factor. As the distance to the markets increases, timely availability of transport is a constraint and cost of transport reduces profits.

- Benefit/Cost ratios at farm level ranged from 2,0 to 5,5 indicating that small scale farmer derive benefits from their involvement in small scale irrigated crop production. At scheme or sub-scheme level benefit/cost ratio (net income derived by farmers versus net state funding) ranged between 0,5 and 3,2, being less than 1 at two schemes and 1-1,3 at another two schemes. The main reason for the low benefit/cost ratio at scheme level was found to be the high cost of labour employed by the scheme, much of which had little or no influence on food plot production. When schemes are too small, as is the case at HOIS, it is difficult to provide the necessary farmer support services whilst achieving an acceptable benefit/cost ratio at Scheme level.

- Current tenure arrangements appear to prevent a market for land sales and rentals to emerge, which in turn prevents keen farmers to enlarge their land holdings. Most schemes were established on either tribal or State owned land. The large majority of plot holders favour title deed to their plots.

3.1.5 Some recommendations based on the study

1. A new structure of farmer support services needs to be developed at the schemes. This structure needs to address the essential needs of farming at these schemes, which include water supply, land preparation and access to information, whilst increasing benefit/cost ratio of the schemes by several units by cutting costs.

2. Current land tenure systems, which are perceived by land right holders as insecure, need to be transformed so as to provide plot holders with maximum possible tenure security to their plot. Such transformation is expected to open up a market for rentals and sales at the schemes, providing a suitable vehicle for farmers, who wish to expand their holding by acquiring more land.

3. The level of dependency by farmers on the State with respect to water supply, which at present is extremely high at all schemes with standard food plots, needs to be reduced by:

* Transferring responsibility of maintaining in-field irrigation equipment to farmers;

* Involving farmers in water management decisions at scheme or section level, whereby the supplier of water supply services becomes responsible to the group of end-users with a view of improving the quality of this service.

* Making farmers realize there is a cost attached to supplying water by charging a token water supply fee.

* Encouraging farmers where possible to make use of more than one sprinkler, which would reduce intervals between applications, reduce the frequency of changing sprinklers and therefore also labour demand of irrigation.

4. A major research effort is needed to develop alternative cropping systems and production technologies and test these under on-farm conditions. Generally this research should be aimed at increasing profitability of small scale commercially oriented irrigated agriculture. Possible avenues for improvement are the use of animal traction, use of on-farm resources, alternative marketing strategies and alternative crops.

5. The entire support system meant to provide services to small farmers should be retrained to rotate their present thinking towards economic viability of small farmers.

3.2 ASSESSMENT OF SMALL SCALE BROILER PRODUCTION IN CENTRAL EASTERN CAPE

3.2.1 Introduction

In South Africa small scale broiler production is being advocated by non-governmental and state agents as a way in which poor households can address poverty and associated problems. Most extension efforts focus on making available information on infrastructural requirements and production practices to potential participants in this activity. Little attention is given to issues of access to inputs, marketing of produce and the impact of this activity on household income and quality of life of participants. The objective of the present study is to conduct a comprehensive investigation of small scale broiler production in rural and peri-urban environments in central Eastern Cape, with a view to formulating recommendations that may assist existing and potential small scale broiler producers in making appropriate business decisions.

The project followed the research approach adopted by the ARDRI FSR-E team in its investigations of small scale farmer activities. This approach involves three main phases, namely:

a) A diagnostic phase aimed at developing general knowledge of how a particular agricultural activity is being conducted by small scale farmers and what the main constraints are. The diagnostic phase is conducted in two sub-phases, namely an initial phase involving farmer-friendly Rapid Rural Appraisal (RRA) techniques, and a second phase involving a questionnaire survey, whereby the results of the RRA guide questionnaire content.

b) A monitoring phase where by means of a case study approach the enterprises of selected participants are monitored closely by researchers. Farmer and researcher cooperage in keeping records of expenditure, inputs, growth and development of plants or animals being produced and the returns on labour and investment. The monitoring phase of the project enables researchers to obtain accurate qualitative and quantitative data about the enterprise and its performance, to identify the impact of constraints on the enterprise and to document the range of strategies adopted by participants to address these constraints.

c) An intervention phase during which one or more potentially suitable interventions, which farmers perceive as being well adapted to their particular conditions, are tried out by farmers and their impact is evaluated.

3.2.2 Participants

Awonke Sonandi:	Previously ARDRI FSR-E, currently lecturer at Fort Cox Agric. College
Patrick Masika:	Previously ARDRI FSR-E, currently lecturer at University of Fort Hare
Joyce Mafu:	ARDRI FSR-E
Wim Van Averbeke:	ARDRI FSR-E

3.2.3 Progress report 1996/97

Considerable progress was made on the diagnostic phase and the monitoring phase was started and some results are available.

3.2.4 Diagnostic phase: main findings

3.2.4.1 Infrastructure

Most broiler producers (68%) use pre-existing buildings in which to rear their chickens. These consist of spare rooms inside the house or existing out-buildings. A minority (32%) constructed a shelter specifically for use as a broiler production unit. In most cases these shelters have walls constructed with dried mud or concrete with wire-net windows. In all cases chickens live on the floor of the shelters where a deep litter system is being maintained. Paraffin heaters are used to keep the shelters warm.

3.2.4.2 Size of the batches and role of the enterprise in the array of livelihood strategies of growers

The large majority of small scale broiler producers keep batches of 20 to 300 birds at a time. They usually sell the entire batch before purchasing a new batch of chicks. Consecutive batches are often separated by long periods of non-activity. Most producers pay for chicks and inputs using off-farm income. Money generated by the broiler enterprise is often used to address urgent household needs. Continuous re-investment of income generated by the broiler enterprise, as would be expected in an on-going concern, is rare. This explains the long periods of non-activity. It therefore appears that much of small scale broiler production is a form of investing spare money, performing a function similar as that of cattle and other livestock in the region.

3.2.4.3 Sources of chicks

Without exception broiler producers purchase chicks from commercial outlets. Most producers who purchase relatively large numbers of chicks (more than 75 at a time) prefer their chicks to be between the ages of one and three days, which are sold at prices ranging between R1,20 and R2,80 per bird. They state high profit margins as the main reason for buying young birds. Producers who keep small batches (less than 75 birds at a time) prefer older birds ranging in age between one week and three weeks old, mainly because they lack the experience, patience or time to care for very young chicks, and because young chicks are susceptible to many diseases presenting a high risk.

3.2.4.4 Feeding regimes

A minority of keepers (18%) maintains an *ad libitum* feeding system, which allows for the broilers to eat as much as they like. Chicks are fed a high protein (21 - 22% crude protein) broiler starter from day old to the age of 2 to 3 weeks, thereafter a medium protein (19 - 20% crude protein) broiler finisher until the birds reach an age of 5 weeks, and finally a low protein (16-18% crude protein) broiler post finisher is supplied until the chickens are sold. This feeding system mirrors that being maintained by large scale commercial producers, because it results in high rates of growth and efficient use of feed. The majority of producers have adopted modifications of this feeding system in an attempt to cut costs. A large number of growers limit the intake of commercial feed and supplement the diet with crushed maize, which they grow themselves or buy from stores. Others leave out the medium protein feed and switch immediately to low protein post finisher once the birds have reached the age of 2 to 3 weeks. Low protein feed is the cheapest of the three broiler feed mixtures.

3.2.4.5 Health management

Maintaining health and avoiding mortalities is an important aspect of broiler production. Mortality rates in small scale broiler projects were found to range between 0 - 67% with a mean of 9.9%. In large scale commercial production a mortality rate of 2-5% is considered an industrial norm. The causes of mortality amongst chicks and chickens in small scale broiler units are many, but in most cases producers are not able to identify the cause of death. A major cause of mortalities is New Castle disease. In the summer of 1994, 27% of the projects experienced an epidemic of this disease, which caused mortalities ranging from 50 to 67%. Repeated cases of the epidemic resulted in the collapse of some poultry projects. Gallsickness", a tick-borne disease common amongst large and small stock, but which does not affect chickens, was identified by keepers as another important cause of ill-health and death amongst their birds. Keepers state that an enlarged gallbladder is used to identify this disease in chickens during a post mortem. They attribute gallsickness to the consumption of concentrated feeds which cause excessive production of bile.

Only 9% of poultry keepers resort to conventional medicines to address health problems of their birds. The others do not administer conventional medicines to their chickens, but use such materials as amprol, potassium permanganate, epson salts, teremycin, american aloe and other herbal remedies to cure ailments such as gallsickness, bronchitis and weak legs. Very few keepers have no knowledge of the vaccines that are available on the market.

3.2.4.6 Marketing of broilers

The majority of the poultry keepers (98%) sell their chickens live to members of their community or to people residing in nearby villages. The cost of hiring a vehicle to transport chickens to a point of sale ranges from R20.00 to R40.00. Pension pay-out points are often targeted by small scale producers when marketing birds. Most producers (93%) market chickens when they have reached the age of 6 weeks. A small number of keepers (7%) start selling chickens at 5 weeks of age. To get an entire batch sold at the age of 6 weeks is not easy for most keepers. As a result the sale of part of the batch is often delayed. In many cases growers have to keep their birds until the next pay day or pension pay-out which may take up to two months. That means that chickens have to be fed for an additional 4 to 9 weeks.

Prices of chickens range between R15.00 and R26.00, and 88% of the keepers do not consider bodyweight when setting a price. Many keepers (52%) bring into account the amount of feed consumed by the birds, while 43% said they match prices to those of other poultry keepers active in the local area. A small number of keepers stated that they base the pricing on the cost of all production inputs. However not a single keeper was in possession of an accurate record of such inputs.

In order to get their chickens sold many keepers resort to selling on credit. This is not preferred practice as an average of 40% of on-credit buyers do not pay in time or default completely. Keepers who were reluctant to sell on credit and keep their unsold birds and continue feeding them. Some appeared unaware of the effect of mounting input costs on profit margins. Others were found to add to the price of the birds as they got older, but often they found that they had priced themselves out of the market.

3.2.5 Diagnostic phase: Main constraints in small scale broiler production in Central Eastern Cape

3.2.5.1 Access to good quality chicks

Regionally, suppliers of good quality chicks are located near large urban centres such as King William's Town and East London. The means of transport available to most rural people to and from those centres, i.e. taxis or buses, are not suited for transport of chicks and often cause mortalities amongst chicks. In one instance, a poultry keepers lost 72% of her chicks due to suffocation and heat stress in the boot of a taxi vehicle. There are farmer support services which assist farmers in obtaining chicks, such as ACAT (Africa Co-operative Action Trust), Vukani (Save and Serve) and government extension. However, producers complain that when ordering through these agencies they are subjected to long waiting periods. As a result chicks may arrive at a time when the keeper is no longer ready for production, because the money for inputs has been spent elsewhere.

3.2.5.2 Health management

The study indicated that the knowledge amongst producers of poultry diseases and health management in poultry is limited. Very few producers are aware of the use of vaccines in the prevention of common poultry diseases or have knowledge of commercially available remedies.

3.2.5.3 Marketing and business management

Generally, small scale broiler producers fail to keep records of inputs and costs, and when such records are kept they are seldomly used in the assessment of enterprise performance. Because inputs are most often paid for by off-farm sources of income, gross income is most often equated to profit. There is a need for broiler producers to be trained in the keeping of records and their use in pricing and the assessment of profitability of the enterprise.

Marketing is a major constraint, because most producers access their immediate surrounding only. This results in the selling of excess stock on credit and repayment levels tend to be low. Alternative marketing strategies need to be developed.

3.2.6 Monitoring phase: Results of the first monitored on-farm experiment

3.2.6.1 Introduction

In October 1996 the ARDRI FSR-E team was approached by two women from Msobomvu (Victoria East District) with a request for assistance in the development of a small broiler unit at their homesteads. This offered the FSR-E team an excellent opportunity to conduct a case study.

The objective of the case study would be to obtain accurate qualitative and quantitative data about the small scale broiler enterprises and their performance, to identify the impact of constraints on the enterprise and to document the range of strategies adopted by participants to address these constraints.

3.2.6.2 Profile of the participants

Participant B
Mrs Nokuphumla Dyantyisi, who lives in Msobomvu, is an unemployed divorcee of 44 years old. She has three children (1 son and 2 daughters) and she receives a welfare grant of R405 per month towards raising her children, which is paid bi-monthly. This is her only source of income. Her residence consist of two dwellings, both constructed from dried mud wood and corrugated iron. Mrs Dyantyisi had never kept broiler chickens before.

Participant A
Mrs Emily Jacobs stays in Msobomvu and is a 61 year old married woman. Her husband is a retired driver aged 64 years. Their household consists of 1 son who is unemployed, 2 grandsons and 2 granddaughters, all of whom are attending school. The household receives an old age pension of R405 per month paid bi-monthly and R300 per month from the husband's retirement fund. Mrs Jacobs had some experience with keeping broiler chickens when working on a farm.

3.2.6.3 Reaching an agreement on participation

The two women requested assistance from ARDRI in setting up a small scale poultry production unit. ARDRI was interested in monitoring a small scale poultry enterprise. An agreement was reached between the two participants and ARDRI with a view to co-operation. ARDRI volunteered to purchase the chicks and inputs. The participants were responsible for preparing proper housing for the chickens by making the necessary alterations to out-buildings assigned to the project, commit themselves to look after the birds to the best of their ability and to keep accurate records of feed utilisation, health problems and sales and allow the ARDRI team to monitor animal growth on a regular basis.

3.2.6.4 Results of the monitoring process

3.2.6.4.1 Description of experimental conditions Day-old chicks were delivered to the two participants on the 5th of November 1996. Each participant was supplied with 50 Ross broiler chicks. In each batch of 50 chicks 20 were marked and their mass gains were monitored bi-weekly by researchers throughout the six-week period of the project. Where possible recommended practices were applied to ensure optimum growing conditions. At delivery the chicks were given a stress-relieving multi-vitamin preparation which was administered by adding it to the drinking water. The chicks were given feed twice a day (mornings and evenings) and the amount given on each day was recorded. Feeding included four bags (3 weeks) of high protein starter, three bags (1 week) of medium protein grower mash and four bags (2 weeks) of low protein finisher. It was the intention that feed and water would be provided *ad libitum*. The mass of the chicks was determined every Monday and Thursday, usually between 9h00 and 12h00, using a mechanical scale.

The chicks were vaccinated to protect them from diseases detrimental to broiler health. The vaccination programme is shown in Table 3.2.1.

Table 3.2.1. Vaccination programme for broiler chicks at Msobomvu.

Day	Disease	Method of administration
10	Newcastle Disease (NCD)	Drinking water
14	Gumboro	Drinking water
17	Infectious bronchitis	Drinking water
21	Gumboro	Drinking water
24	NCD	Drinking water

Thermohygrographs and a swirling hygrometer were used in determining temperature and relative humidity within the houses.

Paraffin glass lamps were used as a source of both heat and light. The amount and cost of paraffin used was recorded for each day.

3.2.6.4.2 The production process From the first day to the end of the project the overall mortality was 18%. Eight chicks of participant A and 10 of participant B died. Most of these deaths were due to chronic respiratory disease (CRD). Chicks suffering from this disease seem slightly listless and have rattling noise, sneezing and efforts to cough. Outbreaks are said to occur between 4 and 6 weeks of age, and the disease is more detrimental to young than to mature birds.

The chicks of participant A were very well cared for and received adequate feed. As a result, they grew faster than those of participant B. The mass of chicks of participant A increased from a mean of 43g on day 1 to a mean of 1 750g at the end of week 5. In case of participant B the chicks showed a increase in mass from 44g on day 1 to 1 526g at the end of week 5. The main reason for the difference in mass gains was the tendency of participant B to save on feed, by providing the chicks with less feed than they could eat. There were times when the feeding troughs were almost empty. When the differential rate of mass gain became apparent, the issue was discussed with participant B and thereafter she also adopted the *ad libitum* feeding regime. A second problem was the shallowness of the drinking troughs of participant B, who used enamel plates for this purpose. This caused the bedding (wood shavings) to be wet and appeared to result in the chicks not eating properly.

3.2.6.4.3 Production costs Production costs incurred by the two participants are presented in Table 3.2.2. On average chickens consumed 5,70 kg of feed. The cost of feeding and heating added to 80% of the total cost of production.

Table 3.2.2. Input cost incurred by two small scale poultry producers at Msobomvu

Cost item	Participant A	Participant B	Mean	Contribution to production cost
Chicks (50)	R97,00	R97,00	R97,00	12,1%
Feed	R517,52	R481,52	R499,52	62,4%
Paraffin	R151,25	R126,75	R139,00	17,4%
Vaccines	R26,32	R26,32	R26,32	3,3%
Other medication	R56,00	-	R28,00	3,5%
Vitamins	R10,06	R10,06	R10,06	0,1%
Total	R853,15	R736,65	R799,90	100%

3.2.6.4.4 Sales and income Participant B commenced marketing her chickens at a very early stage when her chickens were only 5 weeks old and had not yet reached a mass of 2 kg (the heaviest was 1 753g). Participant A delayed marketing until the chickens had reached the age of 6 weeks when most of her chickens were weighing at 2kg or more. At 5 weeks of age the heaviest chicken of participant A had reached a mass of 2 267g and the smallest weighed 1 305g.

Most chickens were sold on credit to old-age pensioners and young people who had come home for the Christmas holidays. Initially participant B charged R28 for a chicken, but she reduced her price to R25 when people complained about the price being too high. According to her records the total amount of money she was expecting from the sales of her 40 chickens was R1255. Even if all chickens would have been sold at R28 per bird the expected income would have amounted to R1120 only. She was unable to explain the anomaly.

Participant A claimed to have sold all her chickens at R25,00 per bird and expected a total income of R1103 from the sale of 42 birds, exceeding the expected total of R1050 by R53, again without an explanation for the apparent anomaly.

Both participants kept records of the names of buyers and the amounts of money they owed, enabling active claiming of payment on days from their clients when they were expected to receive money such as pension payout or wage income.

Very little money was received at the time of sale. By the time all chickens were sold participant A had received R25 in cash and participant B R50. By early March participant A had received R492 and was owed R611. Participant B had received R787 and had an amount of R468,50 due to her. This means that participant B was just able to recover her production costs two months after the sales had been completed, whilst participant A still needed to receive R356 before she could recover her production costs.

3.2.6.5 Subsequent developments

Both participants used part of their income to purchase small numbers of 4 to 5 week old chickens from a producer in Hogsback at R12 per bird, keeping and feeding these birds in the broiler unit for a period of 2 to 3 days during which clients were identified, whereafter they were sold on credit for R25 per bird.

3.3 MANURE AND ITS ROLE AND POTENTIAL AS A FERTILIZER IN SMALL SCALE CROP PRODUCTION IN CENTRAL EASTERN CAPE.

3.3.1. Participants

Sivanathan Yoganathan:
Wim Van Averbeke:

3.3.2 Objectives

To determine the current and potential role of kraal manure as a fertilizer in small scale crop production in the communal areas of central Eastern Cape.

3.3.3 Summary of findings

An investigation into manuring practices by black small scale farmers in six villages in the Border and Ciskei regions of the Eastern Cape showed that 75% of the 80 responding farmers used separate kraals for each type of animal held and that 53% of the responding kraal owners used kraal manure as a fertilizer in field crop production. Manure application cycles differ widely, with 35% applying manure annually, 28% bi-annually, 19% once in 3 to 5 years and 19% using an application cycle longer than 5 years. Two thirds of the respondents transport manure from kraal to field by means of a wheel barrow. Application rates were found to vary considerably. When converted to amounts supplied per annum, the application rate of manure ranged between 0,13 and 98,8 tons ha^{-1}. Given the current application rates and cycles used, the amount of available manure appears not to be a limiting factor, the mean amount of manure stored in kraals being at least twice the amount used per application in five of the six villages.

On average the dry organic matter in kraal manure was found to contain 3,8% nitrogen, 1,1% phosphorus and 4,8% potassium. The average nutrient reserve stored in the kraals at the time of sampling was equivalent to 245 kg nitrogen, 71 kg phosphorus and 312 kg potassium. Agro-ecological conditions and type of animal held in the kraal did not have a significant effect on the nutrient content of the manure stored in the kraal.

3.3.4 Selected analytical results

A regression equation was developed to determine the organic matter content of kraal manure from the weight loss of manure samples during ashing at 500°C. The potassium, calcium, magnesium and sodium content of the samples were determined by ashing $\pm$ 5g of dry manure samples at 500°C for 2hrs and thrice repeated dissolving and evaporation of the ash of manure samples in 50% HCl. The filtrates were analysed for potassium and sodium by means of flame

photometry and for calcium and magnesium by atomic absorption spectrophotometry. The nitrogen and phosphorus contents were determined colorimetrically after digesting manure samples equivalent to 0,5g of organic matter in sulphuric acid and hydrogen peroxide at 420^0C for one hour using potassium sulphate, titanium oxide and anhydrous copper sulphate as a catalyst. The results are shown in Table 3.3.1.

Table 3.3.1 Mean nutrient content of kraal manure samples collected from six villages in Central Eastern Cape, whereby nutrient contents are expressed as a percentage of dry organic matter content of the manure samples.

Village	N (%)	P (%)	K (%)	Ca (%)	Mg (%)	Na (%)
Gxulu	3.98	1.02	4.16	5.87	2.79	0.31
Annshaw	3.84	1.01	5.10	6.52	2.85	0.94
Kubusi	3.70	1.02	4.48	3.59	1.51	0.38
Ngqele	3.75	1.03	4.49	3.80	1.71	0.31
Zalaze	3.45	1.55	6.67	13.98	5.81	2.95
Zibi	4.07	1.47	5.20	11.00	6.13	0.55

A second series of analysis of kraal manure was conducted at Coventry using Ion Coupled Plasma Spectrophotometry. Ten samples were analysed enabling validation of the results obtained in the first analysis series. The micro nutrient content was also determined. The results are presented in Table 3.3.2.

Table 3.3.2. Macro and micro nutrient content of the dry organic matter fraction of ten selected manures sampled in Central Eastern Cape, whereby nutrient content is expressed as a mass percentage of dry organic matter content.

Source		N	P	K	Ca	Mg	Fe	Cu	Zn	B	S	Al	Na
Gxulu	T* C**	3.64	0.56	2.47	2.27	0.97	1.47	0.004	0.016	0.005	0.48	1.57	0.17
	B C	2.44	0.40	1.99	1.51	0.65	2.29	0.004	0.013	0.006	0.44	1.76	0.16
	T S	3.49	0.51	5.35	1.90	0.93	0.57	0.003	0.015	0.005	0.66	0.67	0.19
	B S	4.36	0.87	6.49	2.44	1.73	1.84	0.007	0.026	0.008	1.06	1.19	0.28
	T G	3.33	0.60	1.12	2.21	0.60	3.95	0.007	0.026	0.009	0.30	3.15	0.15
	B G	3.71	0.97	1.52	4.46	1.18	5.08	0.011	0.044	0.014	0.65	3.75	0.23
Zala-ze	T C	4.51	0.92	7.35	7.84	2.52	0.92	0.005	0.022	0.018	0.96	1.02	2.04
	B C	3.46	1.04	7.55	5.96	2.05	0.99	0.004	0.025	0.015	1.01	1.02	2.58
Zibi	T C	4.15	1.03	4.91	4.36	2.35	5.14	0.011	0.031	0.014	0.71	4.18	0.53
	B C	4.74	1.80	7.71	8.33	3.78	11.91	0.021	0.064	0.032	1.08	11.54	0.82

* T - Manure from less than 5cm depth; B - Manure from 7-10 cm.
**C - Cattle manure; S - Sheep manure; G - Goat manure.

The results obtained using Ion Coupled Plasma spectrophotometry confirmed those obtained using atomic absorption spectrophotometry (Ca & Mg), flame photometry (K & Na) and colorimetry (N & P).

From the results it can be concluded that kraal manure is a valuable resource in nutrient cycling in communal agriculture. Its use and management is subject to improvements and deserves research attention.

3.4 STUDIES WHICH ARE IN THE PUBLICATION STAGE

Two components of the study on tick control and health management in cattle in the communal areas of central Eastern Cape conducted during 1995/96 and 1996/97 have reached the publication stage and have been accepted for publication by scientific journals. Abstracts of the articles follow.

TICK CONTROL BY SMALL SCALE CATTLE OWNERS IN CENTRAL EASTERN CAPE

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Accepted by the Journal of the South African Veterinary Association.

ABSTRACT

A survey conducted in five magisterial districts involving rapid rural appraisal and a questionnaire showed participation in State managed and funded dipping programmes by cattle owners in the communal areas of central Eastern Cape to be nearly complete, with 98% of livestock owners interviewed participating in every single dipping event. Disease control was the main reason for participation, but farmers perceive dipping to have a much broader disease preventing activity than is really the case. Other reasons for participation in dipping were preventing ticks from sucking blood, providing animals with a clean appearance, and preventing damage to teats of cows. Many livestock owners complement dipping with other tick control measures, including old sump oil, household disinfectant, pour-on acaricide and manual removal of ticks. Recently local farming communities were given the responsibility of buying dipping acaricide. This has left them with the challenge of developing farmer-managed, cost-effective tick control programmes. At present, this process is constrained by a lack of information and farmer training.

PERCEIVED CAUSES, DIAGNOSIS AND TREATMENT OF BABESIOSIS AND ANAPLASMOSIS IN CATTLE BY LIVESTOCK FARMERS IN THE COMMUNAL AREAS OF THE CENTRAL EASTERN CAPE, SOUTH AFRICA.

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Accepted by the Journal of the South African Veterinary Association.

ABSTRACT

Perceived causes, diagnosis and treatment of redwater (babesiosis) and gallsickness (anaplasmosis) in cattle by livestock farmers in the communal areas of central Eastern Cape, were investigated by means of participatory methods, semi-structured interviews and a questionnaire survey. Most livestock owners relate the causes of these two diseases to excessive eating of lush green grass by animals, which is thought to bring about an accumulation of bile in the body. The majority of livestock owners diagnose gallsickness and redwater on the basis of presenting signs and post mortem findings. Between 70 and 90% of a total of 343 livestock owners participating in the study claimed to administer herbal remedies to treat the two tick-borne diseases, whereby two thirds combine herbal remedies with conventional medicines and one third use herbal remedies only. Application of herbal remedies was said to be aimed mainly at the removal of excess bile. However,

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some plant species used to prepare herbal remedies are reported to possess activities ranging from anti-inflammatory, analgesic, anti-microbial, anti-pyretic and purgative, and may be effective in the treatment of gallsickness and redwater. A lack of understanding of the causes and transmission of gallsickness and redwater leading to ill-directed treatment, and widespread deviation from the directions of use when administering conventional medicines were identified as constraints, that could be addressed by farmer training and the supply of appropriate information.

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4. RESEARCH PROGRAMME FOR 1997/98

4.1 CORE RESEARCH PROGRAMME

4.1.1 Socio economic survey by means of a questionnaire in the three target areas

The main objective of this survey is to identify the relationship between socio-economic conditions of households and the farming systems they employ, with a view of identifying groupings within the target communities with which to engage in particular farming systems interventions (identification of recommendation domains).

Work to be conducted during 1997/98 includes compiling the questionnaire, conducting the survey in the three target areas namely Koloni, Guquka and Hlosini (approximately 50 respondents in each village), coding the questionnaire, analyzing the responses using the PC package "Statistica" and to compile a preliminary report.

4.2 OTHER RESEARCH PROGRAMMES

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

The report on this study will be completed by the end of July 1997.

4.2.2 Assessment of income generating agricultural development projects series

The ARDRI FSR-E team has conducted work on the assessment of agricultural development projects that are being recommended by development agencies as being well suited for the purpose of enabling rural households to generate additional income. These assessment are aimed at critically analyzing the practices, inputs, benefits and constraint involved in these projects with a view of improving the recommendations that are being made by development agencies to rural households. Thus far two types of projects have been assessed, namely small scale rabbit production and poultry production.

In 1997/98 the ARDRI FSR-E team will commence assessment of small scale pig production and of community gardens in rural areas of central Eastern Cape.

4.2.3 Potential of kraal manure as a fertilizer in small scale crop production in communal areas of central Eastern Cape

This study will be continued. Work during 1997/98 will be directed at determining optimal application rates of kraal manure. Two experiments are planned for the period under consideration, namely a pot experiment and an on-farm field experiments involving cabbage grown under irrigated conditions.

4.2.4 Restructuring of Tyefu Irrigation scheme

The closure of Eastern Cape agricultural parastatals in their current form is imminent. In order for production at irrigation schemes previously managed by these parastatals to be maintained, the irrigation schemes will require restructure. From current Government policy it is evident that management of these schemes needs to be transferred from parastatal or government to stakeholders, whereby government will maintain responsibility for certain technical support and advisory functions only. Locally such a process is unprecedented and there is a need for the development of workable models and processes leading to successful management transfer. ARDRI has been approached by EDAFU to assist in the re-structure of Tyefu Irrigation Scheme. ARDRI envisages to become engaged in a participatory process involving farmers, other stakeholders and Government, whereby the Institute's staff act as facilitators. The object is to describe the processes by which change was achieved and to monitor the effects of change. The results captured by the report to be completed by the end of July 1997 (see 4.2.1) should form a good base line against which to measure the effects of change.

4.2.5 Khambashe socio-economic survey

In December 1987 ARDRI conducted a socio-economic survey of rural households residing in the Khambashe Tribal Authority area. This study was commissioned by the Ministry of Rural Development of Ciskei. The general objective of the survey was to provide base-line and felt needs information for the target area. The main subjects addressed in the survey were demography, land, crops, livestock, incomes, expenditures, problems and potential for agriculture or other development, infrastructural aspects, community services and the perceptions and needs of people and communities.

Under the auspices of the Umthiza development centre, the ARC, the Department of Agriculture and Land Affairs, CIRAD of France and ARDRI will conduct a similar survey in the same area. The objectives of the survey are dual. Firstly, the survey will provide recent information which will guide the development of activity plans for the Umthiza development centre and the Central region's office of the Department of Agriculture and Land Affairs of the Eastern Cape and secondly the results of the survey will enable the study of changes which have occurred in this area over the last ten years. The latter aspect of the study is expected to be helpful in defining policies aimed at supporting rural communities in the region.

Work on the study is expected to commence in May 1997 and the field work is expected to be completed by the end of August 1997.