CHAPTER 4

SMALLHOLDER COMPARATIVE ADVANTAGE IN THE EASTERN CAPE

4.1 Introduction

The first phase of this research studied the comparative advantage of smallholder farmers in the Eastern Cape. Given the modest resources at hand, the size and huge diversity of the smallholder agricultural sector in South Africa, and the lack of reliable secondary data on smallholder farm production costs and outputs from which to make a sample frame, no attempt was made to describe *representative* smallholder farms and activities. Rather, the objective was to give insights into what is *possible* on a broad scale - given the observed activities of samples of relatively successful smallholder agriculturists, who are currently involved in farming and selling significant portions of their output in the market. This phase sought to show whether there were agricultural activities that smallholder farmers can undertake both profitably and efficiently in today's South Africa. It needs to be shown whether small-scale producers of agricultural commodities in South Africa have a comparative advantage in anything, or whether such producers should continue to abandon their own agriculture in favour of work in industrial plants or on commercial farms.

4.2 The Concept and Study of Comparative Advantage

4.2.1 Theoretical Foundations

The concept of comparative advantage has its roots in the international trade work of the classical economists Adam Smith, David Ricardo, Robert Torrens and John Stuart Mill. The theory of comparative advantage is thought to have been formulated by Robert Torrens, but is generally associated with David Ricardo (Mathemera, 1997).

At the end of the eighteenth century, Adam Smith professed that mutually beneficial trade is based on the principle of *absolute advantage*. In other words, a country may be more efficient in the production of some commodities and less efficient in the production of others relative to another nation. Irrespective of the cause of the difference in efficiency, both countries can benefit if each specialises in the production of what it can do more efficiently than the other. This concept was challenged only four decades later when Ricardo and Torrens argued that mutually beneficial trade is possible when only *comparative advantage* exists. Since then, *absolute advantage* has been considered only a special case of the general principle of *comparative advantage* (Chacholiades, 1990).

A country is said to have a comparative advantage in the commodity in which that nation's degree of superiority (efficiency) is higher, and a comparative disadvantage in the commodity in which its degree of superiority is lower, relative to another country. Therefore, as opposed to absolute advantage, comparative advantage is a relative concept (Chacholiades, 1990:17-18). The law of comparative advantage states: "When each country specialises in the production of that commodity in which the nation has a comparative advantage, the total world output of every commodity necessarily increases (potentially) with the result that all countries become better off" (Chacholiades, 1990:18).

Since Adam Smith's (1776) *Wealth of Nations*, the most important argument in trade theory has been the notion that government interventions can inhibit productivity by limiting access to markets. According to Masters (1995: A-5), although it's been proven historically that economic growth is greatest under more open trade regimes, this does not imply that complete *laissez-faire* (that is, absence of governmental interference in economic affairs) is optimal, or that there is nothing governments can do to influence trade patterns. The development of the concept of comparative advantage has led to the identification and quantification of the sources of comparative advantage. These include technological efficiency (Ricardo, 1817); factor intensity of different industries (Heckscher, 1919; Ohlin, 1933) (later challenged by Leontief, 1953); use of industry-specific resources (Viner, 1937); domestic demand (Samuelson, 1962); and exchange rates (cited by Masters, 1995).

4.2.2 Challenges to Comparative Advantage

Masters (1995:9), identifies two main challenges to comparative advantage: one focussing on developing countries starting around 1950, and the other focussing on industrialised countries starting in the early 1980s. During both periods there were popular demands for government action to support vulnerable industries against rapid changes in production and trade levels.

In developing countries the need was for restriction of imports to avoid dependency on other countries. Economists offered two arguments for restricting trade in developing countries: Import-substitution or 'inward' industrialisation; and domestic development strategies. Prebisch (1950) and Singer (1950) independently formulated the thesis that over time the terms of trade would turn against countries that export primary products and import manufactures. They therefore advocated a development strategy based on import substitution of manufactured goods rather than promotion of agricultural exports. Hirschman (1958) introduced the concept of 'linkages' as a tool for investigating how investment in one type of activity resulted in investment in other income-generating activities. He argued that developing countries would benefit more from the linkages of import substitution industries than those of export industries. These linkages thus justified trade restrictions and an inward-looking strategy (cited by Masters, 1995:9; Staatz and Eicher, 1998:10-11)

Industrial country trade theories of the 1980s, on the other hand, favoured subsidisation of exports with strategic policies to capture market share. Based on the case study-based approach (as opposed to the hypothesis-testing approach), it was concluded that industries are successful because of the fundamental economic conditions around them. The policies needed to support competitive advantage turned out to be the same as those needed to support comparative advantage. These are, for example, the provision of education, research, and other public goods, as well as enforcement of anti-trust rules, disclosure and labelling requirements and safety regulations (Masters, 1995: 10).

The challenges to comparative advantage have strengthened the theory by extending it to a broader variety of conditions and circumstances. The common consensus now is that potential gains from trade restrictions are far outweighed by the gains from open trade. Even in cases where 'vulnerable industries' were protected in some countries, it was generally discovered that the costs of supporting these industries exceeded the eventual payoff in the long run (Masters, 1995:11).

4.2.3 Measurement of Comparative Advantage

Knowledge of comparative advantage is essential in developing countries, as this will inform policy makers of avenues through which existing patterns of comparative advantage could be exploited. However, a major practical difficulty in developing countries, according to Morris (1990:1), is that comparative advantage is not easy to determine empirically. This is because simply comparing costs of production between two regions or countries is not conclusive, since the comparison is not based on absolute production costs. Even if relative production costs are known, government policies and market failures often distort them. Ways, therefore, need to be found to factor in such distortions so as to determine true patterns of comparative advantage.

Two types of summary measures have been developed in the study of policy impacts on social welfare. One type focuses on the private and social costs of public sector investment, for example the Net Present Value (NPV), and the Economic Internal Rate Of Return (EIRR) (Gittinger, 1972). The second type of summary measures focuses on the static effects of price-distorting policies, for example, the Effective Protection Coefficient (EPC), and the Domestic Resource Cost (DRC) (Bruno, 1972; McIntire and Delgado, 1985; Morris, 1990; Masters and Winter-Nelson, 1995).

According to Nelson and Panggabean (1991:703) such summary measures tend to summarise too much, which could lead to omission of significant results of the analysis. The Policy Analysis Matrix (PAM) (Monke and Pearson, 1989) was developed to address this problem. The strengths of the PAM technique lie on at least three facts (Nelson and

Panggabean, 1991:703). Firstly, it allows varying levels of disaggregation; secondly, it simplifies the analysis of policy-induced transfers; and finally, it makes it possible to identify the *net effect* of a varying set of complex policies and to sort out the individual effects of those policies.

Partial equilibrium methodologies such as DRCs and PAMs, however, will always have their limitations. For example, the indicators provide information on which activities are the most efficient users of inputs and the most profitable given certain prices. It is not known whether some prices will change after farmers switch into a particular activity, potentially affecting the relative efficiency of the activity. With these limitations in mind, this study employed the PAM technique drawing to determine the comparative advantage of commercial smallholders in the Eastern Cape. The technique made a number of useful indicators of policy effects relatively easy to calculate using obtainable data. It also enabled easily interpretable and consistent comparison ranking of different productive activities within and across regions.

4.2.4 Specific Cases Studied

The activities presented in Table 4.1 were selected to study comparative advantage of Eastern Cape smallholders. They were carefully selected to cover a wide range of land uses in the Eastern Cape Province as follows:

Table 4.1: Selection of Case Study Farming Activities

Sub-sector	Activity	Location
Livestock	Indigenous cattle	Mpofu/Seymour, Ciskei
	Exotic cattle	Mpofu/Seymour, Ciskei
	Dairy	Keiskammahoek, Ciskei
Horticulture	Cabbage	Zwelitsha, Ciskei
	Citrus	Mpofu/Seymour, Ciskei

Sub-sector	Activity	Location
Field crops	Irrigated maize	Keiskammahoek, Ciskei
	Dryland maize	Herschel, Transkei

The case studies are discussed in more detail below. Each of the case descriptions made were arrived at after intensive focus group interviews and individual farmer visits. They therefore refer to stylised examples of farms instead of actual farms. The aim of the descriptions is to provide a general picture of what smallholders in the Eastern Cape are involved in.

These farmers were selected because they represent a profile of independent African smallholders in the Eastern Cape province. The history of their development was discussed in Section 3.3.2.1 above. Despite their apparently unpopular political and economic reputation, they still represent what African smallholders can do once given an opportunity to conduct independent commercial farming.

Indigenous Cattle

The sample area selected as case study of indigenous cattle production is located in the Mpofu/Seymour district. Emerging beef lessee-managers in this district produce for the growing market of abattoir and abattoir suppliers. These buyers purchase directly from the farmers on the basis of live weight.

The main activity in this system is indigenous Nkone breeding on leased state land under the project development strategy. The particular case study is a 1060 ha unit accommodating a 275 animal unit herd under suitable climatic conditions for Nkone rearing. The farming practice in this farming unit is characterised by semi-intensive monitoring of cattle performance to breed an environmentally suitable Nkone breed. Marginal cattle are culled every year. Production runs over a 22-month cycle from calving to sale of long yearlings/weaners and employs both family and hired labour. Owing to the Nkone's hardiness and ease of calving (92 percent calving percentage),

minimum intervention is required in terms of supplementary feeding and disease control. Despite the Nkone's hardiness and environmental adaptation, its production activity in the sample farm is run under semi-intensive conditions employing fairly sophisticated infrastructure. These facilities include a scale, neck clamp, and a high quality handling pen. A decision to invest in these facilities was made primarily in preparation for an anticipated privatisation in the near future. From a production efficiency point of view they were arguably not required.

Family labour accounts for about a quarter of the total number of production hours under this activity. The rest of the labour hours are filled by hired workers from surrounding villages where farm production is mainly to supplement household consumption (Siyoko, 1997).

Exotic cattle

The exotic cattle activity is subjected to the same market conditions as its indigenous counterpart. This study selected a Simmentaler (dual purpose breed) breeding unit as a case study for estimating private and social costs for exotic cattle enterprise in the Eastern Cape. This is located in Mpofu/Seymour district in the former Ciskei and is managed by lessees. The 277 ha holding accommodates 115 animal units bred for both milk and beef. The production activity, stretching for a period of 11 months, employs both hired and family labour. The marketing activity is co-ordinated by the former homeland parastatal. The animals are sold as long yearlings on regular basis to local buyers.

Dairy

Emerging dairy production in the former Ciskei and Transkei is limited to the development projects and irrigation schemes established by the former homeland authorities in the 1970s. This development strategy entailed huge modern capital investment in the form of dairy parlours and irrigation infrastructure for pastures estimated at R8.86 million between 1976 and 1979 (Van Averbeke, 1995). Through an

arrangement with the parastatal Ulimocor the farmers currently settled in the scheme will gradually be granted private ownership of the land. Milk in these schemes is sold locally, and because of high costs (perishability, distance, and transport costs) is considered as a non-tradable commodity.

One of these is a 1730 ha land area in the district of Keiskammahoek in the former Ciskei. This farming system supports 12 ha dairy units relying principally on cultivated pasture. For the purposes of this study, a 27 AU case study unit was selected. This unit is run on a 17 ha area accommodating 6 ha of kikuyu permanent pasture and 6 ha of winter ryegrass. The farm employs both hired and family labour. On average, milk production per cow per day is 5.5 litres marketed locally at R1.50 per litre. The decreasing level of parastatal support has had a negative impact on the milk yields and therefore incomes.

Citrus

The Kat River citrus farming system located in the Mpofu/Seymour district was selected for the purposes of this analysis. A 17 ha navel orange holding along the Kat River valley was studied for the estimation of private and social costs for perennial citrus in this area. Orchards accommodate 600 trees per hectare. Production on these farms employs only hired labour in a highly mechanised process aimed at producing the highest possible exportable produce percentage. Currently, about 60 percent of a 35-ton per hectare yield are exported. Over 30 percent of the produce are sold on the local market and the remainder to the factory.

These farmers lease their land from the state on an annual basis and manage their own operations. They belong to the Kat River Citrus Co-operative (KATCO) through which they market their produce and buy production inputs. KATCO is a member of the Outspan citrus export company. All the export produce is sold through Outspan in a non-regulated marketing environment. In the absence of any protection in the output market export price in Port Elizabeth is used as the reference price in the budgets.

Cabbage

The 50 hectare irrigated vegetable farming area of Horseshoe situated about 10 km north of King William's Town in the Zwelitsha district of the Eastern Cape was selected as a case study area for the analysis of irrigated cabbage production. Also part of the agricultural schemes in the former homelands, this farming system is managed by 25 fully independent farmers, each on 2 hectares leased from the state. The parastatal responsible for this scheme is Ulimocor who took over its running in 1985 from the former Ciskei Department of Agriculture.

The market for cabbage is readily available in the urban area of King William's Town-Bisho. Some of the produce is sold on the farm to retailers. Any surplus - which is rarely experienced - is sold in the East London market. For the purpose of this study the King William's Town market is taken as the reference market.

The climate and soils are generally suitable for production of irrigated vegetables and water is readily accessible from the nearby Buffalo river. Sprinkler is the main system of irrigation used on these plots. Services provided to the farmers by Ulimocor included, a 50 percent subsidy on water charges, a 25 percent subsidy on mechanical operations, maintenance of infrastructure, security, timely training and extension services.

Irrigated Maize

The selected case study activity for the analysis of irrigated maize budgets is located in the district of Keiskammahoek in the former Ciskei. Planning in this area was done in the context of the former homeland irrigation schemes strategy of the 1970s. About 22 ha of land is allocated to cultivation of irrigated field crops and vegetables in 0.25 hectare plots. More than 60 percent of this arable cropland is allocated to and managed by independent, semi-commercial maize producers employing family labour. In the particular case study plot, about 75 percent of the maize produced is marketed locally at the prevailing local price in Keiskammahoek. This price is used as the reference price for

the market. As in the case of dairy, irrigated maize in this area is considered as a non-tradable commodity owing to transaction costs associated with transportation.

Dryland Maize

The dryland maize farming system located in the Herschel district in the former Transkei was selected for the study of private and social prices for dryland maize. The case study under consideration is a 1-hectare holding managed by smallholders and employing family labor. A combination of semi-arid climate and unreliable rainfall in this area significantly affects the yields. The Transkei Agricultural Corporation (Tracor) provided contractor services at subsidised prices. Only 30 percent of the total output is sold locally with the rest used as fodder. Dryland maize is also taken as non-tradable as it faces the same transaction cost constraints as irrigated maize and dairy.

4.2.5 The Policy Analysis Matrix as Applied in this Study

The study of comparative advantage required construction of Policy Analysis Matrices (PAMs) for each of the selected activities. A PAM is an accounting technique that organises data on costs of production and marketing, for specific rural activities, technologies and market channels. PAMs contrast observed ("financial") data to data valued at hypothesised social ("economic") costs in an internally consistent manner, leading to calculation of economic indicators used to assess economic efficiency and the competitiveness of specific activities in specific markets (Monke and Pearson, 1989).

Production of the basic indicators in a Policy Analysis Matrix (PAM) involved collection of production and marketing cost data through focus group interviews, farmer recall, and interviews with organisations involved in smallholder extension and marketing. The objective was to derive in each case study area farm budgets for principal crop and livestock activities, on a per unit basis, using prevailing technologies. This budget data could then be associated with secondary data on transportation costs, prices, and shadow prices, to assess partial equilibrium indicators of comparative advantage and distribution

for the major activities in each area. The next sub-section elaborates on the process of budget preparation.

4.2.5.1 Construction of Farm-Level Budgets for the PAM

Policy makers need farm-level data to make policy decisions regarding farm-level issues. Apart from the COMBUD's[24] prepared periodically by the government, South Africa has lacked such data in the smallholder sector up to now. It is thus one of the implicit objects of this study to contribute to laying of a foundation and starting of a tradition of more intensive farm-level data gathering in the smallholder farming areas. Hence the Appendix section of this thesis could be an invaluable resource for anyone involved in smallholder research and policy making. A more formal publication by Ngqangweni, *et al.* (1998) containing smallholder budget information for the Eastern Cape, KwaZulu-Natal and the Northern Province is in circulation - a direct outcome of this study.

After selecting activities to be analysed, the next step in this study was to prepare farm-level budgets for each of the case studies. The primary objectives of enterprise budgets were:

- To present data that contrasts private and social profits;
- To allow quantification of transfers induced by policy or market failures through construction of PAM ratios; and
- To determine comparative advantage of smallholders in the selected activities.

In line with the methodology applied in this study, a number of key respondents and respondent groups were identified. The agricultural and extension offices in the case study districts as well as the (former) regional offices of the Ciskei and Transkei agricultural corporations served as main reference and verification points during the process of budget preparation.

[24] "*Com*mercial *Bud*gets" covering traditionally white commercial farming areas.

They helped with identification farmers whose production records were kept up-to-date. This proved to be invaluable in facilitating gathering of accurate and relevant data. These farmers were then visited a number of times individually and sometimes in groups to gather and verify cost and revenue data on their farming practices. Data gathering was approached in a systematic manner using the approach suggested by Monke and Pearson (1989).

For the crop enterprises namely, citrus, cabbage and maize activity calendars were first drawn up to identify various tasks in crop production, such as land clearing and preparation, planting, fertilisation, pest control and weeding, and harvesting. The next step was to specify quantities of inputs and outputs associated with each calendar task. Inputs were classified into fixed (capital equipment), direct (hired and family) labour, and intermediate inputs. A standard unit of measurement (per hectare in this case) was then specified and was used consistently in the analysis and interpretation of results. For valuation of these data items, prices were collected from secondary sources, such as farm input firms, co-operatives and retail outlets.

A special challenge in the preparation of crop budgets arose with citrus, a perennial crop. In this case the activity budget prepared represented the observed costs and returns of the activity in a year of full production (year 7). Profitability figures from the first to the sixth year were compounded to give a net present value in year 7. The present values were added up and taken as an investment cost, and the useful life of the investment as the remaining term of the production cycle. The citrus budget used in the analysis is presented in Table 4.1 as an illustrative example (see also Appendix 4). The rest of the detailed activity budgets are presented in Appendices 1 to 7.

Preparation of livestock (dairy, beef and dual-purpose cattle) budgets involved almost the same procedure as that of the crop activities (see Appendix 1). These employed the Animal Unit as the standard unit of measurement in the analysis. After the observed cost and income items were priced and presented, their shadow prices were determined. The shadow prices, which represent the social costs, were then presented in a "social budget".

Table 4.2: Budget for Irrigated Citrus in Mpofu District, Eastern Cape

The farming system

Location	Mpofu, Eastern Cape
Practice	Irrigated citrus production
Citrus area (ha)	17.00
Expected lifespan (yrs)	40.00
Full production attained in	eighth year
Working hours	8.00
Hired wage ®	30.00
Discount rate (%)	5.00

Activities

Activity	Fixed input	Adult labour (man-days)	Intermediate input
Land preparation		contractor	
Irrigation equipment installation	Irrigation lines and equipment	contractor	
Planting	spades	90.00	600 trees, 100 windbreaks
Fertilising	knapsack	1.00	0.5 ton fertiliser;480 L fertiliser
Pest and disease control	boom sprayer, tractor	377.00	73 L pesticide; 0.1 ton pesticide
Weed control	herbicide sprayer	55.00	9 L weedicide
Soil and leaf sampling		contractor	
Maintenance	slasher, hand-saw	2.00	
Harvesting	picking shears, storage shed, bin trailer	696.00	1 picking bags
Marketing		contractor	

Table 4.2: Continued

List of fixed costs items and their Net Initial Costs

Fixed input	Initial cost (R)	Useful life (yrs)	Salvage value (SV) (R)	Present value of SV (R)	Net initial cost (R)
Tractor	58208.50	10.00	5820.85	3573.50	54657.69
Boom sprayer	47880.00	10.00	4788.00	2920.68	44959.32
Herbicide sprayer	4000.00	10.00	400.00	244.00	3756.00
Storage shed	15000.00	10.00	1500.00	915.00	14085.00
Bin trailer	14800.00	10.00	1480.00	902.80	14348.60
Knapsack	250.00	5.00	0.00	0.00	250.00
Slasher	80.00	5.00	0.00	0.00	80.00
Picking shear	25.00	5.00	0.00	0.00	25.00
Hand-saw	9.00	5.00	0.00	0.00	9.00
Spades	32.00	5.00	0.00	0.00	32.00
Irrigation lines and equipment	102000.00	10.00	10200.00	6261.92	95738.08

Calculation of annual fixed costs (R/ha)

Fixed input	Days/ha	Days/ year	Per ha share of annual use
Tractor	25.50	1087.00	0.19
Boom sprayer	22.40	378.00	0.17
Herbicide sprayer	3.20	55.00	0.02
Slasher	0.06	1.00	0.00
Hand-saw	0.06	1.00	0.00
Knapsack	1.00	1.00	0.01
Picking shear	38.50	654.00	0.29
Bin trailer	38.50	654.00	0.29
Loading shed	2.50	42.00	0.02

Table 4.2: Continued

Fixed input	Net initial cost (R)	Capital recovery factor	Share of annual use	Annual capital cost
Tractor	54657.69	0.13	0.47	3326.70
Boom sprayer	44959.32	0.13	0.42	2445.30
Herbicide sprayer	3756.00	0.13	0.06	29.20
Slasher	80.00	0.23	0.00	0.01
Hand-saw	9.00	0.23	0.00	0.00
Knapsack	250.00	0.23	0.02	1.20
Picking shear	25.00	0.23	0.29	1.67
Bin trailer	14348.60	0.13	0.29	538.86
Loading shed	14085.00	0.13	0.02	36.48

Calculation of annual private costs (R/ha)

ITEM	QUANTITY	RANDS PER UNIT	TOTAL (R)
Fixed inputs			
Tractor	2.00	3326.70	6653.40
Boom sprayer	1.00	2445.30	2445.30
Herbicide sprayer	1.00	29.20	29.20
Slasher	2.00	0.01	0.02
Hand-saw	6.00	0.00	0.01
Knapsack	2.00	1.20	2.40
Picking shear	25.00	1.67	41.75
Bin trailer	1.00	538.86	538.86
Loading shed	1.00	36.48	36.48
Investment cost	1.00	19657.61	1260.50
TOTAL FIXED INPUT COST			11007.92
Direct labour (days)			
Unskilled adult	109.00	20.00	2180.00
Intermediate inputs			
Fertiliser (ton)	0.50	2161.43	1080.72
Fertiliser (L)	480.00	1.55	744.00
Pesticide (ton)	0.10	29.79	2.98
Pesticide (L)	73.00	52.66	3844.18

Table 4.2: Continued

ITEM	QUANTITY	RANDS PER UNIT	TOTAL (R)
Weedicide (l)	85.00	18.74	1592.90
Picking bags (units)	1.00	9.00	9.00
Contractor-leaf and soil sampling (ha)	1.00	175.00	175.00
Water (ha)	1.00	120.00	120.00
Electricity (ha)	1.00	555.00	555.00
Repair and maintenance (ha)	1.00	939.00	939.00
Fuel and lubricants (ha)	1.00	240.00	240.00
Packing (ha)	1.00	5007.10	5007.10
Transport (ton)	35.00	31.20	1092.00
TOTAL INTERMEDIATE COSTS			15401.87
Land (ha)	1.00	2000.00	2000.00
TOTAL PRIVATE COSTS (R)			30589.79
Annual Revenue			
Sales:			
Export (ton)	22.75	1340.00	30485.00
Local (ton)	9.25	450.00	4162.50
Factory (ton)	3.00	200.00	600.00
TOTAL			35247.50
ANNUAL PROFIT PER HA			4657.71

Calculation of annual investment cost (amortised over 40 years)	
TOTAL AMOUNT (R)	21628.37
AMMORTIZATION FACTOR	0.06
ANNUAL COST (R)	1260.50

Table 4.2: Continued

Decomposition of annual private costs (R/ha)

ITEM	QUANTITY	TRADABLE INPUT (R/ha)	LABOUR (R/ha)	LAND (R/ha)	CAPITAL (R/ha)	TOTAL
Fixed inputs						
Implements (ha)	1.00				9747.41	9747.41
Investment cost (ha)	1.00				1260.50	1260.50
Total					11007.92	
Direct labour						
Unskilled adult (days)	109.00		2180.00			2180.00
Intermediate inputs						
Fertiliser (ton)	0.50	1080.72				1080.72
Fertiliser (L)	480.00	744.00				744.00
Pesticide (ton)	0.10	2.98				2.98
Pesticide (L)	73.00	3844.18				3844.18
Weedicide (L)	85.00	1592.90				1592.90
Picking bags (units)	1.00	9.00				9.00
Packing (ha)	1.00	5007.10				5007.10
Water (ha)	1.00	120.00				120.00
Electricity (ha)	1.00	555.00				555.00
Repair and maintenance (ha)	1.00	939.00				939.00
Fuel and lubricants (ha)	1.00	240.00				240.00
Contractors						
Contractor-leaf and soil sampling (ha)	1.00	175.00				175.00
Transport (ton)	35.00	1092.00				1092.00
Total		15401.87				
Land	1.00			2000.00		2000.00
TOTAL ANNUAL COSTS (R)						30589.79
TOTAL ANNUAL REVENUE (R)						35247.50
TOTAL ANNUAL PROFIT (R)						4657.71

Table 4.2: Continued

Decomposition of annual social costs (R/ha)

ITEM	QUANTITY	TRADABLE INPUT	LABOUR	LAND	CAPITAL	TOTAL
Fixed inputs						
Implements (ha)	1.00				8550.36	8550.36
Investment cost (ha)	1.00				1260.50	1260.50
Total					9810.86	
Direct labour						
Unskilled adult (days)	109.00		2180.00			2180.00
Intermediate inputs						
Fertiliser (ton)	0.50	948.00				948.00
Fertiliser (L)	480.00	652.63				652.63
Pesticide (ton)	0.10	2.61				2.61
Pesticide (L)	73.00	3372.09				3372.09
Weedicide (L)	85.00	1397.28				1397.28
Picking bags (units)	1.00	7.89				7.89
Packing (ha)	1.00	4392.19				4392.19
Water (ha)	1.00	105.26				105.26
Electricity (ha)	1.00	486.84				486.84
Repair and maintenance (ha)	1.00	823.68				823.68
Fuel and lubricants (ha)	1.00	210.53				210.53
Contractors						
Contractor-leaf and soil sampling (ha)	1.00	175.00				175.00
Transport (ton)	35.00	1092.00				1092.00
Total		13666.01				
Land	1.00			2000.00		2000.00
TOTAL ANNUAL COSTS (R)						27656.88
TOTAL ANNUAL REVENUE (R)						35247.50
TOTAL ANNUAL PROFIT (R)						7590.62

4.2.5.2 The Construction of the PAM

Table 4.3 provides a stylised example of a PAM. The letters A through L represent groupings of data that reflect the associated row and column headings. For example, the data in category A would be revenues from a farming activity measured using the actual, observed prices paid by the private smallholder. Category E includes those same revenues calculated using an economic price, with taxes, subsidies, and price distortions removed. Category I is the net of associated values in A and E, which measures the divergence between private and social revenues. The two columns for costs allow separation between the inputs that are traded in export markets and those that are non-tradable domestic goods, such as land and labour.

Table 4.3: A Policy Analysis Matrix

Basis of analysis		Costs		
	Revenues	Tradable inputs	Domestic inputs	Profits
Private prices	A	B	C	D
Social prices	E	F	G	H
Divergence	I	J	K	L

Source: *Adapted from Monke and Pearson (1989)*

The actual entries in the PAM allow direct comparisons of revenues, costs, and profitability among agricultural systems that produce identical outputs, either within a single country, or across countries. This is made possible by six indicator ratios derived from the PAM. These ratios measure the competitiveness of different agricultural activities given current technology and government policies within and between regions. They rank the comparative advantage of various smallholder enterprises and identify possible areas of investment to increase the growth of national income.

The first indicator derived from the PAMs is the domestic resource cost (DRC). The DRC is a measurement specific to a given technology, a given end market, and a given

location of production. It condenses into a single ratio the relationship between true cost of producing one unit of the item in question and the return to selling it. DRCs less than one are usually thought to indicate efficient production based on the existence of comparative advantage. More specifically, the DRC for a particular smallholder activity is equal to the value of domestic inputs used, priced using social prices, divided by product revenues at social prices less the cost of tradable inputs priced at social prices (DRC=G/(E-F)). A DRC value less than unity therefore indicates that the opportunity cost (meaning the cost of production as valued by the foregone most profitable alternative uses of the inputs) of the domestic resources used is less than the value-added earned from the sale of those resources. Put simply, it indicates how well the activity uses resources to earn value. Comparing across activities, the one with the lowest DRC is the one that earns the most value with the least value of inputs.

Although DRCs are usually employed in the context of international trade, and refer to the saving or earning of foreign exchange, the methodology also applies to regions within a country, provided the commodity in question is tradable. This condition does not hold for all the enterprises considered in this study as some commodities studied are not imported or exported from each particular region (although they probably could be if their prices justified it).

Non-tradables are commodities (or resources) whose equilibrium local market price is too high to permit profitable export to "outside" (non-local) markets, but too low to justify transporting the good into the local area, given prices "outside." Furthermore, true non-tradables are not good economic substitutes for other tradables (their prices are not correlated with tradables). DRC measurements can only be interpreted as showing comparative advantage in the cases of tradables, although they are computed for all goods. Low DRC (less than 1) for a tradable suggests that it would be profitable to concentrate more resources in that activity, but the same cannot be said of the DRCs for non-tradables. There, increased local production will lead to falling local prices as the local market is saturated, and the computed DRC will rise quickly.

The second indicator is the nominal protection coefficient on outputs (NPCO). The NPCO indicates the extent to which the market price differs from the social price (NPCO=A/E). By definition of social prices, an NPCO above unity indicates that producers of that good enjoy a price premium that represents a financial transfer from consumers of the good to its producers. An NCPO below unity would indicate a transfer from producers to consumers. These transfers occur either because of government policy or market imperfections that cause the market price to differ from the economic price.

The third indicator is the nominal protection coefficient on inputs (NPCI). The NPCI is the ratio of the private price of inputs to their social price (NPCI=B/F). Like the NPCO, the NPCI measures financial transfers caused by government policies or market imperfection. The NPCI measures the extent to which the market price of tradable inputs exceeds their social price. An NPCI above unity indicates that smallholders undertaking that activity pay a premium for their tradable inputs.

The fourth indicator is the effective protection coefficient (EPC). The EPC measures the effects of policies and market imperfections affecting the markets for outputs and tradable inputs. It measures the divergence between the value added by domestic inputs as measured with private prices and that measured with social prices (EPC=(A-B)/(E-F)). Value added by domestic inputs is product revenue minus costs paid for tradable inputs. An EPC greater than unity indicates that the profitability of activity given current policy and market conditions exceeds what it would be if subsidies or other such distortions were removed. The EPC indicates whether policy and market conditions for both outputs and purchased inputs have created an incentive or disincentive to undertake an activity.

The fifth indicator is the profitability coefficient (PC). The PC is the ratio of the profit from an activity measured with private prices to that measured with social prices (PC=D/H). Like the EPC, the PC measures the extent to which policy or market conditions have created an incentive or disincentive to undertake an activity. Unlike the EPC, the PC includes variation between private and social prices of non-tradable inputs.

The last indicator used in this report is the subsidy ratio to producers (SRP). The SRP measures the premium producers receive by undertaking a certain activity in relation to the social price or value of a good (SRP=L/E=(D-H)/E). It is a measurement of the profits derived from a financial transfer from consumers of a good to its producers.

4.2.6 Data Requirements for the Policy Analysis Matrix

An important aspect in determining many of the PAM ratios is the estimation of social values for revenues and costs. This is the most difficult part of the research, since if this is done incorrectly, the indicators would also be misleading. It is especially in relation to the social valuation of revenues and costs that a number of assumptions had to be made.

These assumptions are an essential part of the analysis from the first phase of this study. They determine what values of land, labour and capital are the closest proxy of their opportunity costs for each activity. These opportunity costs in turn largely condition the outcome on whether or not an activity makes efficient use of resources. The next part of the chapter discusses this process in more detail.

4.2.6.1 Financial (Private) Valuation of Domestic Factors and Tradable Inputs

Factors of production are generally taken as land, labour and capital. Assumptions and methodology underlying valuation of each of these factors for budget preparation will be discussed next. Some useful guides on valuation of resources for project analysis have been published in the past (see for example Gittinger, 1972; Squire and Van der Tak, 1975; and Brown, 1979). This sub-section will draw heavily on these sources along with the appreciation of unique circumstances in the study area.

Land

In both financial and economic analysis, land is valued based on the form of tenure and whether or not transfer of ownership is involved (Brown, 1979). In general, actual prices

paid by farmers for their land are recorded directly in private budgets. In the valuation of land for private budgets, these principles were followed in this particular exercise.

In execution of this particular exercise, *i.e.* measuring efficiency of resource use, the basic premise is that all figures included in the private/financial budgets reflect the opportunity cost to individual farmers for the use of resources. This opportunity cost refers to a quantifiable measure of the cost to a farmer for putting the resource, in this case land, in a given use rather than in its next best alternative use. The survey identified nominal rates charged by the state for its land leased to the farmers in the study area - R12/ha for indigenous beef farmland and R15/ha for dual-purpose farmland. For citrus, the lease rate was R2900/ha. Dairy, cabbage and maize farmers did not pay for the land, and hence a figure of zero in their private budgets.

Labour

It was an observed tendency for maize and cabbage sample farmers to employ both hired and family labour in production activity. For small farms, the use of family labour is a common phenomenon. Employment of hired labour by smallholders also occurs in the study area, which suggests that it is profitable to do so. This is probably because it still pays many rural people in the Eastern Cape to leave their land fallow and seek wage employment elsewhere. It would therefore be important to explain the source of hired labour for indigenous beef, dual-purpose cattle, dairy, citrus and cabbage activities.

The major source of hired labour for the smallholders in the study area is the surrounding villages. This is a homogeneous group of local Xhosa villagers residing mostly within walking distance from the farms studied. The contracting arrangements with the farm operators were such that they are full-time workers walking to and from home to work daily, and paid 'regular' market wages.

Valuation of hired labour for private budgets was relatively straightforward. Farmers in the study area paid a market wage as observed in the farming industry in the area. This

price was recorded directly in the private budgets and varies between activities. Citrus farmers paid R30 per adult working day compared to R10 paid by livestock, dairy, cabbage and maize farmers in the study area. The only explanation for the difference in wages between the two groups could be that the citrus arguably required relatively more skilled labour than cattle, cabbage and maize. There were no observations of additional benefits to the labour force. This approach was employed with an observation that influences of imperfect competition such as minimum wage laws (Brown, 1979) are non-existent in the study area.

Valuation of family labour required a different approach. The opportunity cost of family labour is defined as the income from the next best alternative that is forgone by participating in the farming activity (Brown, 1979). The next best alternative for family members working on the farm in the Eastern Cape would be wage employment elsewhere in the country. Given the unemployment rate, the opportunity cost of family labour was taken as their expected wage. This was calculated as follows:

Expected Wage = *Market Wage * (1 - unemployment rate)*

Capital

Since capital goods have a longer productive life than one production period, their value has to be annualised in private budgets. Monke and Pearson (1989) provide useful guidelines for this annualisation process. They advocate the use of the 'capital recovery cost' as the annual equivalent value for a capital item, *i.e.* the annual payment that will repay the cost of a capital item and provide an economic rate of return. This measure discounts the initial purchase price of a capital item to an annual equivalent, using a capital recovery factor derived by employing the following formula:

$$\frac{(1 + i)^n i}{(1 + i)^n - 1}$$

Where i is the investment-earning rate of return, and n is the useful life of the capital item.

Working out a proper proxy for an investment-earning rate of return for the study area was particularly tricky. This figure had to reasonably mirror the true opportunity cost of capital as it applied to the farmers in the area. In West Africa this has conventionally been valued at 20%, which represents the rate of return to livestock (Delgado, 1989). This would arguably be a good proxy for the Eastern Cape if one takes into consideration the same value and role of livestock among black farmers.

Another alternative was to use a figure of 5% representing the real cost of borrowing capital in South Africa. The latter figure was opted for because all the cases studied were strictly commercial. A general assumption that their capital wealth is tied up in livestock would not necessarily apply to them. Their opportunity cost of capital would be affected more by market interest rates.

A question that arises in the construction of PAMs is how to determine cost of the operator or manager in the production system. According to Monke and Pearson (1989:20), the cost of capital, which is defined as the pre-tax return that owners of capital require to maintain their investment in the system, is included in the domestic costs (see category "C" in Table 4.3). Category D (private profits) (Table 4.3) then represents "excess profits" to the operators of the activity. If D is negative, then operators are earning a subnormal rate of return and can be expected to exit from the activity. If private profits are more than zero (or above the "normal level"), then the manager is earning "super-normal" returns.

Tradable inputs were relatively simple to deal with. The price paid by the farmer was directly included in his private budget.

4.2.6.2 Economic Valuation of Domestic Factors and Tradable Inputs

Factors of production were also valued at their economic prices for construction of 'social' budgets. Social budgets measure profitability of enterprises from society's point of view. They organise data useful for an analysis of enterprises' level of efficiency in use of society's resources. To determine economic or social values for factors of production, financial prices were converted into 'shadow prices.' These represent opportunity cost to society of engaging in production of an activity (Bannock, *et al.*, 1992).

This study takes a deliberate step in valuation of domestic factors for black smallholder farmers in the Eastern Cape. In general, it assumes opportunity costs that are comparable to those of their white commercial counterparts. Given the history of smallholder repression and inequality of opportunity discussed in Chapter 1, it would probably not be fair to compare the two groups of farmers in this way. However, it was considered proper to determine how smallholder production would fare in terms of efficiency if it were to be subjected to the same cost assumptions as those faced by similar commercial farm activity. This would then expose the smallholders in an even more unambiguous fashion.

Land

According to Brown (1979), if the market for land were perfect, the market price for land would be taken as its true economic cost or the net value of production forgone. But other factors tend to have a stronger influence on the market price than the land's net contribution to production. These include speculative expectations and considerations such as social prestige and personal security.

In the study area, production takes place on land leased from the state in the case of indigenous beef, dual-purpose cattle, cabbage and citrus farms studied. Farmers in the project area pay a nominal annual amount as rent for the land to the state. If this price

were a good indication of the productive value of land in the area, it would normally be expected to be representative of the opportunity cost to society for the use of the land. But, since this was only a nominal price, which does not necessarily reflect this productive value, it could not be used in the social budgets.

For indigenous and exotic cattle activities it was assumed that R30/ha was a reasonable indication of the opportunity cost of land, based as observed on adjacent commercial farms. In the case of dairy cattle, cabbage, irrigated and dryland maize activities, figures of R600, R450, R600, and R100 per hectare respectively, were taken as shadow land prices. Based on a study conducted by the University of Fort Hare (1997) in the study areas, these figures represent what the farmers would rent their land out for. This was accepted as the closest indication of the shadow price for land in these areas. Opportunity costs for citrus lands were assumed at R2000/ha also based on what the farmers in the area would be willing to accept for their land. These costs are comparable to those faced by commercial farmers.

Labour

For social budgets, both hired and family labour need to be valued at their opportunity cost to society. Computation of shadow wage rates for both labour forms would entail taking care of distortions in the labour market. In the absence of a minimum wage requirement, the shadow wage rate remained the same as the private wage rate for both hired and family labour. Since the farmers do not adhere to Unemployment Insurance Fund, worker compensation and services council levies, their budgets were not affected by such adjustments.

Capital

None of the capital items included in the budgets were subjected to any distortions in their trade. The smallholder farmers are not registered for the national sales tax, the Value Added Tax (VAT), and can therefore not claim it back. This is the only distortion

taken care of in this analysis. However, some of the input items are not subject to VAT. All these adjustments are reflected in the social budgets.

Tradable Inputs

Since all the smallholder farmers included in the survey area are not registered for VAT, they still incur tax on certain inputs. But many of the inputs used by the farmers are zero-rated, for example, animal feeds and remedies, fertiliser, pesticide and seed. The effect of VAT is therefore very small

4.2.6.3 Methodological Approach to Valuing Outputs

The ultimate goal of this analysis was to measure the individual activities' profitability from the viewpoint of society as a whole. In this context, profitability refers to the capacity of these activities to maximise the efficient use of the nation's resources in producing national income. In valuing outputs, it is important to separate tradable items from non-tradable ones. Treatment of those items that earn foreign exchange differs from that of those consumed locally.

Non-tradable outputs

In this study dairy, cabbage, irrigated and dryland maize outputs were considered non-tradable. Dairy is non-tradable by virtue of its highly perishable nature and therefore high transaction costs involved in marketing. Maize (local traditional varieties) and cabbage are produced on such a small scale that trading them would not make economic sense because of transaction costs of selling small quantities of a bulky product over large distances. These products are also not imported into the area at any scale.

For dairy and irrigated maize produced and sold in Keiskammahoek, and dryland maize produced and sold in Herschel, local retail prices in their respective towns were used as

reference prices. These retail prices were then converted into farm-gate prices by simply deducting all marketing costs.

The social value of outputs is defined as the value of output after adjustments for transfer payments and distortions in the prices of foreign exchange and outputs. By definition, non-traded activities' "foreign exchange earnings" equal zero. In the absence of transfer payments in the output prices for dairy, cabbage and maize, the social output value remains zero for comparative advantage calculations with respect to the rest of the country and the same as their private value from the standpoint of assessing relative profitability within the Eastern Cape.

Tradable outputs

In valuing outputs in private budgets, the same principles applied for non-traded commodities were applied in the valuation of indigenous beef, dual-purpose cattle and citrus outputs. Deducting marketing, transport and handling charges from the border price to obtain an "export parity price" derived the foreign exchange earnings for exported outputs. Since beef is an importable in the study area and also subject to a 40% import tariff, its import parity price in East London harbour was used as reference in the valuation of indigenous beef and dual-purpose cattle outputs. The Port Elizabeth price was used as reference for citrus output. The East London and Port Elizabeth citrus export prices were observed to be free of market distortions as total deregulation has been fully realised. This has made social valuation of outputs citrus outputs relatively easy. Its resulting social output value did not differ from the private values.

4.3 Indicators of Smallholder Comparative Advantage

4.3.1 A Summary of the Results

As a framework for any analysis of comparative advantage, assumptions relating to relevant opportunity costs, as they apply to inputs and outputs, are essential and therefore

need to be clearly stated. These are used in the process of converting financial (private or observed) prices into economic (social or shadow) prices. In the previous sections, a number of assumptions relating to this central aspect of opportunity costs for inputs and outputs were laid out and explained. This section of the chapter presents results showing indicators of comparative advantage within the context of these assumptions as discussed in the previous sections. The findings emanating from this analysis are summarised in Table 4.4. These figures indicate the various aspects of efficiency of smallholders in their employment of resources in seven selected farming activities in four districts of the Eastern Cape.

The DRC column is particularly important in the interpretation of the results in general, and is therefore highlighted in bold. In the Policy Analysis Matrix (PAM) methodology, the DRC (domestic resource cost) ratio is the principal indicator of efficiency of resource use and therefore of the existence of comparative advantage in a farming activity. Simply put, the rest of the ratios only serve to explain the degree of protection in the market for inputs, outputs and resources associated with the activity in question. The Policy Analysis Matrices for each of the selected farming activities were extracted from more bulky data on enterprise budgets that were created as the initial survey exercise. The process of budget construction and accompanying details are presented in Appendices 1 to 7.

Table 4.4: Summary of Indicators of Comparative Advantage, Eastern Cape

Commodity and district	NPCO	NPCI	EPC	SRP	**DRC**	PC
Indigenous Beef: Mpofu	1.05	1.00	1.06	0.04	**0.62**	1.13
Exotic dual purpose: Mpofu	1.00	1.06	0.93	-0.04	**1.17**	1.50
Dairy: Keiskammahoek	1.00	1.01	0.99	0.18	**1.04**	-11.15
Irrigated Citrus: Mpofu	1.00	1.13	0.92	-0.08	**0.65**	0.61
Irrigated Cabbage: Zwelitsha	1.00	1.03	0.92	0.19	**1.01**	-42.15
Irrigated Maize: Keiskammahoek	1.00	1.04	0.97	0.11	**0.37**	1.30
Dryland Maize: Herschel	1.00	1.03	0.99	0.03	**0.36**	1.05

A number of important caveats must be borne in mind before any meaningful interpretation of Table 4.4 and subsequent tables can be made. Dairy, cabbage and the

two maize activities selected for analysis are non-tradable within the context of the study area, as is milk. Their case was explained in Section 4.2.4. The level of economic efficiency of resource use in these activities can only be interpreted as it applies to the 'local' village market. This then leaves us with only three genuinely tradable activities in the study area, namely, indigenous beef (Nkone) cattle, the exotic (Simmentaler) dual-purpose cattle, and the irrigated citrus activity.

However this does not mean that the rest of the figures, i.e. those relating to activities that are not 'genuine' tradables, will be totally discarded in the interpretation of results. They will only be interpreted with due qualifications. Although the DRC methodology does not necessarily apply to activities that are not tradable outside national boundaries, its application has been stretched in this study to include activities that are at least partly commercially exchanged.

A general overview of the results presented in Table 4.4 suggests that, under the given set of assumptions relating to opportunity costs, and bearing in mind the caveats mentioned above, smallholders in the Eastern Cape produce certain commodities both profitably and efficiently. Although no intensive effort was taken to compare these farmers' efficiency with that of commercial farmers, these results do expose very important findings in this regard. Using land and labour opportunity cost assumptions which apply to commercial farmers, smallholder farmers showed good comparative advantage in two of the activities selected for study namely, indigenous beef and citrus. With a DRC ratio of 0.62 the indigenous beef activity boasts the best indicator of efficiency, followed by citrus at 0.65.

Not to be ignored are irrigated and dryland maize activities. With DRC's of less than 1 these two activities do possess 'comparative advantage'. However, as explained above, their comparative advantage only applies to the 'local' level (i.e. the surrounding village area) market. At the bottom of the range are dairy, irrigated cabbage and exotic cattle activities, with each recording a DRC ratio exceeding 1, suggesting a lack of comparative advantage. This informs us that the cost of employing domestic resources to raise exotic cattle or dairy or to grow cabbage exceeds the resulting value-added from such an

exercise. The direct message from these results is that, *ceteris paribus,* it is probably not worthwhile to society for smallholders to continue raising exotic dual-purpose or dairy cattle or produce irrigated cabbage in the Eastern Cape.

These assertions could not be considered conclusive without subjecting the data to further tests. Thus for the purpose of expanding the scope of discussion, it was deemed appropriate to conduct a sensitivity analysis. It would only be interesting to determine how sensitive the above results are to the assumptions about opportunity costs. The next section presents the results emanating from this investigation.

4.3.2 Interpretation of Results Including the Outcome of Sensitivity Analysis

Although the main concern of this section is to report the sensitive nature of the original results to changes in opportunity costs, it is not the only one. As shown in Tables 4.6 through 4.11, other changes such as that of the 'off-take' rate in the cattle activities and the citrus export percentage were also tested. An extract of these results is presented in Table 4.5.

Table 4.5 contrasts outcomes from two scenarios namely, the "most relaxed" estimate of opportunity cost (comparable to smallholder private costs) versus the "strictest" social cost (comparable to white commercial costs) (Lyne, 2000; see also Ohene-Anyang, 1997). The "most relaxed" columns show data on land and labour costs, which approximate those reported or observed from the farmer's point of view, i.e. his private costs. They also show a resultant 'DRC' when using these more lenient assumptions. Under the most conservative scenario, the opportunity costs of land and labour approximating commercial rates are recorded with their resultant DRC and other PAM indicator ratios. The rest of the scenarios (see Table 4.6 to 4.11) indicate how the comparative advantage situation is likely to change if the assumptions regarding the opportunity costs of labour and land, as well as other factors change. These are discussed in more detail below as they apply to each of the chosen smallholder activities.

Table 4.5: Contrasting Outcomes from Strictest (Private Level) Versus Most Relaxed (Commercial Level) Assumptions

Activity	"Most Relaxed" Opportunity Cost Estimates			"Strictest" Opportunity Cost Estimates							
	Land (R/ha)	Labour (R/day)	DRC	Land (R/ha)	Labour (R/day)	**DRC**	NPCO	NPCI	EPC	SRP	PC
Indigenous Cattle[a]	12	10	0.37	30	20	**0.62**	1.05	1.00	1.06	0.04	1.13
Exotic Cattle[b]	15	10	0.96	30	10	**1.17**	1.00	1.06	0.93	-0.04	1.50
Dairy Cattle[c]	0	10	0.77	600	10	**1.04**	1.00	1.01	0.99	0.18	-11.15
Irrigated Citrus[d]	2900	30	0.79	2000	20	**0.65**	1.00	1.06	0.96	-0.06	0.61
Irrigated Cabbage[e]	0	10	0.86	450	10	**1.01**	1.00	1.03	0.92	0.19	-42.15
Irrigated Maize[f]	0	10	0.15	600	10	**0.37**	1.00	1.04	0.97	0.11	1.30
Dryland Maize[g]	0	10	0.32	100	10	**0.36**	1.00	1.03	0.99	0.03	1.05

Notes:

a (1) The DRC of 0.62 is a result of use of infrastructure coefficient comparable to that of exotic cattle farm. Keeping real economic land and labour costs constant and using reported infrastructure costs pushes DRC up more than one and half times; (2) a most likely off-take rate of 16% was used as opposed to a rate of 14% reported in the survey.

b An additional assumption in the DRC calculation was that the 14 % off-take rate reported in the survey reflects the likely scenario in exotic cattle activity.

c Land was valued at its assumed real economic cost of R600 as opposed to a zero cost as reported in the survey.

d Land was valued at almost three times lower than it's reported value. An export percentage of 65% was also assumed instead of 60% reported in the survey. This makes citrus more profitable than was reported in the survey.

e Land was valued at its assumed real economic cost of R450 as opposed to a zero cost as reported in the survey.

f Land was valued at its assumed real economic cost of R600 as opposed to a zero cost as reported in the survey. Real opportunity cost of family labour was assumed to be R10 a day, which is comparable to a commercial wage rate elsewhere in the survey area.

g The opportunity cost of land was assumed to be R100 as opposed to a reported value of zero.

4.3.2.1 Indigenous Beef

Indigenous beef (Nkone) cattle farmers in the study area leased land from the state at a nominal rate of R12 per hectare. This is land transferred from the then 'republic' of South Africa to the former homelands, which subsequently became property of the South African Native Trust as stipulated by the Natives Trust and Land Act of 1936 (see Section 3.3.2.1 for a detailed background discussion).

The hired labour employed was paid a wage of R10 a day, which was considered as the market-related rate in the study area. In the Nkone farming system studied, the smallholder farmer had made some physical capital investments in preparation for an envisaged privatisation of the farm. This decision by the farmer was taken to be of special significance as it turned out that it would have some bearing on the results pertaining to smallholder comparative advantage on indigenous beef. This is discussed in more detail below.

In the sensitivity analysis exercise, the "relaxed" level resource costs borne by the Nkone smallholder were taken as the first possible opportunity costs scenario (see Table 4.6). An additional factor was recorded as part of the first scenario, that is, an off-take rate of 16 percent was assumed. Using this scenario the smallholder farmers would enjoy superior comparative advantage as seen in a DRC of 0.37. If higher opportunity costs (double the relaxed level costs) are applied, the efficiency ratio rises to a less efficient but still impressive 0.44, even after a higher and more likely[25] off-take rate of 16 percent is used. This ratio is still safely lower than the threshold 1 above which comparative advantage is considered non-existent.

Although the opportunity costs of land and labour play a role in determining smallholder comparative advantage in the Eastern Cape, such a role seems to be miniature. It should also be pointed out, however, that land and labour opportunity costs seem to still play a relatively more important role than the quantity of output.

[25] A higher off-take rate would make more sense for the Nkone considering its physical advantages.

The rest of the sensitivity analysis results show that smallholders will enjoy comparative advantage only up to a certain level of opportunity costs of land and labour. Even though no threshold level was measured, it seems that if land and labour opportunity costs were to increase up to R60 a hectare and R20 per day respectively, society would no longer gain from smallholder use of resources in raising indigenous beef.

Another important factor in determining comparative advantage was considered to be the fact that the Nkone cattle have become adapted to the Eastern Cape environment over more than a thousand years (Hundleby, *et al.*, 1986). Characteristics such as low mortality rates, favourable off-take rates, disease resistance and general hardiness, add to the advantages of these indigenous breeds.

In this analysis, it was assumed that the Nkone's natural hardiness as a breed could potentially play a role in determining their comparative advantage. Based on evidence of Nkone's 'extensive' nature, and comparable observations from other livestock activities, namely exotic cattle, 'real fixed' costs for Nkone were assumed to be no higher than those observed for the farm keeping exotic cattle. The results of an analysis done in the activity budgets using these lower fixed costs showed that the Nkone activity had a substantial comparative advantage. This comparative advantage disappears rapidly when 'intensive' type infrastructure is added to the Nkone activity. The real economic land and labour costs were kept constant and private/reported/observed infrastructure costs were used. This adjustment pushed the DRC up by more than one-and-half times. This suggests that success using indigenous cattle will require avoiding capital intensive technologies.

Together with scientific findings on Nkone's physical performance (Hundleby, *et. al.*, 1986), these comparative advantage results clearly demonstrate the Nkone cattle activity's potential as a leading livestock enterprise for smallholders in the Eastern Cape. Among the seven activities tested in this analysis, indigenous cattle have the third lowest DRC ratio after the two maize activities. However, as explained above the maize results only apply under 'local market' conditions and are therefore relatively less relevant to the study

area. Indigenous cattle are in effect the most potentially profitable cattle enterprise for smallholder producers in the Eastern Cape.

Table 4.6 Sensitivity Analysis: Indigenous Cattle

Scenario						DRC
#	Description		Opportunity cost		Off-take rate (%)	
	Land price level	Labour price level	Land (R/ha)	Labour (R/day)		
1	Low	Low	12	10	16	0.37
2	Low	Low	12	10	14	0.44
3	Low	High	12	20	16	0.46
4	Low	High	12	20	14	0.46
5	Medium	Low	30	10	16	0.59
6	Medium	Low	30	10	14	0.59
7	Medium	High	30	20	16	0.62
8	Medium	High	30	20	14	0.61
9	High	Low	60	10	16	0.84
10	High	Low	60	10	14	0.84
11	High	High	60	20	16	0.86
12	High	High	60	20	14	1.90

According to the NPCI ratios reported in Table 4.5, tradable input markets affecting indigenous beef are free of intervention. However, the EPC ratio exceeding 1 indicates incentives to the farmers through institutional arrangements affecting tradable inputs and increasing private profitability. The NPCO ratio also shows a transfer to the producers as a result of an import tariff in the beef market. The PC ratio shows a more complete picture regarding government intervention in input and output markets since it also includes non-tradable inputs. Such an intervention has acted as a minor disincentive for Eastern Cape smallholders undertaking the indigenous beef activity. This could be explained in imperfections in mainly in the land market. The positive SRP figure also alludes to small transfers to the Eastern Cape beef smallholders. However, these transfers

are almost too negligible to be taken up as major policy indicators. At best, they are only a pointer or warning that better institutional arrangements should be in place if smallholders are to be encouraged to invest in indigenous beef production.

4.3.2.2 Exotic Dual-Purpose Cattle

The survey recorded almost similar private land and labour costs for the exotic (Simmentaler) cattle as their indigenous counterparts, except for a slightly higher land price for the exotic cattle enterprise at R15 per hectare. According to Table 4.5, if these private prices were used as the lower limit opportunity costs, the Simmentaler activity would just manage a modest level of efficiency as measured by a DRC ratio of 0.96. However, a look at the adjacent columns reveals that if commercial-level opportunity costs (more than double the smallholder private costs) are used, such efficiency worsens to an unacceptable level with a DRC of 1.17. It appears that the main factor responsible for such deterioration is the doubling of the land price to represent commercial level opportunity costs in the study area. The sensitivity analysis results in Table 4.7 reveal that beyond land and labour costs of R15 per hectare and R20 a day respectively, the exotic cattle enterprise becomes socially non-profitable (see scenario #5, Table 4.7). It is also revealed in the table that the quantity of meat/milk output plays only a secondary role in shaping smallholder comparative advantage in exotic dual-purpose cattle in the study area. A more primary role is taken up by the opportunity costs faced by smallholder farmers, especially those of land.

The NPCO ratio of 1 (see Table 4.5) indicates zero intervention in output markets affecting exotic cattle products, i.e. meat and milk. Since all the smallholder farmers included in the survey area are not registered for value added tax (VAT), they still incur tax on certain inputs. Many of the inputs used by the farmers are zero-rated, for example, animal feeds and remedies, fertiliser, pesticide and seed. The effect of VAT is therefore very small, hence the NPCI ratio of just over 1. As in all the smallholder activities studied, the EPC ratio for exotic cattle has remained just less than 1, which indicates a minor disincentive in the tradable input market for these activities. The farmers, it seems,

could easily avoid this disincentive by registering for VAT exemption. The interpretation of the EPC is the same for all activities studied and will therefore not be carried on to the rest of the activity subsections. The effect of the minor tax disincentive in tradable input markets for exotic cattle are easily offset by a generous incentive in non-tradable input markets. This is indicated by a PC ratio of 1.50, which incorporates the effects of intervention in non-tradable input markets.

An important finding from the sensitivity analysis results is that only through increased subsidisation of land prices could the Simmentaler activity boost its social profitability. Sadly, however, exotic cattle cannot be expected to survive with the need for relatively more intensive management than their indigenous counterparts, poor local milk market and poor prospects for lower land prices. Any remnant exotic cattle farmers would likely disappear in the near future as policy encourages indigenous cattle production instead, by making more investments in an enabling institutional environment for this activity.

Table 4.7 Sensitivity Analysis: Exotic Cattle

Scenario						DRC
#	Description		Opportunity cost		Off-take rate (%)	
	Land price level	Labour price level	Land (R/ha)	Labour (R/day)		
1	Low	Low	15	10	16	0.96
2	Low	Low	15	10	14	0.96
3	Low	High	15	20	16	0.99
4	Low	High	15	20	14	0.99
5	Medium	Low	30	10	16	1.10
6	Medium	Low	30	10	14	1.17
7	Medium	High	30	20	16	1.14
8	Medium	High	30	20	14	1.14
9	High	Low	60	10	16	1.39
10	High	Low	60	10	14	1.39
11	High	High	60	20	16	1.42
12	High	High	60	20	14	1.42

4.3.2.3 Dairy

Based on an initial arrangement within the context of the agricultural schemes, the smallholder dairy farmers studied did not pay for land. They only paid the market-wage rate of R10 per day for hired labour and the relevant amounts for tradable inputs. Taking this as the lower limit scenario in the sensitivity analysis, the results show that smallholder dairy farmers in the study area would manage a fair level of comparative advantage. Previous surveys conducted in the study area estimated opportunity costs for land under dairy, including irrigated pasture, at R600 per hectare. Taking this commercial rate and a labour price of R10 per day immediately exposed the dairy smallholders' poor efficiency in the use of resources as seen in the DRC of 1.04. Again the role played by the opportunity cost of land takes special prominence.

It seems that dairy is prone to the same challenges of intensive management demands and low local milk prices as is the dual-purpose activity. A study conducted by Sonandi and Van Averbeke (1995) among the Keiskammahoek dairy farmers emphasise the important role that management plays in dairy farming. They found that negligent management was to blame for decreasing milk yields in the Keiskammahoek irrigation scheme. However, as would be expected in any farming activity, management was by no means the sole determinant of profitability among the smallholder dairy farmers studied. Even the relatively superior management observed among these farmers was not enough to get the dairy enterprise to an acceptable level of social profitability.

A closer look at some of the figures presented in Tables 4.5 and 4.8 reveals other interesting observations about the smallholder dairy activity. Of particular interest are the SRP and PC figures in Table 4.5. An SRP figure of 0.18 reveals a subsidy to smallholder dairy producers. A quick glance in the next column magnifies this view. The PC ratio applying to dairy producers is -11.15. The negative in the figure is a reflection of a negative social profit denominator, which consequently affected the sign of the ratio. The sign should therefore not be incorrectly interpreted to show a disincentive towards smallholder dairy producers. Instead the three indicators together namely, the positive

SRP ratio, the negative in the PC ratio, and the PC ratio itself (regardless of the sign), all confirm a significant amount of subsidisation of smallholder dairy producers in the study area. This could be explained by a notably high degree of investment in physical infrastructure in these farms set up during the establishment of the irrigation schemes in the area.

Table 4.8 Sensitivity Analysis: Dairy

Scenario					DRC
#	Description		Opportunity cost		
	Land price level	Labour price level	Land (R/ha)	Labour (R/day)	
1	High	Low	600	10	1.04
2	Low	Low	250	10	0.88
3	Low	High	250	20	1.10
4	Medium	Low	375	10	0.94
5	Medium	High	375	20	1.16
6	High	High	600	20	1.26
7	Zero	Low	0	10	0.77

Prospects for smallholder dairy in the Eastern Cape are not particularly good. A look at the detailed sensitivity analysis results in Table 4.8 supports this assertion. Of the seven scenarios considered only three record a DRC ratio of less than 1. One of these is the smallholder's private level scenario already discussed above which sets the opportunity cost of land at zero. The other two scenarios set the opportunity cost of land at a little more than 60 percent of the commercial level (R375/ha) with the labour opportunity cost at commercial rate. Keeping the opportunity cost of land at 63 percent of the commercial value and doubling the opportunity cost of labour immediately renders dairy socially unprofitable. The result is the same if one holds the labour opportunity cost at double its commercial value and taking that of land even lower at 42 percent of its commercial value (R250/ha). What is reflected here is the equal role that land and labour opportunity cost play in determining the comparative advantage of smallholder dairy in the study

area. It could therefore be concluded that smallholder dairy's social profitability in the study area rests heavily on the unlikely prospect of low land and labour opportunity costs.

4.3.2.4 Irrigated Citrus

The citrus case study (the Kat River scheme) has experienced probably the smoothest process of transfer of ownership and running of production activities from parastatal to individual smallholder farmers in the Eastern Cape than any other former parastatal project activity. It has also continued to be the only exported and therefore real tradable smallholder farming activity. Farmers directly incur a cost of R2900 (rental from the state) per hectare for their land. The labour was observed to be 200% more expensive than all the other activities chosen for analysis at R30 per day. Taking these observed conditions as the first (lower limit) scenario in the sensitivity analysis (see Tables 4.5 and 4.9), reveals that smallholder citrus in the study area would still enjoy a relatively comfortable level of comparative advantage. This is manifested in the DRC of 0.79 under this scenario. Further investigation revealed that opportunity costs of land and labour for smallholder citrus in the study area were R2000 per hectare and R20 per day respectively. This scenario significantly improves the activity's social profitability by close to 20 percent. The DRC of 0.65 for smallholder citrus makes it the second best after that of indigenous cattle.

According to Table 4.9, none of the twelve scenarios considered for the sensitivity analysis tests showed lack of comparative advantage for smallholder citrus. These results also show that none of the factors applied in the sensitivity analysis namely, land and labour opportunity costs, as well as export quantity, played a more dominant role than the other in shaping social profitability. However, one cannot underestimate the impact of a good citrus harvest and therefore a high export percentage. It is shown in Table 4.9 that, keeping the opportunity costs of land and labour constant, and adjusting export percentage up or down by 5 percent, tended to have at least an equal effect on the DRC. This is a pointer towards the danger of ignoring the output side and only concentrating on

the input side. The only major threat to the output side is the incidences of hail that have been reported over the years, which have negatively affected export percentage.

After factoring in the observed generous subsidies in the form of initial investments in start-up infrastructure (irrigation lines, etc), the remaining 'incentives' were minor. The SRP of -0.06 in Table 4.5 instead shows some form of taxation to the smallholder citrus farmers in the area. That could probably be traced back to the relatively higher private land and labour costs that these farmers incur. Otherwise, *ceteris paribus*, it appears that citrus carries tremendous prospects for smallholders in the Eastern Cape.

Table 4.9 Sensitivity Analysis: Citrus

Scenario						DRC
#	Description		Opportunity cost		Export (%)	
	Land price level	Labour price level	Land (R/ha)	Labour (R/day)		
1	High	High	2900	30	60	0.79
2	High	High	2900	30	65	0.74
3	High	Low	2900	20	60	0.74
4	High	Low	2900	20	65	0.69
5	Medium	High	2000	30	60	0.75
6	Medium	High	2000	30	65	0.69
7	Medium	Low	2000	20	60	0.69
8	Medium	Low	2000	20	65	0.65
9	Low	High	1000	30	60	0.70
10	Low	High	1000	30	65	0.65
11	Low	Low	1000	20	60	0.64
12	Low	Low	1000	20	65	0.60

An important question to be raised when arguing the citrus case is that of high debt levels of the sample citrus farmers. Is this likely to affect the farmers apparent efficiency? This is a rather thorny issue which is easier to avoid than to tackle. The methodology applied in this study, which uses the DRC as an indicator of comparative advantage, only reveals the extent to which domestic resources earn revenue under a given technology. The data

used to arrive at the indicator ratio is derived from enterprise budgets, which do not account for debt repayment. However, the results should be interpreted with a caution given about the long-term prospects of smallholder citrus if the debt issue is not solved.

4.3.2.5 Irrigated Cabbage

According to the irrigation scheme set-up, the smallholder cabbage farmers surveyed did not pay directly for the land, but paid a market-related wage of R10 per day for hired labour. If this is taken as one of the likely scenarios, these farmers struggle to show any respectable level of comparative advantage judging from a DRC of 0.86. Their efficiency situation worsens when opportunity costs of land and labour are pushed higher. Using commercial level assumptions about opportunity costs, smallholder cabbage shows no comparative advantage.

Both the SRP ratio shows a fair amount of producer subsidisation. The PC ratio particularly looks exaggerated. This is, however, a fair indication of the situation on the ground. Despite the favourable marketing environment for cabbage in the sample area of Zwelitsha, and fairly good yields, this activity has evidently been dependent upon capital and water subsidies for irrigation as well as on full-time extension and training services from the parastatal. The only variable that was factored in this analysis was capital investment. The rest of the variables were not accounted for. These findings suggest that, in a normal uncontrolled environment, smallholder cabbage's comparative advantage in the Eastern Cape is potentially non-existent. The only opportunity for success rests on a particular set of institutional arrangements. If commercial smallholder cabbage is to survive in this province, it would be only under an innovative institutional model whereby technical, human resource and marketing support services to the smallholders would be key. And since cabbage is considered a non-tradable in the study area, all the conclusions only apply to the local market.

Table 4.10 Sensitivity Analysis: Cabbage

Scenario					
#	Description		Opportunity cost		DRC
	Land price level	Labour price level	Land (R/ha)	Labour (R/day)	
1	Low	Low	450	10	1.01
2	High	High	450	20	1.31
3	Medium	Low	300	10	0.96
4	Medium	High	300	20	1.26
5	Low	Low	250	10	0.95
6	Low	High	250	20	1.24
7	Zero	Low	0	10	0.86

4.3.2.6 Irrigated and Dryland Maize

It was observed that from the farmer's point of view, land used in both dryland and maize production was free owing to the afore-mentioned irrigation scheme arrangement. As in the case of other irrigation scheme activities, maize farmers in the study area paid R10 per day for hired labour. The sensitivity analysis results show that among all the activities studied, the two maize activities boast the best social profitability potential under all possible scenarios considered. Taking commercial level opportunity costs for land and labour, irrigated and dryland maize had virtually the same DRC's: 0.37 and 0.36 respectively. A fair amount of subsidisation is observed in both the SRP and the PC ratios.

For reasons already discussed, smallholder maize's potential is only limited to the local level market. A closer look into the local market reveals that high transaction costs associated with maize marketing threaten even the local market for this crop. Over-saturation of the market during good harvests would put downward pressure on the price, making it futile to pursue maize production in the area. Such considerations lead one to conclude that maize would at best remain a subsistence crop among smallholders in the Eastern Cape.

Table 4.11 Sensitivity Analysis: Irrigated and Dryland Maize

Activity	Scenario					DRC
	#	Description		Opportunity cost		
		Land price level	Labour price level	Land (R/ha)	Labour (R/day)	
Irrigated maize	1	'Real'	Low	600	10	0.37
	2	High	Low	400	10	0.30
	3	High	High	400	20	0.43
	4	Medium	Low	300	10	0.26
	5	Medium	High	300	20	0.40
	6	Low	Low	200	10	0.23
	7	Low	High	200	20	0.36
	8	Zero	Low	0	10	0.15
Dryland maize	1	Low	Low	100	10	0.36
	2	High	Low	300	10	0.44
	3	High	High	300	20	0.75
	4	Medium	Low	200	10	0.40
	5	Medium	High	200	20	0.71
	6	Low	High	100	20	0.67
	7	Zero	Low	0	10	0.32

4.4 Concluding Remarks

During the best part of the 20th century black smallholder farming in South Africa was largely forgotten both in research and policy making circles. This neglect was determined mainly by the socio-political circumstances prevailing during the apartheid era in the former homeland areas where these farmers are based. These circumstances were such that black farming was actively discouraged in favour of the white large-scale farming sector. These factors have culminated in a situation whereby researchers and policy makers know little about the black smallholder sector.

An extreme notion that seems to dominate the perception of some scholars is that smallholder farming has no prospect of being rehabilitated to the level it used to achieve before it was deliberately suppressed. The present study takes up the challenge of providing evidence to the contrary, and of illustrating that at least for some black smallholders in some circumstances, smallholder farming can provide a viable way to increase rural livelihoods.

The previous section presented results of a survey of selected smallholder activities spread throughout the central region of the Eastern Cape province. Specifically it showed what activities black smallholders in this province can pursue profitably and with an acceptable level of efficiency. In other words, it reveals areas in which these farmers possess comparative advantage, which could be built upon. According to these results, two of the smallholder activities studied in particular are highlighted to have a comparative advantage. Indigenous beef cattle show a considerable potential under low fixed cost technologies. In general, the semi-arid climate, steep topography and cattle-favouring vegetation types found in much of the Eastern Cape, all combine to reinforce the potential for this breed in the province. The study also found that it would be particularly important, when investing in this type of activity, for smallholders to keep fixed costs low in order to draw advantage from the adaptation of the Nkone breed to the local physical conditions. It was shown that heavy infrastructure investment boosted per unit costs in a way that was not adequately compensated for by increased productivity. Better local beef marketing arrangements that would lower transaction costs would arguably in turn boost the returns to the farmer and to society as a whole.

In addition to indigenous beef cattle, citrus also presents special opportunities along river valleys where there is good soil and abundant water for irrigation. Physically, these valleys are deep and the occurrence of level land is generally limited and localised (Van Averbeke, 1995). Notwithstanding these limitations, citrus has maintained a good track record as possibly the only true foreign exchange earner available to smallholders in the Eastern Cape province.

To maintain this record, smallholder citrus needs to maintain a good export percentage as much of its profitability depends on export earnings (at least 60 percent of total output). The key holding observed was in the order of 20 hectares. It is questionable whether citrus holdings of smaller than 10 hectares in the Eastern Cape could support full-time agricultural production by an individual with the requisite skills for horticulture. It is also important that the actual degree of subsidy, mainly in the form of water drawn from the river, be adequately specified by policy. It was also observed that poor quality orchards could potentially harm profitability. There is a need for investment in new orchards which would also mean more and better quality output, more export percentage and therefore enhanced profitability. An important factor in these farmers' long-term performance is that of debt servicing. Their sustainable profitability will depend very much on their progressive ability to repay their debt and redeem themselves from their current reputation of bad debt servicing.

The rest of the activities studied are either not socially profitable under the specified opportunity cost assumptions, as in the case of exotic cattle, dairy, and irrigated cabbage, or their profitability only applies to the local market, as is the case with irrigated and dryland maize. These results only serve to indicate a need for increased attention from policy-oriented and technology-oriented researchers as well as increased agricultural support in the higher potential areas. The concluding chapter elaborates on this issue.

CHAPTER 5

RURAL GROWTH LINKAGES IN A SMALLHOLDER FARMING AREA IN THE EASTERN CAPE

5.1 Introduction

With the first phase of this research having established that smallholders do have a comparative advantage in some agricultural activities, the aim of the second phase was to address the issue of the impact of rising smallholder incomes on the local economy. The second phase consisted of a survey of household consumption and expenditure behaviour in the Middledrift district, from whose results growth linkages were then calculated. From these results it should be possible to identify areas of intervention necessary to sustain growth originating from a stimulus to tradable agriculture from economic reform.

The survey for the second phase was carried out in two Middledrift villages, namely Ann Shaw and KwaNdindwa[26]. The degree of contrast between these two villages made it possible to make certain comparisons between some factors of significant importance in the context of the findings of this research. The three rounds of interviews conducted were carefully scheduled around the major expenditure periods during the first quarter of the year. First, the mid- and end-month periods of February and March during which many of the professional, regular and casual wage earners get paid. Second, the month of March during which the second old age pension cheques for the year are handed out. Third, the major expenditure time of Easter during the first week of April at which time most food and consumer non-durables are purchased in the first quarter of the year.

[26] See Section 5.4 for a description of the survey method.

However, the results should be interpreted bearing in mind that this research excluded the important expenditure time of Christmas.

Each survey round lasted for a week on average. In order to fill any major data gaps, for example missed expenditure for items such as consumer durables, the recall period was extended to a maximum of one year in such cases. However, because of their sensitive nature, certain types of data were particularly challenging to probe. These include data on income earnings, formal savings, and alcohol and stimulants expenditure. Notwithstanding these challenges, data of major significance to the objectives of this research were adequately and satisfactorily captured. The surveys recorded information on household composition, decision making, household income and income sources, assets, agricultural production, and the household's consumption and expenditures on foods and non-food goods and services.

5.2 Origins of the Concept of Linkages

It was pointed out in the preceding chapter that the concept of comparative advantage was challenged by a number of studies by development economists beginning in the 1950s and 1960s. The thinking of that time was that the scope of economic growth through agricultural and other primary exports was limited (after Raul Prebisch and Hans Singer). Albert Hirschman was one of the most influential development economists of that era through his empirical work in Latin America. In his book, *The Strategy of Economic Development* (1958), he introduced the concept of (*production*) "linkages" between industries or sectors. These were classified as "forward" and "backward" linkages arising from an investment in any type of activity. Backward linkages on one hand were defined as the demand for inputs arising from the new investment. Forward linkages on the other hand were considered as the new productive activities arising from a new intermediate product on the market (Delgado, *et al.*, 1998; Staatz and Eicher, 1998).

Agriculture was generally considered to have no direct stimulus to the setting up of new activities through linkage effects, and manufacturing was seen as superior in this respect. It was therefore concluded that investment in industry would "create" a comparative advantage, generally leading to more rapid and more broad-based economic growth than would investment in agriculture.

According to Staatz and Eicher (1998:11) the distress about the lack of attention to agriculture prompted economists like Bruce Johnston, John Mellor and William H. Nicholls to emphasise the importance of agriculture in economic growth. Drawing on the insights from the Lewis' two-sector model, Johnston and Mellor (1961), argued that agriculture could make five important contributions to the structural transformation of developing countries. It could provide labour, capital, foreign exchange, and food to a growing industrial sector and also supply a market for domestically produced industrial goods.

Another development in the study of the role of agriculture in economic development was a shift from theory to empirical research. Based on experiences in industrialised countries, development programmes of the 1950 also emphasised the American model of agricultural extension as well as the "diffusion model" of agricultural development. The diffusion model came under scrutiny following the failure of extension and community development programmes to achieve the desired results. Consequently, Schultz (1964) influenced a major shift from agricultural extension towards investment in agricultural research and human capital.

The "high-payoff input" model subsequently took over as the dominant agricultural development model during the 1960s and the 1970s following the success of the Green Revolution technology in Asia. At the backdrop of this success, Mellor (1966) and Adelman and Morris (1973) argued a case for strong *consumption linkages* from agriculture. According to Delgado, *et al.* (1998:6), in a closed economy consumption linkages are generated as a result of new spending on tradable items which in turn creates new demand for items for which there was previously insufficient local demand. If there

are underused resources in the local economy as a result of insufficient demand for what they can produce, then the new consumption adds to total production of these previously demand-constrained items.

Based on findings from their Asian work, Mellor and Lele (1973) (cited by Haggblade, *et al.*, 1989), put emphasis on the significance of agricultural consumption linkages, concluding that middle-sized peasant farmers spend more of their incremental income on labour-intensive and rurally produced goods than their large-scale and urban counterparts. Such spending generates new demand "multipliers". These multipliers indicate how much extra net income could be generated in rural areas from new production of non-tradable goods and services arising from new household income gained from tradable sectors (Delgado, *et al.*, 1998:2).

5.3 Empirical Studies on Growth Linkages

Delgado, *et al.* (1998), provide a comprehensive review of the literature on empirical estimation of growth multipliers. This sub-section dwells heavily on their report on growth linkages work done mainly in Sub-Saharan Africa. They cite Peter Hazell and Steven Haggblade as the key contributors to the quantification and modelling of production and consumption multipliers (Haggblade, *et al.*, 1989 and Haggblade, *et al.*, 1991).

Rangarajan (1982) examined historical data and estimated both production and consumption linkages in India. He discovered that the 'agriculture-to-industry' production multipliers were weaker at 13 percent. Consumption linkages on the other hand were quite significant. Bell and Hazell (1980) and Bell, *et al.* (1982) use a semi-input-output model to estimate the effect of technological change on irrigation in Malaysia. Hazell (1984) (cited by Delgado, *et al.*, 1998), simplifies the analysis in his measurement of a multiplier effect on income of an exogenous shock to agriculture. Such a shock could come from a technological change or outside investment. Assuming that

the amount of intermediate inputs used per unit of tradable output does not change as a result of the initial increase in tradable output, the multiplier (M) is measured as:

$$M = \frac{1 - a_{nn} + a_{nt}\left(v_n / v_t\right)}{1 - a_{nn} - \beta_n v_n (1 - s)},$$

Where:

v_n = a constant with a value equal to $1-a_{tn}-a_{nn}$; the share of value added in gross output of the non-tradable sector;

v_t = similarly for tradables;

a_{nn}, a_{tn}, = respectively, the share of non-tradable intermediate inputs in non-tradable and tradable output (between 0 and 1);

β_n = marginal propensity to consume non-tradables;

s = leakage; a constant proportion of total income (savings and tax rate).

Assuming that $a_{nn} = a_{nt} = a_n$ (intermediate demand for non-tradables) and $v_n = v_t = v$, the multiplier becomes:

$$M = \frac{1}{1 - a_n - \beta_n v (1 - s)}.$$

Hazell's simplified multiplier can be easily measured using values for the marginal budget share (MBS) for non-tradables in household expenditure (β_n), the ratio of non-tradable intermediates to gross output in total production (a_n), and the ratio of value added to gross output in total production (v). By setting $\beta_n = 0$, the effect of production linkages alone can be easily derived. A vital feature of the model is the assumption that the supply of non-tradables is perfectly price elastic, with output constrained by effective demand.

5.4 Measurement of Growth Linkages in this Study

This study utilised data collected with the use of structured questionnaires over three rounds in 1998. A total of 100 randomly sampled households were interviewed in two villages of Middledrift district in the central Eastern Cape. The sample was subdivided such that 50 households were surveyed in each of the two chosen villages namely, rural KwaNdindwa and the relatively more 'urbanised' village of Ann Shaw. The survey had two immediate main objectives. The first objective was to examine how increased rural incomes would be spent on a mix of tradable and non-tradable farm and non-farm good/ service categories. The second goal was to assess the potential for these expenditure patterns to generate growth multipliers in the rural areas. The analysis estimated modified Working-Leser regressions (Hazell and Röell, 1983; Delgado *et al.*, 1998) to estimate marginal budget shares (MBS) for a typical rural household in each specified good/service category, based on mean values from the household survey. Growth multipliers were estimated expeditiously by ignoring the use of non-tradable inputs, leading to a very simple algorithm.

5.4.1 The Household Expenditure Model

Average budget shares (ABS) represent the percentage of total household expenditure that goes to a given commodity or expenditure group. Marginal budget shares (MBS) are the percentages of the last increment of income spent on a given good or expenditure group. Dividing MBS by ABS gives income elasticity, that is, the responsiveness of expenditure on a given good or group of goods to increments in income.

It is hypothesised that the MBS for non-tradable goods are the principal factors driving the estimates of growth multipliers (Haggblade, *et al.*, 1991). These marginal budget shares depend on the pattern of rural consumption, which may differ by location and by income category (Delgado, *et al.*, 1998). Marginal budget shares were obtained by employing the modified Working-Leser model (Hazell and Röell, 1983) for each good category, adapted to cross-sectional household level data. This model entails using total

expenditures as a proxy for income in order to estimate Engel functions. Marginal budget shares would then represent marginal propensities to consume, provided the total expenditures were a good proxy of household income (Delgado, *et al.*, 1998). A modified Working-Leser model of the following form was employed for estimation:

The linear Engel curve is:

$$E_i = \alpha_i + \beta_i E \qquad (1)$$

The function above, however, does not permit the marginal budget share (β_i) to vary at all. A modified Working-Leser model was thus chosen:

$$S_i = \beta_i + \alpha_i / E + \gamma \log E \qquad (2)$$

To allow comparison of expenditure behaviour of households with different incomes, allowance was made for differences in their other socio-economic characteristics. Engel functions of the following form were thus estimated:

$$E_i = \alpha_i + \beta_i E + \gamma_i E \log E + \Sigma_i (\mu_{ij} Z_j + \lambda_{ij} E.Z_j) \qquad (3)$$

Where E_i is expenditure on commodity i
E is total consumption expenditure
Z_j are household characteristic variables, and
$\alpha_i, \beta_i, \gamma_i, \mu_{ij}, \lambda_{ij}$ are constants

Instead of a restrictive linear Engel curve, this functional form allowed for non-linear relationships between consumption and income. It also controlled for household characteristics that may affect both the intercept and slope of the Engel function. The model was estimated in share form in order to mitigate potential heteroskedasticity problems (Hazell and Röell, 1983). Dividing equation (1) by E gives,

$$S_i = \beta_i + \alpha_i / E + \gamma \log E + \Sigma_i (\mu_{ij} Z_j / E + \lambda_{ij} Z_j) \quad (4)$$

Where $S_i = E_i/E$ is the share of commodity i in total expenditure.

The marginal budget share (MBS_i), average budget share (ABS_i) and expenditure elasticity (ξ_i) for the ith commodity is:

$$MBS_i = \partial E_i/\partial E = \beta_i + \gamma_i (1 + \log E) + \Sigma_j \lambda_{ij} Z_j \quad (5)$$

$$ABS_i = S_i \quad (6)$$

$$\xi_i = MBS_i / ABS_i \quad (7)$$

For the average household, these equation terms are evaluated at the sample mean values for E and Z_j. But across expenditure groups (say upper and lower expenditure halves, as done in this study), then E and Z_j are assigned their mean values for relevant halves. These share equations were estimated by ordinary least squares (OLS).

5.4.2 Choice of Explanatory Variables

Table 5.1 below summarises the independent variables selected for inclusion in the share equations for the two villages studied. The variables in Table 5.1 were included on the basis that they logically explain the relationship between income and consumption of individual commodities. All these are self-explanatory. Many household characteristic variables were included to prevent bias in the estimator arising from omission of significant sources of inter-household variability in expenditure behaviour.

Hazell and Röell (1983) noted some disadvantages to estimation of the above share equations. First, R^2 coefficients are typically smaller. Second, the inclusion of many explanatory variables in the equation for every commodity or expenditure group wastes

some degrees of freedom. This was particularly the case in the Middledrift regressions due to the small sample size. Third, the need to use the same functional form in each equation cancels out a common approach of fitting several different functions for each commodity, and then choosing the one that fits best.

Table 5.1: Independent Variables included in the Middledrift Regressions

Description	Name	Unit
Intercept	INTERCEPT	R
Reciprocal of total expenditure	1/E	R
Log of total expenditure	LOG_E	
Distance from nearest tar road	TARDIST	km
Distance from nearest tar road divided by total expenditure	TARDIST/E	
Size of household	HHSIZE	# of people
Size of household divided by total expenditure	HHSIZE/E	
Age of household head	AGEHEAD	years
Age of household head divided by total expenditure	AGEHEAD/E	
Value of household assets (e.g. TV, radio, refrigerator)	ASSETSR	R
Value of household assets divided by total expenditure	ASSETSR/E	
Number of babies (less that one year old) per capita	BABIES	# of people
Number of babies per capita divided by total expenditure	BABIES/E	
Number of children (one to five years old) per capita	CHILD	# of people
Number of children per capita divided by total expenditure	CHILD/E	
Number of youths (6 to 15 years old) per capita	YOUTH	# of people
Number of youths per capita divided by total expenditure	YOUTH/E	
Number of adult women per capita	WOMEN	# of people
Number of adult women per capita divided by total expenditure	WOMEN/E	

5.4.3 The Household Consumption and Expenditure Behaviour in Middledrift

Table 5.2 below summarises the consumption and expenditure behaviour of an average household in Middledrift, Eastern Cape. The sample is disaggregated into lower and upper expenditure halves, and rural and small town locations. These findings are a result

of evaluation of equations (5), (6) and (7) for MBS, ABS and expenditure elasticities (see Section 5.4.1). The disaggregated results were found to be statistically non-significant. However, this has little bearing in the interpretation of the 'whole sample' results.

Results in Table 5.2 in the "whole sample" columns reveal that households in Middledrift spend more on basic food than on any other good or service group. Up to a third of the total budget of the average household in Middledrift is spent on food. These include starches such as maize meal, samp (stamped maize) and rice and other grocery items such as fresh and sour milk, bread flour, vegetables, sugar, oils, and meat. Steyn (1988) found an even higher figure in the adjacent Peddie district. Along with transportation and other expenditure (church contributions, support for relatives, donations and pocket money), the expenditure elasticity of food in Middledrift is less than unity, suggesting that these items are necessities among Middledrift households.

Food remains a necessity in the rural half of the Middledrift sample at expenditure elasticity of 0.23. This is consistent with findings by Nieuwoudt and Vink (1989) in rural KwaZulu-Natal province. However, in the small town half of the sample, food staples are increasingly becoming inferior, judging from the negative elasticity. It seems that family and social obligations (family and social traditional festivities and ceremonies) occupy most of incremental incomes. Also, as incomes increase, this group becomes the most important in rural budgets.

The bottom section of Table 5.2 presents results on whether household income growth will stimulate production of farm or non-farm (demand-constrained) non-tradables. The results show that households in Middledrift allocate almost half of their budgets to non-tradable goods. Half of Middledrift incremental incomes are spent on non-tradables. The better part of these expenditures (64 percent) is on non-farm non-tradables. Non-farm non-tradables will become a more important part of their budgets as incomes increase. It appears that non-farm sectors such as transportation, liquor and tobacco, furniture, education, medical, communication, and family and social obligations will grow the most as rural incomes in Middledrift increase.

5.4.4 Treatment of Household Consumption and Expenditure Data

Characterisation of expenditure goods and services according to sector and tradability is central in the interpretation of growth linkage results. In their linkages study in Niger, Delgado, *et al.* (1998) elaborate on this assertion. For example, treating a non-tradable good as tradable inevitably leads to an underestimation of the amount of additional growth that can be derived through linkage effects. This is taking into account the fact that tradables, by definition, are imports or exports. Therefore their additional demand leads to leakage of income from the region of concern rather than to stimulation of new local production.

In this study, the survey data were first aggregated and categorised into sixteen groups, then further aggregated into "farm tradable", "farm non-tradable", and "non-farm non-tradable". This was done in order to allow calculation of average budget shares and marginal budget shares by expenditure group and by sector and tradability group. Growth multipliers of sector and tradability groups would then be readily derived.

The sixteen categories into which the data was aggregated are: food, household cleansing materials, fuel and lighting, clothing and footwear, furniture, housing, transportation, liquor and tobacco, medical, educational, entertainment, insurance and savings, communication, family and social obligations, agricultural and other/miscellaneous expenditure. These were further aggregated into farm tradable, farm non-tradable, non-farm tradable, and non-farm non-tradable.

Table 5.2: Consumption and Expenditure Behaviour of an Average Household in Middledrift, Eastern Cape

Group	Whole sample		
	ABS	MBS	Elasticity
By commodity			
Food	0.36	0.33	0.94
Cleansing materials	0.07	-0.06	-0.85
Fuel and lighting	0.08	0.09	1.12
Clothing and footwear	0.04	-0.01	-0.40
Furniture	0.06	0.12	2.03
Housing and construction	0.02	0.05	2.18
Transportation	0.08	0.07	0.92
Liquor and tobacco	0.01	0.04	2.88
Medical	0.05	0.07	1.39
Educational	0.04	0.10	2.35
Entertainment	0.002	-0.01	-3.61
Communication	0.05	0.08	1.71
Family/social obligations	0.04	0.05	1.36
Agricultural	0.01	0.02	3.27
Other expenditure	0.09	0.05	0.50
By sector & tradability			
Farm tradable	0.19	0.18	0.94
Farm non-tradable	0.16	0.18	1.09
Non-farm tradable	0.35	0.32	0.92
Non-farm non-tradable	0.29	0.32	1.09

"Farm" goods were relatively simple to classify as these include those originating on farm, for example, horticultural, crop, and livestock items produced on the household land. "Non-farm" goods on the other hand include all the items originating off-farm and all consumption durables and non-durables.

Tradability was observed on the basis of local boundaries. The definition by Delgado, *et al.* (1998) of 'local' as radius of 100km around the household was adopted. Non-tradables were defined as those goods freely traded within the local area, but not outside it. Such factors as perishability and bulkiness were incorporated in determining whether or not a good was tradable in the local context. Derivation of marginal budget shares from household expenditure models requires the above classification exercise. Table 5.3

classifies goods/services according to whether they are tradable or non-tradable and whether they are farm or non-farm.

Table 5.3: Classification of Good and Services into Farm and Non-Farm Tradable and Non-Tradable Categories in the Middledrift 'Local' Boundary Area

Item	Classification
Farm goods	
Home-grown vegetables	Non-tradable
Home-consumed livestock and livestock products	Non-tradable
Non-farm goods and services	
Fuel (Batteries, candles, paraffin, electricity, matches)	Tradable
Household cleaning, laundry, toiletries, cosmetics, medicines	Tradable
Liquor and tobacco	Tradable
Magazines, newspapers, gambling	Tradable
Clothing	Tradable
Medical services	Non-tradable
Education (school fees, tuition, books and other expenses)	Non-tradable
Transport	
Service	Non-tradable
Fuel & repair expenses	Tradable
Communication services (telephone calls, postage)	Non-tradable
Other services (church contributions, donations)	Non-tradable
Housing expenses (building materials)	Tradable
Consumer durables	
Household furniture	Tradable
Jewelry	Tradable
Household appliances (TV, Radios, fridges, stoves)	Tradable
Blankets	Tradable
Dishes, containers	Tradable
Vehicle purchases	Tradable
Food	
Dairy products	
Fresh milk, sour milk, cheese, creamers, sterilized milk	Non-tradable
Maize and maize products	
Maize meal, samp, mealie-rice	Tradable
Cereals and cereal products	
Rice, flour, pasta, oats, breakfast cereals	Tradable
Prepared foods	
Potato chips, fried fish, fat cakes	Non-tradable
Fresh fruits and vegetables	Non-tradable

Item	Classification
Canned fruits and vegetables	Tradable
Legumes	Tradable
Dry beans, peanuts, soya products, peanut butter	
Meat	
Pork, mutton, chicken, sausages, cooked meat	Non-tradable
Fresh fish	Non-tradable
Canned fish	Tradable
Fats and oils	
Margarine, cooking fat, butter	Non-tradable
Cooking oil	Tradable
Eggs	Non-tradable
Sugar	Tradable
Food seasoning items	Tradable
Sweets and chocolates	Tradable
Dessert items	Tradable
Canned food	Tradable
Jam, syrup	Tradable
Soft drinks and beverages (tea, coffee, fizzy drinks)	Tradable
Home-made beverages (traditional beers)	Non-tradable
Baby foods	Tradable
Other food items	
Soups, sauces, vinegar, yeast	Tradable
Agricultural items purchased	
Fertiliser, veterinary supplies, seed, chemicals, equipment, implements	Tradable

5.4.5 The Growth Multiplier Model

Growth multipliers are a measure of how much extra net income growth can be derived in the rural areas from stimulating production in the non-tradable sectors through new effective demand from a unit of new income from the tradable sectors. A multiplier is a numerical derivation from a regional model that typically incorporates household demands and intermediate demands between sectors. Conceptually, computing a multiplier requires a definition of what is inside the region of interest and what is outside, and spin-off effects are limited to those inside the zone. In Middledrift, the region of interest was restricted to local administrative boundaries. Definition of a region of interest makes possible the identification of consumption items that are tradables and non-tradables with respect to the region of interest.

For present purposes, a non-tradable is a good whose current local price is determined by local supply and demand, regardless of modest price movements outside the region of interest. Such goods are typically not traded with points outside the region of interest, and are not close substitutes in consumption with items that are. By definition, all services are non-tradables. Perishable prepared foods are often non-tradables in rural areas, though not in all places. Tradability or lack of it is a characteristic of the local market for a given item and not of the good. Tradables are goods whose local free market price is determined primarily by factors outside the region of interest.

An important difference between tradables and non-tradables thus defined is that an increase in local consumer demand for tradables does not add further to local incomes. This is because the increased consumption is either imported to the region of interest, or local production destined for export is now diverted to local consumption. However, an increase in local consumer demand for non-tradables increases the demand for an item that cannot be imported and is not being exported (by definition). Provided that local resources are not fully employed and available for work, the new demand for non-tradables creates net additions to local employment and incomes. This illustrates a major assumption of linkage analysis, that the elasticity of supply of non-tradable items consumed locally is elastic (Delgado *et al.*, 1998). Failing this, increased demand for non-tradable consumer items stemming from increased incomes in the area of interest will just lead to inflation.

After subjective classification of local consumer items into tradables and non-tradables, this study aggregated the goods and services identified into four main categories: farm tradables, non-farm tradables, farm non-tradables and non-farm non-tradables (see Table 5.3 for a detailed classification).

Estimating the full regional multiplier requires including new demands for non-tradable inputs, in addition to new demands for non-tradable final goods. However, this greatly complicates the calculations. For simplicity, this study ignore non-tradable intermediate inputs, which will bias the results downwards by about 5 – 10 percent, based on

simulations in other African countries (Delgado *et al.*, 1998). It also ignores the fact that the simple formulation in fact assumes that all additional demand for non-tradables goes fully into increased production (and none of it into increased relative prices for non-tradables, implying a perfectly elastic supply of non-tradables). This has been shown elsewhere to bias multiplier estimates upwards by 20 – 30 percent, which more than offsets the downward bias. On balance, the simple methodology may slightly overestimate true multipliers, but by no more than 20 percent.

The simple multiplier is easy to see if we start with the amount of spending left over from an income injection after spending on tradables (which, recall, do not add to net local employment) and savings are netted out: *(1 – MBS tradables – s)*, where "s" is the share of income saved. This is then repeated multiplicatively "t" times, where t is the number of times the income is re-spent in the local community. MBS-tradables and savings are leakages from the re-spending cycle and they would therefore reduce the multiplier. Since the parameters are both positive and less than unity, the multiplier is the solution to an infinite series:

$$Multiplier = (1 - MBStradables - s)^{t}$$

$$Multiplier = \frac{1}{(1-MBSnontratables)}$$

remembering that: *1 - MBS tradables = MBS nontradables*

The above formula is only true if one ignores the fact that even tradables use non-tradable inputs. It therefore assumes that the value added ratio is one resulting in an underestimate of the true multiplier.

5.4.6 The Growth Multipliers in Middledrift

Table 5.4 summarises the growth multipliers calculated for the Middledrift household analysis.

Table 5.4: Estimated Total Extra Income for R1 in Extra Income from Production of Tradables (In R)

Country/Region	Tradable sector	Farm non-tradable	Non-farm non-tradable	Total Multiplier
Middledrift, RSA	1.00	0.35	0.63	1.98

The figures in Table 5.4 show the total net additions to average household income in South African Rands that result from an initial shock of 1.00 in the local tradable farm or non-farm sectors. The sources of growth were decomposed into new spending on farm and non-farm demand constrained non-tradable goods. The sum of the three components makes up the total multiplier. The table shows a R1.00 increase in household incomes through an outside positive effect (for example, a policy change) affecting local tradables. It also shows that such an increase will lead to R0.35 of additional income from spending on farm non-tradables, and to R0.63 of additional income from spending on non-farm non-tradables. This means a total multiplier of R1.98, of which R0.98 is the net extra growth from spending on demand-constrained items.

An important assumption underlying these results is that increased demand for non-tradable goods and services will be met by new production of these items. In other words, the supply response of non-tradables is assumed to be elastic. This is because, by definition, new demand for these items cannot be met from imports.

Table 5.4 illustrates two important facts. First, 'local' level linkages in South Africa seem to be generally comparable with those reported for Africa. This is consistent with previous studies done in Sub-Saharan Africa by Haggblade, *et al.* (1989), particularly in Zambia (Hazell and Hojjati, 1995), Nigeria (Hazell and Röell, 1983), and Burkina Faso

(Reardon, *et al.*, 1992). To illustrate the comparison, Table 5.5 shows agricultural growth linkages reported for selected African and Asian countries.

Table 5.5 Agricultural Growth Multipliers in Africa and Asia

Country	Total Multiplier
Niger	1.77
Malawi	1.66
Nigeria	2.81
India	1.70
Malaysia	1.83

Source: Delgado, et al. (1998)

Second, overall multipliers from the non-farm sector in Middledrift are higher than those from the farm sector. In fact the farm sector multipliers constitute only 18 percent of the composition of the total multiplier compared to 32 percent of the non-farm sector. This is consistent with findings from work done elsewhere in Africa, which confirmed the notion that linkages were primarily the way in which agricultural growth stimulated non-agricultural growth. In other words, any amount of growth in agriculture, as meagre as it may be, will certainly result in multiplied growth in non-agricultural sectors.

Table 5.6 demonstrates how much the rural economy will grow if policy supports smallholder tradable sectors. In the previous chapter it was shown that candidates for beneficial support should be indigenous beef cattle and irrigated citrus in the Eastern Cape, as these demonstrate the highest social profitability. The next section takes indigenous beef and citrus farming areas as case studies to demonstrate how much income would likely be gained in their economy if policies that enhance productivity are implemented.

5.5 Likely Multiplier Effects of Policy Support in Indigenous Cattle and Citrus Areas

Indigenous beef cattle selected for the study area were shown to have a comparative advantage under the normal physically tough environment to which they are well

adapted. This study also showed that the level of intensity of technology applied drives such comparative advantage. High fixed input technologies tended to worsen the comparative advantage situation. Investment in more and better handling facilities was deemed superfluous as the indigenous cattle were more profitable under low fixed cost technologies. It was argued that better marketing infrastructure would boost both private and social returns by up to 50 percent (based on returns on adjacent commercial farms), and are therefore recommended for indigenous beef.

Citrus was also shown to have a comparative advantage under the given opportunity cost assumptions. Table 4.9 shows that better quality of output and therefore higher export percentage means better comparative advantage for citrus. A major need identified in the citrus system was that of investment in new orchards to replace ageing ones which make up about half of the total orchards. This would potentially enhance the export percentage and therefore profitability.

Table 5.6 shows indigenous cattle and citrus as case studies to hypothesise multiplier effect of profitability-enhancing policies on the rural economy based on multiplier figures presented in Table 5.4. This is a straightforward illustration which isolates the two case studies, and shows in monetary terms how much income would be gained in the surrounding rural economy if profits increase by an assumed level. The multipliers in Table 5.4 are by themselves enough to show the likely benefits of alleviation of structural constraints in the local economy directed towards profitable tradable smallholder items. Table 5.6 only serves to replace the multiplier coefficients by money values. The table takes a 17-hectare navel orange farm and a 275 Nkone Animal Units as case studies. Based on the above-mentioned facts, it is assumed that policy support would result in 50 percent improvement in profit in both cases. It also assumes a multiplier of 1.98 based on the 'overall multiplier' in Table 5.4.

Table 5.6 shows that in both the indigenous cattle and citrus cases after policy change, e.g. removal of structural constraints, the profit increased by over half. In both cases this will result in overall income increasing by 98 percent. The bottom line is that there is a

need for demand-led growth policies in the rural areas of South Africa. In other words, there is tremendous extra growth potential through boosting rural incomes, which in turn would stimulate demand for non-tradable goods and services. Under-employed resources would then be brought into production.

Table 5.6: Hypothesised Multiplier Effects of Policy Support to Indigenous Beef and Citrus in the Surrounding Rural Economy (R)

Activity	Before Policy Change		After Policy Change	Multiplied Income Effect in Local Economy
	Annual Profit Per Unit	Total Annual Profit	Annual Profit Per Unit	
Indigenous Beef	179.66	49,406.50	74,109.75	146,737.31
Irrigated Citrus	4,657.71	79,181.07	118,771.61	235,167.79

5.6 Summary

Following up on the previous chapter's findings, this chapter's main purpose was to address the issue of the impact of rising smallholder incomes on the local economy. It reports on the second phase of this research, which consisted of a survey of household consumption and expenditure behaviour in the Middledrift district in the Eastern Cape, from whose results "growth linkages" were then calculated. Two villages in Middledrift namely, the more remote rural KwaNdindwa and the more urbanised Ann Shaw location were chosen for carrying out the structured survey. Three survey rounds were conducted to record information on household composition, decision making, household income and income sources, assets, agricultural production, and the household's consumption and expenditures on foods and non-food goods and services.

Albert Hirschmann first introduced the concept of "linkages" in the 1950s. His idea was to measure *production* linkages between industries or sectors. He classified them as "forward" and "backward" linkages arising from an investment in any type of activity. Backward linkages on one hand were defined as the demand for inputs arising from the

new investment. Forward linkages on the other hand were considered as the new productive activities arising from a new intermediate product on the market.

During this era agriculture was generally considered not to have strong linkage effects, and manufacturing was seen as superior in this respect. However, against the backdrop of the success of the Green Revolution, a case could be made for strong *consumption linkages* from agriculture.

The concept of agricultural consumption linkages was promoted based on the notion that incremental agricultural income spending on rurally produced goods and services generated new demand "multipliers". These multipliers indicate how much extra net income could be generated in rural areas from new production of non-tradable goods and services arising from new household income gained from tradable sectors as a result of a technological change or outside investment. Growth multipliers have since then been quantified in a series of empirical studies mainly in Asia and Africa.

In this study, a total of 100 randomly sampled households, equally divided between the two selected villages, were interviewed. The first objective was to examine how increased rural incomes would be spent on a mix of tradable and non-tradable farm and non-farm good service categories. The second goal was to assess the potential for these expenditure patterns to generate growth multipliers in the rural areas. The analysis estimated modified Working-Leser regressions to estimate marginal budget shares (MBS) for a typical rural household in each specified good/service category, based on mean values from the household survey. Growth multipliers were then estimated expeditiously by ignoring the use of non-tradable inputs, leading to a very simple formula.

Conceptually, computing a multiplier requires a definition of what is inside the region of interest and what is outside, and the spin-off effects are limited to those inside the zone. In Middledrift, the region of interest was restricted to local administrative boundaries. Definition of a region of interest makes possible the identification of consumption items that are tradables and non-tradables with respect to the region of interest.

An important difference between tradables and non-tradables is that an increase in local consumer demand for tradables does not add further to local incomes. This is because the increased consumption is either imported to the region of interest, or local production that was exported is now diverted to local consumption. However, an increase in local consumer demand for non-tradables increases the demand for an item that cannot be imported and is not being exported (by definition). Provided that local resources are not fully employed and are available for work, the new demand for non-tradables creates net additions to local employment and incomes. This illustrates a major assumption of linkage analysis that the elasticity of supply of non-tradable items consumed locally is elastic.

In this study, the survey data were first aggregated and categorised into sixteen groups, then further aggregated into "farm tradable", "farm non-tradable", and "non-farm non-tradable". This was done to allow calculation of average budget shares and marginal budget shares by expenditure group and by sector and tradability group. Growth multipliers of sector and tradability groups were then derived.

It was found that 'local' level linkages in South Africa appear to be generally comparable with those reported for the rest of Africa. It was further found that most growth was derived from spending on non-farm non-tradable items especially services such as health, education and transport. These results generally confirmed a need for demand-led growth policies in the rural areas of South Africa.

CHAPTER 6
DISCUSSION AND CONCLUSIONS

6.1 Introduction

> "Agriculture in South Africa has a central role to play in building a strong economy and, in the process, reducing inequalities by increasing incomes and employment opportunities for the poor, while nurturing our inheritance of natural resources" (Ministry for Agriculture and Land Affairs, 1998).

Since the early 1990s an active debate in South Africa has intensified in a quest to formulate policy options to restructure the agricultural sector in line with the advent of the wider socio-political changes sweeping the country at the time. Notably, the government has been actively involved in partnerships with the private sector, NGOs, universities and other interested parties in search of agricultural policy solutions for a new democratic order. As a result, good progress has been made in the formulation of a number of policies in agriculture during the 1990s decade[27].

The opening quotation above comes from the latest discussion document on agricultural and land policy and is a reflection of what the government perceives should be the main goal of agricultural policy. It is a commonly accepted fact that South African agricultural policy currently faces two broad challenges namely, maximisation of general efficiency, economic growth and resource sustainability in farming on the one hand, and promotion of equity within the rural population on the other. The latter also involves tackling the related extremely challenging problem of rural poverty.

[27] See Kirsten and Vink (1999) for a review of economic and agricultural policy changes in South Africa during the 1990s.

In a recent presentation, Duncan (1999) put the South African policy agenda into perspective. He professed that there is enough scope for win-win situations between the

The effectiveness of 'truth' on the other hand has been constrained by the lack of empirical base, especially affecting the goal of promoting smallholder farming. Because of previous lack of demand for data on smallholder farming, such data has been scarce. Only recently has significant headway been made in smallholder empirical data gathering, mainly in response to the new administration's new focus to integrate smallholders into the mainstream agriculture.

The progressive expansion in smallholder data capacity in recent times is a positive sign if a sound base for policy making is to be established. This study contributes to the essential and challenging requirement of providing empirical evidence to inform policy making, for the effective integration of smallholders into the mainstream economy. It aims to inform policy of avenues of support for economically competitive smallholders, as well as the likely impact of such support on rural incomes and employment. This final chapter particularly aims to review and expand on the main messages created in the previous chapters, and in conclusion, to come up with policy recommendations for achieving the main goals of growth and equity in South African agriculture.

6.2 Black Empowerment: Undoing the Legacy of the Past

Historical developments played a significant role in the demise of a once competitive black smallholder farming sector since the late nineteenth and early twentieth century. These were mainly in the form of dispossession of blacks of their land in order to promote white farming. Through this, blacks were effectively proletarianised. More successive support measures were put in place by the authorities of the time to boost large-scale white-run farming, while in the process ignoring the needs of black small-scale farmers. The latter group of farmers was restricted in tiny and mostly poor-quality land portions in the former homeland areas. These areas are poor, degraded and lack proper support services for productive farming ventures. From the national perspective, the rate of poverty and unemployment seems to be worst among blacks living in the former homeland areas. So is the effect (though not exclusively) of past policies. This was the subject of most of the introductory chapter.

Since the 1970s, a series of events have gradually taken place in South Africa to characterise a process of transformation in ideology, politics and the economy and a move away from the haunting past. Politically, the 1990s saw radical progress as power peacefully shifted from whites to blacks. However, there is still a long way to go in the economic arena. No transformation will be complete without a deliberate re-inclusion of the previously excluded blacks into productive economic activity, i.e. the so-called system of 'democratic capitalism'. Such a process will involve efforts to empower black farmers and to create equal opportunities for their participation in the wider economy. 'Affirmative action', 'black advancement', 'black economic empowerment' or 'agricultural democratisation' - whatever name the process is called - must have as its goal, the levelling of the playing field for equal participation of all types of farmers in the market. International evidence over the past few decades has served to strengthen the argument for promotion of smallholder agriculture in countries seeking economic reform in order to promote equity.

6.3 International Evidence: A Strong Case for Smallholder Agriculture

One of the fiercest debates in economic scholarship has been that of the relationship between farm size and productivity. Formerly it was thought that large-scale farms were more superior to small-scale farms. Such factors as subsistence-mindedness, tradition and lack of innovativeness were associated with the perceived inferiority of small farms. The issue of presence of economies of scale in agriculture, under the influence of Karl Marx and some of his counterparts, reinforced this view during the early twentieth century. The 1950s saw investment in research to determine whether there existed increasing or decreasing returns to scale in agriculture. Spearheaded in India, this research, which was later deemed too subjective, showed an inverse relationship between farm size and agricultural productivity. Major research in other developing countries, however, has tended to confirm the Indian results rather than oppose them. It is now generally accepted that there is a decline in output per unit area as the total area of a farm increases.

In general, countries that followed a smallholder-based development path often achieved impressive growth in their economies. The period of independence was a turning point in most of colonial Africa as a strong drive towards agricultural commercialisation was carried out. A number of African agricultural success stories were recorded since this process was initiated. Kenya, Ivory Coast, Malawi and Swaziland are some of the prime examples of such success. These countries consistently kept an impressive growth record from the 1960s up to 1980s. Zimbabwe then took over during the 1980s as the new smallholder-based miracle. Across the Indian Ocean, Indonesia, Taiwan and other East-Asian countries provide further examples of nations that successfully put (smallholder) agriculture at the centre of development strategies. The most important lesson from these success stories is that an enabling environment needs to be created for smallholder growth to result in effective economic development.

Historical factors marginalised research and policy in smallholder farming in South Africa to some extent. As a consequence, little is known about the potential of this sector to act as an engine of growth and thus contribute to the general economic advancement in the country. It is therefore an absolute and pressing need to invest in new research ventures to close this information gap. Any available output in this regard will form part of a solid foundation for policy makers to make informed decisions especially during this period of transformation. The next section will elaborate more on this.

6.4 Smallholder Agriculture has Strong Potential: Lessons from South Africa

Two seminal volumes on rural livelihoods in South Africa were launched recently under the leadership of Michael and Merle Lipton of Sussex University. The publishing of these documents in 1996 was a welcome relief from a desperate drought of research output relevant to smallholder agriculture in South Africa. They set out to explore the potential for creating livelihoods in agriculture and the rural non-farm sector in the Western Cape and KwaZulu-Natal provinces. At a launching conference of these two books in 1997, there was a noted general pessimism about what smallholder agriculture

can do for black rural communities. Some of the book chapters also at least allude to the fact that smallholder agriculture will at best create a few additional rural livelihoods.

The debate on the role of smallholder agriculture in South Africa is arguably still at a controversial stage. One of the factors responsible for the apparent uncertainty about what smallholder agriculture is capable of achieving is the lack of an acceptable definition of "small-scale" or "smallholder" in the South African context (see for example Kirsten and Van Zyl, 1998). Clearly, more research is needed in this area for consensus to be reached. This study, based in the Eastern Cape province, is a contribution to this important debate. It seeks to establish whether or not smallholder farming is profitable and worth investing in. Similar research was recently conducted in Northern Province and KwaZulu-Natal (Ngqangweni, *et al.*, 1999). A clear message from these research findings is that smallholders in South Africa are efficient in producing at least some of the agricultural activities they are currently involved in. There exist special opportunities to exploit comparative advantage enjoyed by smallholder farmers in these areas. These opportunities were not previously exposed.

Ngqangweni, *et al.* (1999) revealed that smallholders in KwaZulu-Natal have a comparative advantage in the two contract activities timber and sugar cane. Convenient contractual relationships have been built up over the years in the province between processors and smallholder timber and sugar cane outgrowers. These arrangements, coupled with a relatively good agricultural potential, form a strong foundation for a thriving smallholder sector in the province. More research needs to go into linkage effects of growth in these activities in the overall rural economy.

Ngqangweni, *et al.* (1999) showed that smallholder agriculture appears to offer opportunities for efficient use of land, labour and capital in the Northern Province. However, small-scale agriculture is barely commercial in the areas studied. The main instances of smallholder cropping observed were primarily for home use. Hence the efficiency indicators observed were primarily for non-tradable activities, and thus did not really indicate comparative advantage for commercial purposes. Further work in the

competitiveness area needs to focus on marketing costs for other activities which are visibly beginning to pick up such as poultry and horticultural products produced under small-scale irrigation.

This study presented more elaborate results on the efficiency of smallholders in the Eastern Cape province. In general, profit opportunities seem to be open in indigenous beef and citrus activities for smallholders to exploit. Of the seven activities investigated, these two activities have the best comparative advantage. In the analysis of indigenous beef opportunities it was discovered that this activity's physical adaptability to the Eastern Cape conditions can be exploited as an additional advantage to the smallholders in the province. Citrus was found to be another impressive prospect for smallholders especially with its good record in the export market.

This study has also shown that the competitiveness of smallholders is influenced in a small way by the level of opportunity costs of land and labour, and to some extent by the level of output. The degree of competitiveness as shown by the indicator ratios is positively related to the level of opportunity costs for land and labour and to the level of output. Thus smallholder potential could be enhanced through lower economic costs for factors of production and through higher output levels.

After exposing the potential of some smallholder enterprises in South Africa, the next research task undertaken by this study was to investigate if such potential could benefit overall rural growth. Studies conducted in Asia and Africa have demonstrated that policy-induced increases in rural income through smallholder agriculture produce strong linkage effects with the rest of the rural economy. A recent study in Zimbabwe by Bautista and Thomas (1999), using the GDP-multiplier method, revealed that agricultural growth linkages were relatively stronger than labour-intensive industrial growth. Of special note was that emphasis on smallholder agriculture investment yielded the largest increase in overall income. In areas or regions where phenomena like poverty, inequality and unemployment are rife such opportunities could hardly be ignored.

This study went on to measure the consumption- or demand-side linkages that would be derived from a policy-boosted tradable smallholder agricultural sector in the Eastern Cape province. These linkages were found to match those recorded from similar African and Asian studies. They were evidently strengthened by cash inflow in the form of remittances and pensions from towns and cities into the rural areas. This phenomenon presents special opportunities for tradable smallholder agriculture, with its now proven potential, to take over as a significant source of required initial income injection. Sale of local agricultural tradables would also serve to lessen dependency on transfer payments from the cities.

Most extra growth appears to spring from spending on non-farm goods and services (health, transport and education). Boosting the supply-responsiveness of such items would only result in short-term benefits if the importance of income growth from a tradable source is not appreciated. Such a source would arguably be derived from tradable agricultural activities with comparative advantage. In this case citrus and indigenous livestock have a potential to act as the initial stimulus for the non-tradable non-farm sector.

But how can policy help build a thriving tradable smallholder sector? As this study draws near to conclusion, the next section will elaborate, *inter alia*, on some of the specific policy recommendations pertaining to ways in which smallholder agriculture could be induced to drive rural income and employment growth. It covers a topical issue of how to bring previously disadvantaged rural South Africans into the mainstream economy through informed policy decisions. Research needs to identify possible avenues through which such decisions could be effectively turned into sustainable programmes to enhance rural welfare. An environment of pessimism about the potential for smallholder agriculture to drive such a rural economic recovery process still exists. This pessimism has overlooked the role of deliberate and purposeful policy focus on this sector.

6.5 Conclusions and Recommendations

"Limitations of the government do not absolve [it] from [its] duties and responsibilities. Governments are elected to do the best they can do for the population" (Groenewald, 1998:532).

6.5.1 Policy Recommendations

6.5.1.1 Acknowledgement of Smallholder Agricultural Potential

Black smallholder or former homeland farming was historically marginalised. At best, policy has tended to treat this sector as a separate entity and not a part of the broader national agricultural sector. Efforts to rehabilitate former homeland agriculture in the past failed. Since the failure of these programmes no coherent policy on former homeland agriculture has existed. Apart from the Farmer Support Programmes (FSPs) led by the Development Bank of Southern Africa (DBSA), some private sector-small farmer innovative partnerships, notably in KwaZulu-Natal, some parts of Mpumalanga and the Northern Province, smallholder agriculture has largely been ignored.

In line with the government's new vision, commercial smallholder agriculture in South Africa needs to be supported to establish itself alongside a thriving large-scale sector. However, debate on the future of agriculture in South Africa has been laden with a sense of uncertainty and unease about how much smallholder agriculture can really contribute towards sustainable creation of income and employment opportunities. Pioneer research on this subject has gone a long way to clear some of this uncertainty. This study in particular has demonstrated that smallholders can certainly contribute positively to the cause of the poverty-stricken rural areas. International evidence has also done its bit to reinforce the view of an efficient smallholder sector whose potential, once unearthed, could act as an engine of rural growth. A general conclusion from such research was that small farmers are constrained by lack of opportunities to which they can show their potential. The time is now ripe to put such potential to the test in South Africa. The

broader socio-political reforms taking place in the country present special opportunities for government to rethink strategies to bring smallholder farming back into the economic mainstream.

6.5.1.2 Establishment of a Clear Policy towards Smallholder Agriculture

The latest agricultural policy discussion document lays a sound basis and vision for a more diversified agricultural sector based on three main goals namely: building a competitive and efficient agriculture (growth); supporting smallholder agriculture (equity); and conserving natural resources (sustainability). The achievement of the objective of supporting smallholder agriculture will depend on the existence of a clear framework for a comprehensive support system. In order to achieve equity in agriculture, smallholder farmers need to be empowered. Empowerment should go farther than entitlement through market-assisted land redistribution. Within a broader context of "agrarian reform" suggested by Ngqangweni (1996), further support measures are needed to assist in the establishment of new emerging farmers. Much has been written on the topic of support services for smallholders. It appears to be a commonly accepted view that support services are a pressing need for smallholders, and therefore should be urgently set up. This study does not dwell much on this topic lest it becomes an unnecessary repetition of what has already been said and written. Instead it will identify some of the key issues to be taken into account by policy. The following main elements are hence recommended as major aspects of a framework for a new policy on smallholder agricultural support:

- **Role of different stakeholders:** A policy framework on smallholder support should clearly define the role of all stakeholders including the private sector, the NGOs and other interested parties. It has been a rather hotly debated issue what role the state should play in the provision of support services to the farmers. Should the state necessarily be directly providing the services through parastatal institutions? Or

should it rather play the role of a facilitator whilst contracting the services out to other organisations - the so-called "New Public Management" (NPM) approach[28]?

In South Africa, parastatal-run service provision has had a questionable track record. The NPM approach, on the other hand, has not been sufficiently explored in the South African system of service provision in agriculture. It offers some advantages that need to be tested. Such advantages include efficiency gains resulting from a diversity of service providers instead of a monopoly. The introduction of an NPM approach, however, will come with its own inherent risks. For instance, it would be risky to fragment research, training and extension services, as these need to be closely linked. However, there is still scope to systematically explore some aspects of the NPM approach as part of a new policy on smallholder support.

- **Identification of key areas of support needed:** In a recent workshop organised by the DBSA on FSPs (Stilwell, 1997), one of the conclusions was that primary support services (inputs, mechanisation, on-farm infrastructure and marketing) were adequately available from the private sector in South Africa. Instead, the secondary services that support production and marketing were lacking, as manifested in poor roads, inadequate communication facilities, poor extension services and inaccessible credit facilities. Policy ought to clearly identify these gaps so as to appropriately direct focus for farmer support. It is thus recommended that the state invests on systematic research ventures specifically aimed at identifying areas needing attention regarding support services.

- **Identification of 'priority' smallholder activities:** Recent studies including the present one, have exposed areas where smallholders in South Africa have comparative advantage. It is through the exploitation of these potential areas that strong growth linkages could enhance the promotion of the needed income and employment growth in the rural areas. Future studies should be commissioned in other parts of the country to identify more of such potential among smallholders. It is

[28] Duncan (1999) provides more background discussion on NPM.

recommended that these comparative advantage activities be targeted as priority for support. This should, however, be done in conjunction with other wider grounds for identification of agricultural potential, for example, physical and agronomic grounds.

6.5.1.3 Institutional Considerations

In this chapter so far, the public sector has been identified as the one to play a facilitative role in the development of smallholder agriculture and promotion of general rural development. A major role of the public sector is expected to be establishment and strengthening of the various institutions required for supporting growth and replication of efficient smallholder activities. Research in smallholder farming area has established that the FSP approach has brought about a considerable degree of institutional innovation in these areas (Thomas and Tyobeka, 1995:178). A number of valuable lessons could therefore be learnt from this approach. Other studies have suggested that establishment of rental markets and strengthening of tenure security in communal farming areas (Lyne, 1991; Lyne, *et al.*, 1991; Lyne and Thomson, 1998), for example, could go a long way to create and promote opportunities for growth of efficient African smallholder activities.

6.6 Conclusions

The purpose of this study was to assist policy makers in finding an economic motivation to explain why it is beneficial for South Africa to support black commercial farming (albeit on a small scale). Enough evidence was provided to show the benefits. The challenge now is to clarify a strategy to empower commercial smallholders and to bring them up to the level of their large-scale counterparts. A number of lessons have been learnt in the first few years of the new democratic dispensation. It could be argued that enough elements of a basic framework for such a strategy do exist. The next big task is to fill the gap that so evidently exists in the implementation of programmes and projects. Different role players are currently involved in some rural upliftment projects - research, food security projects, infrastructure construction and other basic needs projects. However, there is very little institutional co-ordination between these different parties.

The time is ripe for the government, as the party with the responsibility to ensure the welfare of all citizens, to fine-tune the institutional arrangements to ascertain that public investments are correctly channelled and that they reach the intended beneficiaries. It should also guarantee that each tier in the institutional network is held accountable for investment to yield maximum returns.