

**THE COMPARATIVE ADVANTAGE OF COMMERCIAL WHEAT
PRODUCTION IN THE WESTERN CAPE**

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I, the undersigned, hereby declare that the work contained in this thesis is my own original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

ABSTRACT

Agriculture is heavily subsidised and protected in most of the major industrial countries. Some of the effects are obvious through the heavy costs imposed on national budgets. Other effects, such as those on consumers or on overall economic efficiency, are less obvious but are nonetheless extremely important. In South Africa there has never been an attempt to calculate total government intervention in agriculture. However, this changed at the time of the negotiations for the Uruguay Round of multilateral trade negotiations under the auspices of the GATT, and the greater importance of the consumer in the designing of agricultural policies.

The aim of this study is to determine whether the production of wheat in the Western Cape is economically optimal under the current policy environment. The study investigates if there was a comparative advantage in the production of wheat as of April 1999. The technique used to calculate the various indicators of comparative advantage is the Policy Analysis Matrix. This technique is used to identify the effects of policy measures on the social profitability of wheat production.

The analysis used data from eight areas, and seventeen varying enterprise budgets were constructed in order to compile a representative picture of the industry's condition. The results of the analysis indicate that Western Cape wheat producers do not have a strong comparative advantage in the production of wheat for the selected areas. The reasoning behind this is complex, but is primarily a result of high levels of input use. Input prices are inflated by policy distortions in input markets, partly because of tariffs on imported inputs. The net effect of the total policy environment also had a negative effect on producers, in the sense that sub-normal profits were achieved.

The future of the Western Cape and South African wheat farmer is uncertain. What is certain is that, if the wheat farmer in South Africa does not take immediate and swift action, directed at improving efficiency in current management and production techniques, and implementing some form of crop diversification, farm debt will ultimately be the demise of the farmer. As interest rates rapidly increase, and

producer prices remain constant or decrease, the farmer begins to farm more for the bank than for private remuneration.

UITTREKSEL

In die meeste groot industriële lande word landbou grootliks gesubsidieer en beskerm. Sommige van die effekte word weerspieël in hoë kostes in die nasionale begroting. Ander effekte soos die op verbruikers is minder vanselfsprekend, maar steeds baie belangrik. Voorheen is daar geen poging aangewend om die totale owerheidsinmenging in landbou in Suid-Afrika te bereken nie. Dit het egter verander met die onderhandelinge rondom die Uruguay Ronde van die AOT, en die groter belangrikheid van die verbruiker in die ontwerp van landboubeleid.

Die doel van hierdie studie is om te bepaal of dit ekonomies optimaal is om koring in die Wes-Kaap te produseer onder die huidige beleidsomgewing. Met ander woorde, die studie poog om te bepaal wat die vergelykende voordeel, indien enige, is by koringproduksie. Die tegniek wat gebruik is om die verskillende indikatore van vergelykende voordeel te bereken, is die Beleidsanalise Matriks of PAM. Die tegniek word gebruik om die effek van die beleid met betrekking tot koringproduksie te identifiseer.

Agt produksiestreke in die Wes-Kaap is ontleed vir die doeleindes van hierdie analise. Sewentien verskillende bedryfsvertakkingsbegrotings is hiervan afgelei om sodoende 'n goeie verteenwoordigende beeld van die bedryfstoeistande te kry. Die resultate van die analise toon aan dat koringproduksie in die Weskaap nie 'n sterk vergelykende voordeel het nie. Die rede hiervoor is kompleks, maar die hoë vlak van inset gebruik kan beskou word as hoofrede. Hoër insetpryse, na aanleiding van die beleidsversteuringe in insetmarkte, is deels die gevolg van invoerbeskerming in die vorm van tariewe op ingevoerde insette. Die netto effek van die totale beleidsomgewing het ook 'n negatiewe effek op die produsente gehad, veral in die sin dat subnormale winste behaal is.

Die toekoms van koringboere in die Wes-Kaap en Suid-Afrika is onseker. Wat wel seker is, is dat as koringboere in Suid-Afrika nie daadwerklike en vinnige hul

bestuurs- en produksieeffektiwiteit verbeter nie, sal skuld toeneem en sal dit koringboerdery se einde beteken. Soos rentekoerse vinniger toeneem en die produsenteprys konstant bly of afneem, sal boere meer aan skuld afbetaal as wat hulle uit koringboerdery kan verdien.

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CHAPTER ONE

INTRODUCTION

1.1 Background

South Africa's agriculture is in the midst of long-term fundamental change. Beginning in the 1980's, major policy reforms were launched leading toward sharply reduced levels of protection for the farming sector (Vink, 1993). These changes, when taken together, comprise a fundamentally new environment for agriculture, an environment offering both challenges and opportunities for agricultural policy analysts.

Recent research on the economics of wheat production in the Western Cape includes Street *et al.* (1998), who have compared yields and production costs of wheat in South Africa with that of other major wheat producing countries; Troskie (1998), who has analysed South Africa's position in the international market, as well as the effect of an *ad valorem* tariff on export parity; and Troskie & Wallace (1996), who have analysed the influence of a weakening exchange rate. None of these studies has, however, analysed the comparative advantage of domestic wheat production, which is a sounder basis for assessing the international competitiveness of an industry, until Ohene-Anyang's recent (1997) study.

However, Ohene-Anyang's study focussed on wheat production in the summer rainfall regions of South Africa. The study was therefore limited to the following areas, with budgetary data from the 1994/95 season:

Douglas – Northern Cape
Bethlehem – Eastern Free State
Bergville – KwaZulu / Natal
Brits – North West and
Ventersdorp – North West

As is evident, the study omitted the Western Cape wheat producing regions. The Western Cape has over the years produced a substantial proportion of the country's wheat, and is currently the largest producer of the nine provinces (SAGIS, 1998 estimates). The Western Cape is indeed an important player in the South African wheat industry. Furthermore, wheat production is an important contributor to the Western Cape economy, and the production of wheat has been experiencing deteriorating trends in the recent past. Thus, a study of the comparative advantage of Western Cape wheat production is justified.

1.2 The Problem

The central question that needs to be addressed, and the one that defines the purpose of this study, is whether or not Western Cape wheat farmers have a comparative advantage in the world wheat market. Closely inter-linked with this question is the issue of policy support and distortion, which dominates the core reasoning behind many countries' comparative advantage in specified industries.

South African agriculture presently produces a low share of GDP, largely as a consequence of structural changes occurring in the economy. Widespread policy distortions, introduced by decades of government intervention, has contributed to this phenomenon (Food Review, February 1998). These interventions were guided by the general political and economic philosophy of white domination – apartheid. Some of these distortions are not peculiar to agriculture, but characterise the entire economy, for example, the high capital-intensity of production in the presence of widespread unemployment.

Nonetheless, it is true that agriculture has been and remains subject to policy distortions that have been especially far reaching. As a consequence of the incentive structure created by policy distortions, agriculture's structure, characteristics, and, most notably, its performance, are in a condition of flux, and one can expect that the future holds much uncertainty (The World Bank, 1994). Hence, this gives ample justification for an analysis of the comparative advantage of the wheat industry in the Western Cape, using the Policy Analysis Matrix.

1.3 The Study Area

The Western Cape Province is divided into five administrative areas:
The North West, Swartland, Boland, the Little Karoo, and the South Coast.

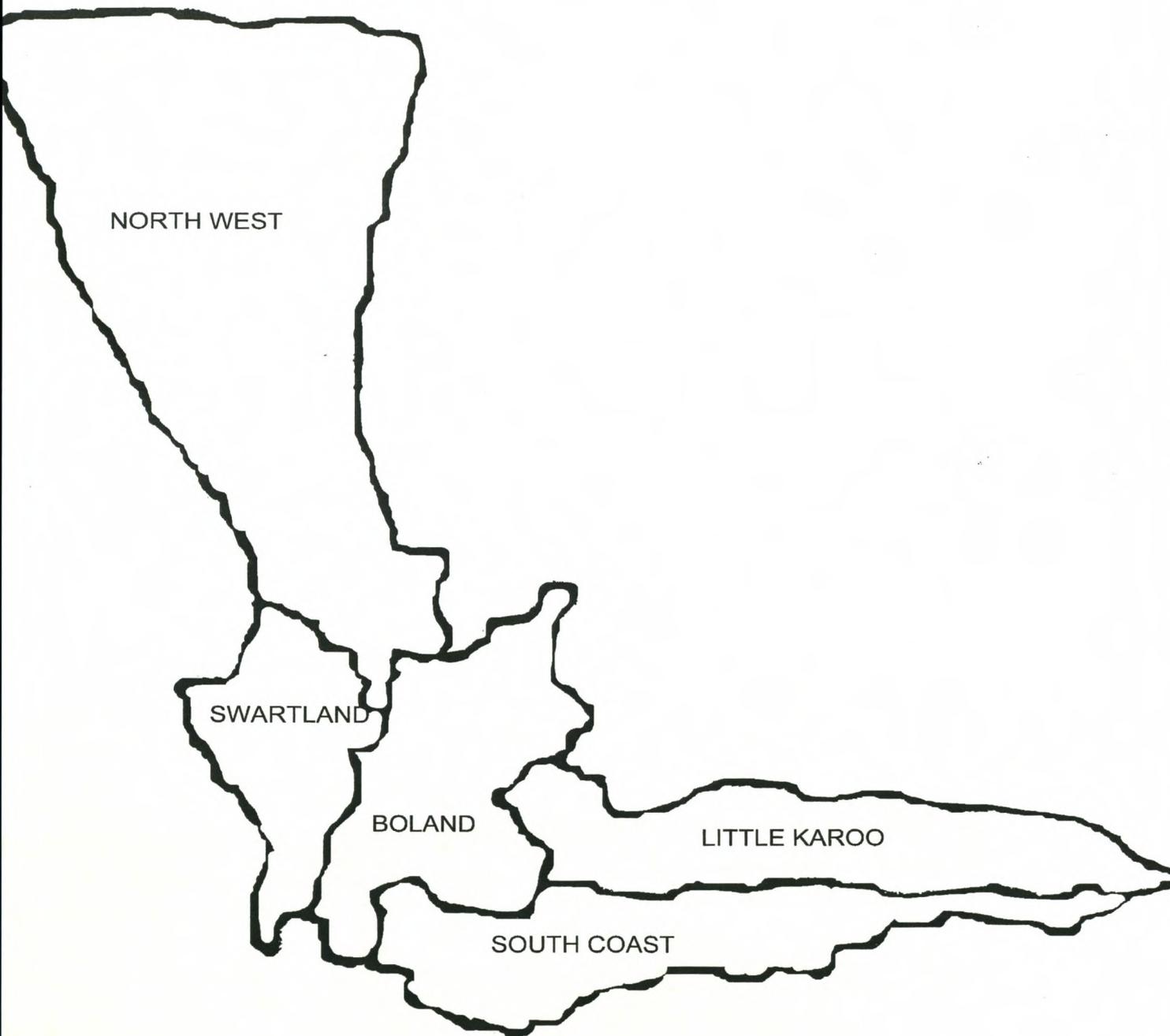


Figure 1.1: Administrative areas of the Western Cape

Of these five administrative areas, wheat is only grown in three. These three include the Little Karoo, the Swartland, and the South Coast. The sub-areas of these three administrative areas, in which wheat is grown, are presented in Figure 1.2 below.

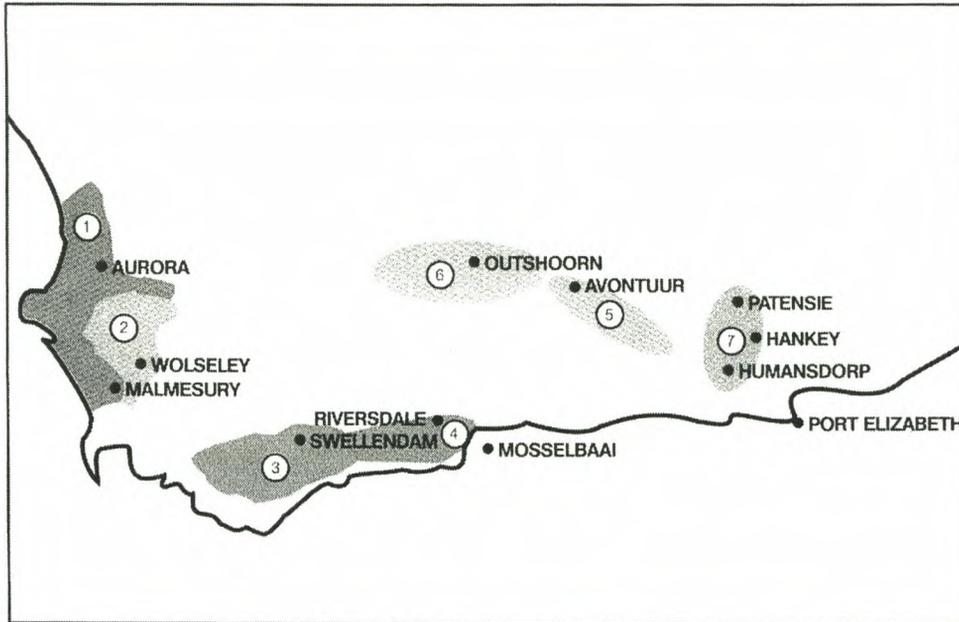


Figure 1.2: Wheat Producing Areas of the Western Cape
(SENSAKO, Winter '99)

These sub-areas are divided as follows:

1. Western section of the Swartland (Sandveld, Rooi-Karoo, West Coast and Darling regions)
2. Middle Swartland
3. Ruens (Caledon, Bredasdorp, Napier and Swellendam)
4. Southern Cape (Heidelberg, Riversdal, Albertinia and Mosselbay)
5. Langkloof
6. Small Karoo region
7. Humansdorp, Hankey, Patensie

In order to approach this study simply and yet retain validity and credibility, representative study areas were chosen. The major wheat producing areas of the Western Cape are situated in the Swartland and South Coast sub-regions, which comprise roughly ninety-five percent of the total wheat producing areas of the Western Cape, around sixty percent being in the Swartland region.

Therefore, the Little Karoo, along with the North West and the Boland were omitted from the study, and only the major wheat producing areas in the Swartland and South Coast were considered. These two sub-areas were further divided into thirteen farming regions, which are listed below:

A) Swartland

1. Middle Swartland: (Moorreesburg region)
2. Piketberg-Porterville mountains
3. Sandveld
4. Koringberg-Red Karoo
5. High rainfall Koeberg-Malmesbury area
6. Durbanville-Paardeberg mixed farming area
7. Constantia-Philippi

B) South Coast

8. Villiersdorp-Vyeboom
9. Botrivier
10. Ruens
11. Bredasdorp-Strandveld
12. Strandveld foothills
13. Dune veld

The study is therefore based on these thirteen farming regions. The most important areas, with regards to production quantity (total yield and yield per hectare), were taken into consideration and the rest omitted. Selection of the study area is dealt with in Chapter 6.

1.4 Objective of the Study

The main purpose of this thesis is as follows:

1. To determine the comparative advantage of the Western Cape commercial wheat farming, using an accounting technique called the Policy Analysis Matrix (Monke & Pearson, 1989), that classifies data on revenues and production, and marketing costs and revenues for specific rural activities, technologies, and market channels.
2. To reveal the various distorting effects, if any, of the current policy environment, on the production of wheat in the Western Cape.

1.5 Outline of the Study

In Chapter Two, a background on wheat production around the globe is provided, and this is followed in Chapter Three by a background on policy that could affect the wheat industry, with particular reference to the South African context. Chapter Four establishes the reasoning behind the choice of the Policy Analysis Matrix for this study. Chapter Five continues the theoretical basis of the study, with a look at shadow pricing. Chapter Six gives the results from the application of the methodology. In Chapter Seven, the conclusions derived from the results are set out, and this chapter serves as the culmination of the study.

CHAPTER TWO

THE GLOBAL MARKET FOR WHEAT

2.1 Introduction

In South Africa, wheat is grown mainly for human consumption. However, small amounts of wheat, not fit for milling purposes, are marketed as stock-feed. Wheat plays only a secondary role in South African field crop production and trade (maize being the primary grain crop). South Africa has traditionally been a deficit producer and thus an importer of wheat (NDA, 1998; Kirsten *et al*, 1998). In 1998 though, 59000 tons of wheat were exported out of South Africa; the previous time wheat was exported was in 1994, the quantity being an insignificant 1000 tons (SAGIS, 1998).

2.2 World Production of Wheat

Table 2.1: World wheat estimates for 1998/99 (million tons)

WHEAT	1995/96	1996/97	1997/98	1998/99 forecast
Production	541	582	609	583
Traded	90	95	95	94
Used	553	578	588	594
Stock	106	110	132	121

Source: Cornelius, 1999

Approximately 600 million tons of wheat are produced annually around the world. Of that, 90 million tons are traded on the global market (Table 2.1). According to Luckhoff (1995), it is evident that world production and world stocks, prior to the 1996/97 season, all show signs of a decrease. The world stock in 1995 stood at 104 million tons, which is the lowest since the 1985/86 season. Generally there is an increasing tendency of total usage of wheat in the world, as consumption increases annually with the increase in the world population. From the 1995/96 season until the 1997/98 season, the total use of grain in the world increased by 89 million tons. The

five biggest exporters of wheat in the world are the USA, the EU, Canada, Australia and Argentina. China, India and Russia also produce large quantities of wheat, but due to their high domestic consumption levels, are not amongst the largest exporters.

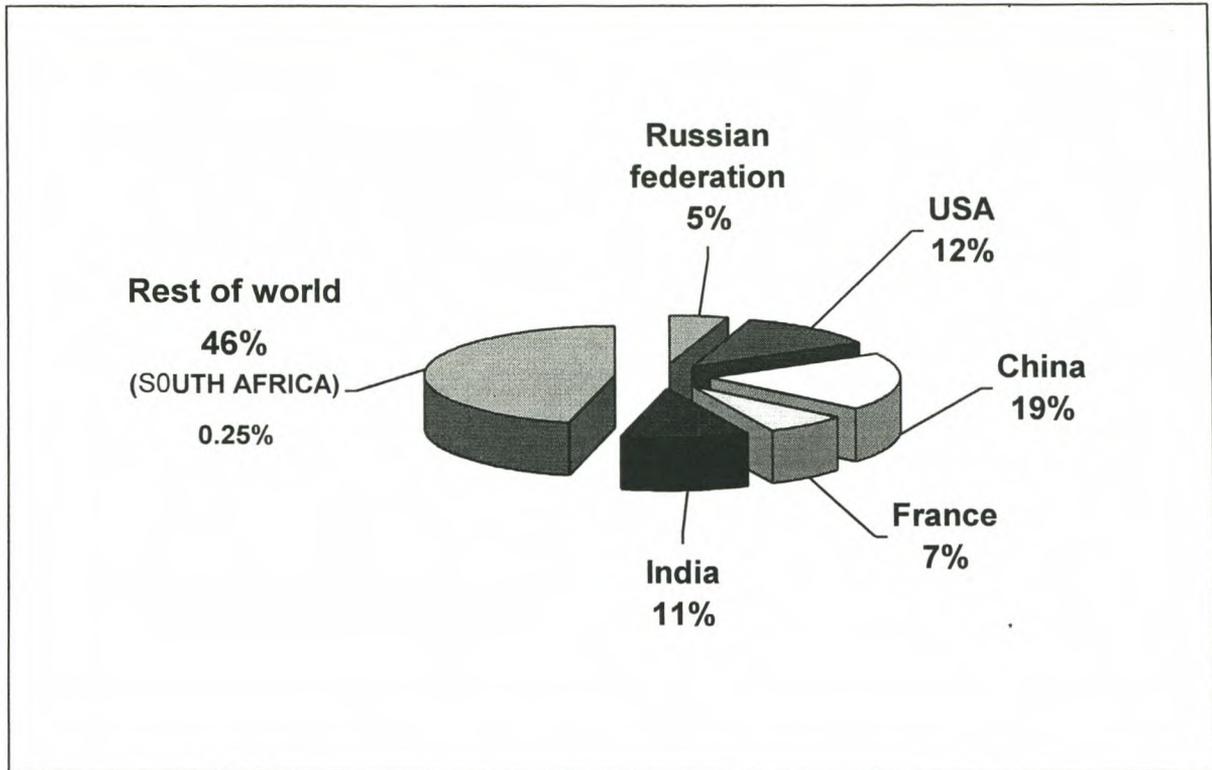


Figure 2.1: Percentage contribution of world wheat production

(Janovsky *et al*, 1999)

Table 2.2: Income, costs and profit of wheat (R/ha)

	Gross Income	Subsidies	Variable Costs	Gross Margin	Fixed Costs	Net Margin
Argentina	3666.40	0	1449.19	2217.21	504.00	1713.21
Australia	1368.79	0	416.71	952.07	107.64	844.43
Canada	2250.57	54.43	388.08	1862.49	342.93	1519.57
EU	8286.56	1931.47	2679.02	5607.54	2396.46	3211.08
USA	2647.57	0	582.10	2065.47	358.93	1706.55

Source: Cornelius, 1999

Table 2.2 gives a general overview of the position of each of the five major producing countries. The exchange rate taken for these figures was the September 1998 rate of \$1: R4,60.

2.3 Domestic Marketing and Pricing of Wheat

Agricultural marketing policy in South Africa used to be determined by the Agricultural Marketing Act (Act 59 of 1968 as amended) which enabled the Minister of Agriculture to proclaim a marketing scheme to control marketing of a particular commodity. With these schemes, it was possible to transform the agricultural output and input marketing system and to determine commodity prices, and thus effect the level and stability of food prices. One of the results of these schemes was invariably the creation of concentrations of monopoly power, especially in the agricultural processing industries (Kirsten *et al*, 1998).

Prior to November 1997, the Wheat Board administered various statutory arrangements relating to the marketing of wheat. The various marketing functions were funded by means of statutory levies. Since November 1997, the price of wheat has been determined by the interaction between supply and demand thereof. Producers can sell their produce to anybody in a free market environment. Currently there is a levy on wheat imports in the form of an import tariff band. The tariff on imported wheat grain stands at R181.00 per ton (Customs and Excise, 1999), with the consumer bearing the full economic burden.

With regard to exports, phytosanitary requirements and quality standards must be adhered to and a Perishable Products Export Control Board (PPECB) certificate must be obtained.

The 28 percent real devaluation of the Rand, from 1998 to 1999 (R5.00 to R6.40 for one US\$), resulted in a decrease in imports and an increase in the average domestic price by approximately 20 percent. The following table (Table 2.3) is a representation of the basic producer prices for BS1-wheat.

Table 2.3: Wheat prices 1993/94-1997/98

SEASON	1993/94	1994/95	1995/96	1996/97	1997/98
PRODUCER PRICES	801.48	770.50	846.78	966.02	904.89

Source: NDA, 1998

2.4 Domestic Production and Consumption of Wheat

Deregulation has made forecasts of wheat production trends difficult. According to recent surveys by SAGIS (1997/98), the estimated land under wheat production in South Africa was 1.392 million hectares in 1997 and 0.748 million hectares in 1998. The yield for the 1997/98 production year was 1.469 million tons of wheat. The current annual consumption of wheat in South Africa is estimated at 2.65 million tons for human consumption, with total consumption of 2.759 million tons.

The gross value of wheat production in South Africa for the period from July 1997 to June 1998 was estimated at R 1 910 million (SAGIS, 1998); another source estimated this figure as being R1 786 million, a 26.8 percent decrease from the R2 439 million of the previous season. (Crops and Markets, 1998; SAGA, 1998).

Plantings, production and yield of wheat in South Africa from 1993/94 to 1997/98, according to a fourth source, are represented in the table below (Table 2.4).

Table 2.4: Recent South African wheat statistics

SEASON	1993/94	1994/95	1995/96	1996/97	1997/98
PLANTINGS (ha)	1 064 798	1 039 491	1 363 150	1 293 800	1 382 300
PRODUCTION (t)	1 975 344	1 832 242	1 968 512	2 700 000	2 283 500
YIELD (t/ha)	1.86	1.76	1.44	2.09	1.65

Source: NDA, 1998

Under the current market conditions and due to climatic limitations, South African wheat production is expected to decrease. In actual fact, it is expected that the total area planted to wheat for the 1998/99 season will show a reduction of approximately 45 percent, in comparison with the previous season (NDA, 1998).

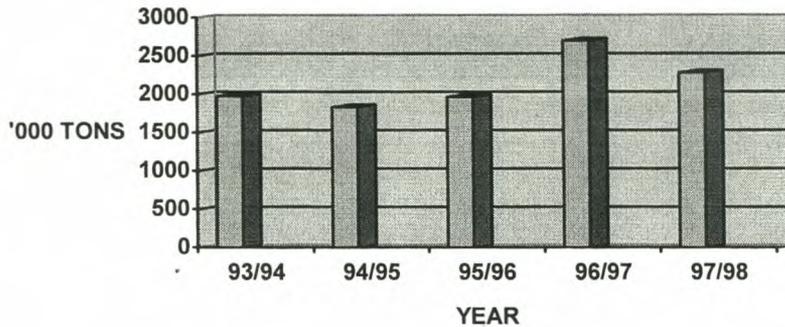


Figure 2.2: South African Wheat Production 1993/94-1997/98

(NDA Trends in the Agricultural Sector, 1998)

This reduction is mainly due to the anticipated reduction in local prices for wheat, resulting from relatively low world prices. However, in this connection, it must be noted that, with the application of the Marrakech agreement of the GATT, the international wheat price is expected to increase (Goldin *et al*, 1993). This is illustrated in Table 2.5 below. However, even if the world price increases, South African prices will still decline, as they adjust to world price levels in post-deregulated times, and as the tariff is reduced. Tariffs will, in any case, be reduced under South Africa's GATT obligations. To date, South Africa has reduced tariffs on agricultural goods to below the GATT bound rates.

Table 2.5: The potential price effects of GATT on wheat prices in South Africa (percentage change in 2002)

Commodity	Partial	Partial	Full	Full
	liberalisation (a)	liberalisation (b)	liberalisation (a)	liberalisation (b)
Wheat	+ 3.5	+ 4.0	+ 16.9	+19.0

a) *With perfect labour markets*

b) *With labour market rigidities*

Source: Goldin *et al*, 1993

2.5 Regional Production and Consumption of Wheat

Table 2.6 below provides an overview of past wheat production in the Western Cape. The consumption of wheat in these regions is also indicated, giving a good estimate of surplus or shortages of wheat in the country and in the Western Cape.

Table 2.6: The relationship between production and consumption of wheat in South Africa and that of the Western Cape

YEAR	SOUTH AFRICA			WESTERN CAPE			REST OF RSA		
	PROD.	CONS.	SURP.	PROD.	CONS.	SURP.	PROD.	CONS.	SURP.
85/86	1 586	2 207	-621	706	313	393	880	1 894	-1 014
86/87	2 249	2 143	106	664	306	358	1585	1 837	-252
87/88	3 037	2 386	651	821	313	508	2 216	2 073	143
88/89	3 490	2 351	1 139	692	324	368	2 798	2 027	771
89/90	1 962	2 304	-342	597	333	265	1 365	1 971	-607
90/91	1 666	2 174	-508	456	325	130	1 210	1 849	-638
91/92	2 085	2 143	-58	457	332	125	1 628	1 811	-183
92/93	1 270	2 132	-862	582	345	237	688	1 787	-1 099
93/94	1 913	2 259	-346	698	368	330	1 215	1 891	-676
94/95	1 773	2 353	-580	696	358	338	1 077	1 995	-918
95/96	1 899	2 438	-539	776	362	414	1 123	2 067	-953
AVE.	2 085	2 263	-178	650	334	315	1 435	1 928	-493
% of total				31%	14,8%	177%	69%	85,2%	277%

Source: Wheat Board, 1997

It is expected that the largest decrease in area planted to wheat will occur in the Free State, where the decrease for the 1998/99 season is expected to be 55 percent (NDA, 1998). Depending on the production in the rest of the country, this could mean a decrease in the percentage of total production for the Free State of around 13 percent.

Figure 2.3 is a representation of the 1997 percentages for total production area divided between the different provinces. This varies greatly with the graphical representation of 1998's percentages for total production area divided between the provinces (Figure 2.4).

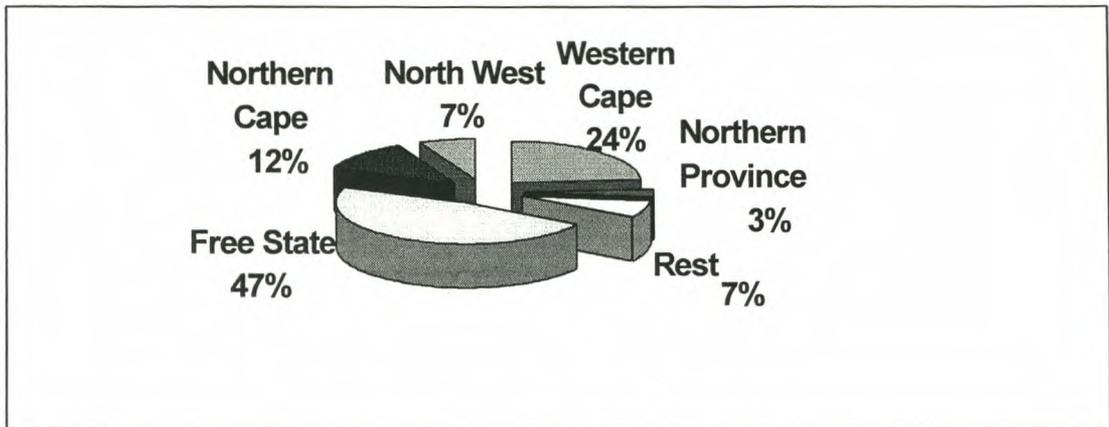


Figure 2.3: Wheat production for 1997 in the South African provinces
(NDA Trends in the Agricultural Sector, 1998).

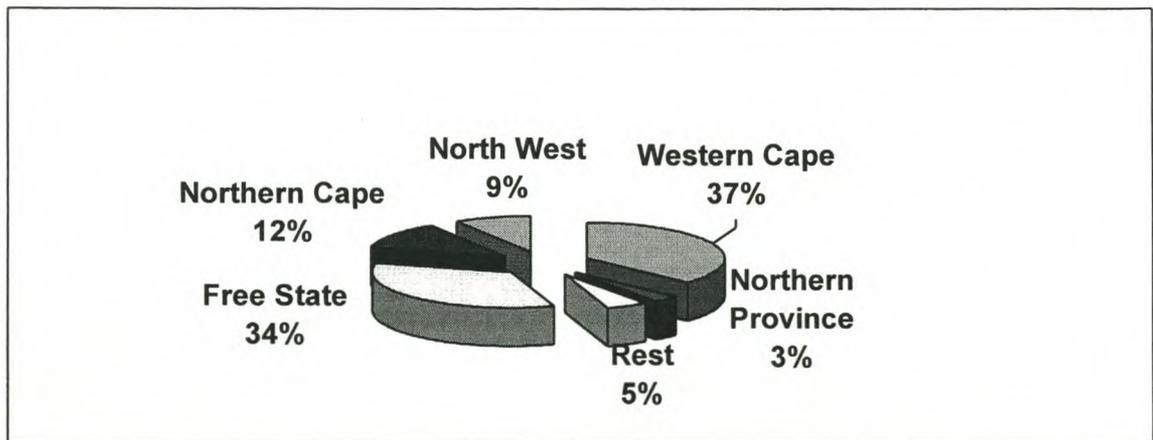


Figure 2.4: Wheat production for 1998 in the South African provinces
(SAGIS, 1998)

Table 2.7 is a recent representation of the wheat industry according to SAGIS which shows a drastic decrease in the 1998 production for the Free State. It is important to note that the Free State has in the past produced up to 45 percent of the total supply of wheat in the RSA (e.g. 1996, 1997), therefore making the Free State the largest and most important production area in South Africa.

Table 2.7: Wheat production in South Africa according to region, (1000t)

Production year	Western Cape	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	Northern Province	Mpumalanga	Gauteng	North-West	Total
1994	738	38	365	453	22	48	72	9	95	1 840
1995	819	30	278	639	12	14	37	9	130	1 968
1996	806	18	345	1 217	24	65	78	8	139	2 700
1997	555	22	286	1 088	21	68	89	16	155	2 300
1998	550	7	180	495	20	37	41	9	130	1 469

Source: SAGIS, 1998

2.6 Conclusion

Adam Smith argued that the source of economic growth lies in specialisation. What has occurred in the wheat industry in South Africa though, is extensive production of wheat, either mono-cropping or in the form of mixed farming. Wheat is being grown on marginal land and many wheat farmers are not diversifying. Good advice for the farmers would be to spread their risk; 'avoid keeping all one's eggs in one basket'.

In an attempt to spread risk and to ensure survival in a very competitive market, wheat farmers could produce several different commodities. This is being successfully implemented in the Koeberg-Malmesbury region in the Western Cape, allowing farmers to continue wheat farming by creating alternative incomes. The concept of farming conservatively¹ to allow for poor seasons is also a concept which guides farmers in an effort to avoid loss of gross profits. Interference by governments, in the form of guaranteed prices and drought relief, tends to work against such well-proven ideas.

¹ Farming conservatively means 1) not over-planting when the price is good and then incurring debt when the price falls 2) marginal land shouldn't be planted for the sole reason that climatic conditions are favourable, for the follow season could result in disaster.

The distortions that such policies create can be seen throughout the world. A very clear example is the Western Cape, where too much land is under wheat, and wheat has entered into dry unsuitable marginal regions. This has in turn led to the production of excess wheat that is too expensive to compete on the world market.

Every year there is an exceptionally large carry-over stock, which is mainly the result of imports, while sufficient local stocks are available in South Africa. This causes an artificial overproduction/ supply situation, which has forced the local wheat price down by approximately 20 percent in real terms over the past two seasons. Coupled with fairly sharp increases in input costs (fertiliser, machinery, diesel and seed), this has impacted negatively on the profitability of wheat production in South Africa.

With the aid of organisations such as the SA Grain Information Service (SAGIS), which currently performs the information function (a section 21 company funded by, amongst others, the Winter Cereal General Trust), and the Winter Grain Producers' Organisation (WPO), which promotes the interests of winter grain producers at all levels, South African wheat farmers can co-ordinate production to meet demand and thereby reduce their surplus.

CHAPTER THREE

DESCRIPTION OF SOME GOVERNMENT POLICIES AFFECTING THE WHEAT INDUSTRY IN SOUTH AFRICA

3.1 Introduction

While free-marketers envision a world without intervention, in the real world governments have to intervene in the economy even if it is only to raise the budgetary resources needed to carry out the minimum tasks of, for example, provision of police protection and roads, and other inherently public activities. Taxation of the economic base is thus the starting point for a government's existence. Wherever that economic base is primarily agricultural, direct or indirect mechanisms for taxing agricultural incomes are likely to be essential components of government policy. Even apart from the need to raise tax revenues, governments intervene in the agricultural price formation process for a purpose.

South African agriculture has had a long history of governmental intervention, with a horde of regulations affecting aspects such as prices, use of natural resources, finance, labour, local and foreign markets, and foreign exchange. This chapter deals with various policies that affect the South African agricultural sector with particular reference to the wheat industry as a whole.

3.2 Rationales for Government Intervention in Agriculture

Governments use policy instruments in order to influence economic resource allocation, such as the level of crop production, the distribution of income, the earning and expenditure of foreign exchange, and the demand for goods and services. While some of these objectives can be influenced directly by government expenditure, administrative action, and legal restrictions, policies which influence price levels and the change in relative prices also have powerful effects on the way individuals, families, and firms utilise resources (Harvard Institute, 1991).

Of the many reasons for Government intervention in agriculture, a few are more relevant than the rest in the South African context. According to Timmer (1986), there are five reasons or rationales, namely: 'contribute to efficient economic growth'; 'improve income distribution'; 'ensure a nutritional floor for all citizens'; 'guarantee food security for the country'; and 'to maintain political stability', which is probably assured if the first four are achieved. Ohene-Anyang (1997) however, adds 'protection of local industries'. Some of these above rationales are inter-linked and therefore only four are deemed to have direct a impact in the South African context.

Firstly, a reason for the government imposing policies on the agricultural sector is that the intervention is believed to accelerate the rate of income growth. Examples of such interventions which can lead to increased economic activity are: infrastructure development (roads, water schemes, schools, and medical facilities); and the provision of public goods (research and development of new technologies).

Secondly, due to market imperfections, the prices of goods or services do not reflect their true scarcity values because the private sector is unable to develop the institutions necessary for an efficiently functioning market. Therefore, the Government takes it upon itself to correct the market failure with policy intervention.

The third, and most common rationale for intervention in developing country agriculture, is the promotion of non-efficiency objectives. Non-efficiency objectives are those which are geared to improving the social welfare of the majority of the country's population. The main concern of non-efficiency objectives is 'income distribution' (Monke & Pearson, 1989).

A fourth reason to justify the Government's active role in the agricultural market is price stabilisation. Market prices can fluctuate substantially from one production cycle to the next; government policies are created to stem extreme fluctuations. Examples of schemes that regulate market prices are; international trade controls, storage schemes, price fixing, and rationing.

3.3 General Agreement on Tariffs and Trades (GATT) and Agricultural Issues

South Africa is a co-signatory of the most recent agreement of the WTO (GATT). The underlying principle of GATT, as far as agricultural production is concerned, is that Governments of the various member nations should not protect their farmers by way of subsidies and that world trade should be freely 'globalised'. This principle is meant to let the producer who is most suited to produce a particular commodity (the producer with a comparative advantage in producing a commodity) do that, in order to bring about competition and more efficient utilisation of the factors of production between producers.

The general implications of the Uruguay Round are (Nijhoff, 1987):

- The scaling down of import duties will enhance international market entry for those industries that derive part of their income from exports.
- With the scaling down of export subsidies and internal support, international commodity prices are expected to increase, which will improve the situation of industries that have a comparative advantage.
- Domestic agricultural prices will correlate increasingly with international prices.
- The benefits obtained by developing countries, in particular through preferential trade agreements (i.e. Lome Convention, Generalised System of Preferences), will decrease as countries comply with the general conditions of GATT.
- Some net food importing countries can expect negative effects on the balance of trade because of increasing international prices and diminishing export subsidies.
- Over the long-term trade liberalisation will result in specialisation, efficiency gains and increased trade in agriculture.

- Competition from abroad and increased imports (due to minimum market entry levels) will put marginal industries and inefficient marketing structures under pressure.
- Phytosanitary and sanitary measures may require additional investment in physical and organisational infrastructure in many developing countries; that is, improved monitoring, inspection procedures and personnel.

The trend of market liberalisation was enhanced by the pressures emerging from the GATT negotiations for the abolition of quantitative import controls and the introduction of tariffs on all agricultural commodities. A general policy of tariffs has been in operation since 1985, but it has only begun to be applied to agricultural commodities since 1992. One of the major implications of a deregulated marketing scheme and a liberalised economy is that the farmer, at the production level, is subject to an environment of intense competition.

One way in which the domestic price of wheat can be influenced is to levy a tariff on imports of wheat into South Africa. In the past it was possible to restrict the import of wheat to a particular quantity via our import quota system, and therefore influence the domestic price. Following the Marrakesh Agreement, the maximum import tariff percentage is 72 percent, but the South African import tariff for wheat fluctuates between 15 and 20 percent, and at times decreases to almost zero (Troskie, 1998). The current tariff on wheat imports is R269/ ton wheat, with a zero tariff on Durum flour (SAGA, 31st July 1999).

The major debate regarding the South African wheat tariff, is which means is most appropriate for its determination. At present a sliding-scale is used, but another option is the possibility of an *ad valorem* tariff (Appendix E).

3.4 The Main Elements of Agricultural Policy in South Africa

South Africa's agricultural policy is still in the process of change; a phenomenon which will endure for many years to come. A number of political and economic pressures have led to a more market-related approach in the marketing of agricultural commodities in South Africa since the early 1980's. There has been a reduction in the use of price controls on a number of commodities which includes wheat, as well as shifts to more market-based pricing systems, away from the old cost-plus pricing procedure.

The appointment of the Committee of Inquiry into the Marketing Act (CIMA), in June 1992 triggered a process of market deregulation that has been played out since the beginning of 1993. It had such an impact on the South African agricultural marketing system, that the wheat board and the wheat marketing scheme, as well as most of the schemes and marketing boards, were abolished during January 1998 (Kirsten *et al*, 1998).

Within the land and labour market, there are few overt policy distortions that currently affect the working of the market and land prices, and wage rates could therefore be considered a true reflection of the economic costs of resources. Irrigated agriculture has, however, the benefit of water being subsidised, but this does not include private irrigation schemes. This is primarily as a result of the pricing structure not taking into account the capital and full delivery costs in irrigation schemes.

Since policy decisions are aimed at changing resource allocation in the economy, a first step in policy analysis is to have a clear understanding of the current design of policy, particularly pricing policy, and the pattern of resource utilisation and productivity. Agricultural pricing policy (Table 3.1), usually deals with specific, direct interventions in agricultural markets, such as a tax on commodity exports, restrictions on input marketing, or a producer or consumer subsidy (Harvard Institute, 1991).

Table 3.1: Direct Pricing Policy Instruments

POLICY TYPE	MAJOR INSTRUMENT	PRINCIPAL ECONOMIC EFFECT
TRADE POLICIES	Subsidy; tax on imports/ exports; import/export quota	<i>Prices of traded goods change; indirect effect on potential tradables; Indirect effect on prices of tradables</i>
EXCHANG RATE POLICIES	nominal exchange rate	<i>Prices of traded goods change; may lead to pressure on prices of non-tradables, e.g. labour.</i>
MARKET SYSTEM POLICIES	subsidies/taxes administered prices	<i>prices of affected goods change rationing; black-market transactions; or budgetary costs</i>
PRODUCTION	minimum wage; land tax	<i>changes allocation of domestic resources</i>
INPUT POLICIES	interest rate or other subsidies	<i>affect labour/capital mix of production</i>

Source: Harvard Institute, 1991

CHAPTER FOUR

METHODS AND TECHNIQUES TO DETERMINE COMPARATIVE ADVANTAGE

4.1 Introduction

Viewed as a 'positive' theory, the principle of comparative advantage yields predictions about the direction of trade and the terms of trade (Eatwell *et al*, 1987).

According to Samuelson *et al*, (1992), the principle of 'comparative advantage' holds that each country will specialise in the production and export of those goods that it can produce at relatively low cost (in which it is relatively more efficient than other countries). Conversely, each country will import those goods which it produces at relatively high cost (in which it is relatively less efficient than other countries).

Proper analysis of the production process and marketing of a commodity, such as wheat, enables the researcher to determine whether or not the production of that specific commodity (wheat), in a certain region, will be financially or economically profitable. Production analysis involves a critical analysis of the input requirements of the production process as well as the generated outputs. It is possible to determine whether scarce resources are used efficiently by applying social or economic analysis. An additional factor is the possibility to justify government agricultural policies and to determine if policies lead to inefficient resource allocation (Appelyard, 1987; Leamer, 1984).

4.2 Selection of the Analysis Technique

The rapid growth in computational power in the last three decades has opened new opportunities for economists to develop disaggregated models to analyse comparative advantage. There are two broad classes of these models: sectoral and economy-wide. As shown in Figure 4.1, the sectoral models may be for a single country, a region or the whole world. The economy-wide models are either general equilibrium models or growth models (Kendrick, 1990).

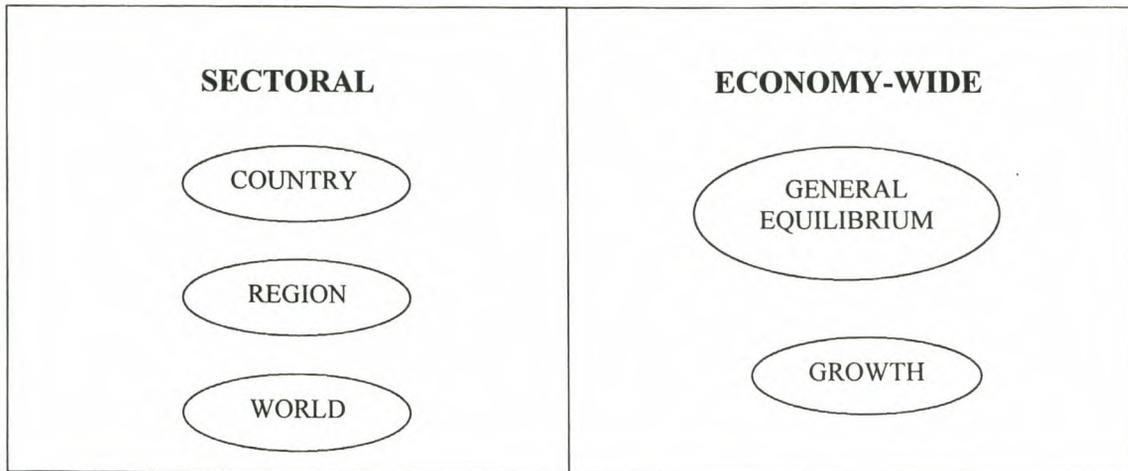


Figure 4.1: Comparative Advantage Models

(Kendrick, 1990)

Various techniques in policy analysis could be used to analyse the influence of policy in the wheat industry; but only the more popular techniques are considered below. Such techniques include:

Sectoral

- the stochastic coefficient regression method
- the conventional gravity model
- partial equilibrium methodologies

Economy-wide

- general equilibrium model

These approaches all have their advantages and shortcomings. A positive concept is to choose the approach which fits the study objective and has the least disadvantages or shortcomings, but still produces accurate results.

4.2.1 Stochastic Coefficient Regression Method

The stochastic coefficient regression method has been used effectively in policy analysis of wheat economies (Gempesaw & Halbrecht, 1990). Conventionally, dummy variables are used in standard fixed coefficient estimating methods such as ordinary

least squares (OLS), to capture policy impacts on the structure of a sector. However, some limitations are encountered when using this conventional approach. The first problem is the difficulty in defining the stages of the policy's impact; that is, the exact timing of when the policies are announced, when they are in full effect, and how they are fine-tuned. Secondly, the fixity of agricultural assets and inelastic supply and demand contrast with the abrupt shocks that occur when dummy variables are used. Thirdly, a fixed coefficient estimation method assumes constancy in the marginal contribution of causal factors, which is restrictive when evaluating the impacts of evolving policies.

4.2.2 Gravity Model

The gravity model is a reduced form equation from general equilibrium of demand and supply systems. It has been used to evaluate bilateral trade flows of aggregate commodity between pairs of countries. This model is able to evaluate the impacts of trade policies on trade flows (Karemera *et al*, 1991).

4.2.3 Partial Equilibrium Methodologies

Partial equilibrium analysis is a technique of microeconomic analysis pioneered principally by Cournot and Marshall to analyse a market, or other part of an economy, by itself. Usually the relationship between only two variables is considered, with the assumption that if something can influence that relationship, it remains unchanged.

A central part of theoretical efforts in the field of policy analysis has been the search for the theoretically correct and easily understandable summary measures of policy impacts on social welfare. Two types of summary measures have been developed. One strand of analysis focuses on private and social costs of public sector investment. Popular measures in this area include the net present value (NPV), and the economic internal rate of return (EIRR). The second strand of analysis focuses on the static effects of price-distorting policies. Popular measures of the effects of price policies include the effective protection coefficient (EPC) and the domestic resource cost of foreign exchange (DRC) (Nelson & Panggabean, 1991).

4.2.3.1 Net present value

The net present value (NPV) is the discounted value of future income from a particular investment less the discounted value of expected costs. A positive net present value indicates that an investment project is worthwhile (Rutherford, 1992).

4.2.3.2 Economic internal rate of return

The internal rate of return is the discount rate that makes the net present value of an investment project equal to zero. This is a widely used method of investment appraisal, as it takes into account the timing of cash flows (Ramsey, 1970; Rutherford, 1992). In cost-benefit analysis it is measured by the formula:

(1)

$$\sum_{j=0}^n B_j - C_j / (1+i)^j$$

Where: i = the internal rate of return

4.2.3.3 Domestic Resource Cost Analysis

Domestic Resource Cost (DRC) is the opportunity cost of using a factor of production to produce one unit of output, divided by the international value added by producing that unit. The concept of DRC relates to a measure of real opportunity cost in terms of total domestic resources, of producing (or saving) a net marginal unit of foreign exchange. The DRC analysis follows a four-step model:

- 1) Development of enterprise budgets
- 2) Pricing of inputs and outputs
- 3) Calculation of resource cost ratios, and a
- 4) Sensitivity analysis

DRC's will always have their limitations, and there is a danger with using partial equilibrium methodologies, as these are summary measures, and important results of the analysis may go unnoticed. For example, the indicators provide information on which activities are the most efficient users of inputs, and given certain prices, the

most profitable. It is not known whether some prices will change after farmers switch into a particular activity, potentially affecting the relative efficiency of the activity. Another important point is that the opportunity costs of domestic resources are a function of current policy. Thus, these opportunity costs are only relevant under a particular set of policy constraints, i.e. they are constrained second best equilibrium values. If policy was to change, so would opportunity costs. For this reason, the PAM is not wholly satisfactory in terms of economic theory, being based on a partial equilibrium rather than a general equilibrium approach (Masters & Winter-Nelson, 1995; Yao, 1997).

4.2.3.4 The Nominal Protection Coefficient

The NPC is an old measure of comparative advantage, dating back to Adam Smith, who used it to compare the market prices and social opportunity costs of wheat. The NPC is defined as the ratio of observed market price paid to producers of a given product and its social (shadow) or world reference price (Masters, 1994).

$$\text{NPC} = P_x / P_x^*$$

(2)

Where: P_x = market price of produce x
 P_x^* = social (shadow) price of produce x

4.2.3.5 The Effective Protection Coefficient

The EPC is defined as the ratio of value added in local prices (V) to the value added in world prices (V^*), where V and V^* are defined as revenue minus the sum of all tradable input costs measured in local and world prices respectively (Masters, 1994).

$$\text{EPC} = V / V^* = (P_x Q_x - P_i Q_i) / (P_x^* Q_x - P_i^* Q_i)$$

(3)

Where: P_x = market price of produce x
 Q_x = quantity of produce x
 P_i = market price of tradable inputs
 Q_i = quantity of tradable inputs
 P_x^* = world price of produce x
 P_i^* = world price of tradable inputs

An EPC greater than one means that private profits are higher than they would have been without commodity policies, and an EPC less than one indicates that private profitability is lower than it would have been without the commodity policies. The DRC is used as an alternative measure to the effective rate of protection / (effective protection coefficient).

4.2.3.6 Policy Analysis Matrix

The PAM is the intellectual successor to the DRC and NPV calculations, and typically uses fixed input-output coefficients, so it is not possible to use it directly to indicate producer or consumer responses to policy changes that reduce distortions. This technique is similar to a cost/benefit analysis approach to comparative advantage studies; the difference is that the PAM considers the government policy effects on different farmers [i.e. an efficient farmer using imported specialised machinery pays substantial import tariffs, while the average farmer benefits by using typical techniques and not employing entrepreneurial abilities (Customs and Excise, 1999)] In such cases, the social cost for the efficient farmer varies from that of the average farmer, and this is the reasoning behind the necessity of a PAM in place of a cost/benefit analysis (Monke & Pearson, 1989).

Since the PAM is not a behavioural model, it cannot be used to calculate the new quantities of outputs and inputs that would follow from other alternative prices (such as those resulting from policy changes). The input-output physical budget is itself the product of past adjustment to actual market prices. Furthermore, the PAM tells only the relative incentives for change, without measuring the magnitude of the change (Nelson & Panggabean, 1991).

Nevertheless, the methods and indicators have the advantage of being relatively easy to calculate using obtainable data. They enable easily interpretable and consistent comparative ranking of different productive activities within and across regions. The snapshot that emerges is a much better appreciation of the efficiency of agricultural resource use than obtained from other methodologies (Delgado *et al*, 1997).

4.2.4 General Equilibrium Model

The general equilibrium model is a pragmatic, indicative approach to policy, which recognises that practitioners of policy analysis will only rarely have the data or the time to construct a fully specified general equilibrium model, capable of generating useful estimates of opportunity costs under different policy scenarios. Mathematically they are systems of simultaneous non-linear equations. Examples of general equilibrium models are: the SAM style models; Johansen Style models; and comparative advantage of general equilibrium models (Kydd *et al*, 1996; Kendrick, 1990).

The PAM has been selected to model comparative advantage in the wheat industry of the Western Cape because it has been designed to deal specifically with measuring the impact of policy on the economics of agricultural production. Since policies may impact on both output markets, and the market for production inputs, the PAM is a useful way to identify sources of policy transfers and inefficiency of resources, and to measure their cumulative effects on a commodity system.

4.3 The Policy Analysis Matrix: a detailed discussion

The Policy Analysis Matrix (PAM) is a logical framework for policy analysis developed during the late 1970's and early 1980's by Scott Pearson of the Food Research Institute, Stanford University, and explained in detail in Monke and Pearson (1989). The PAM grew out of a history of policy analysis using the domestic resource cost approach.

The basis of the PAM is a set of profit and loss identities that are familiar to any businessman. A strong point of the PAM is that it allows for varying disaggregation. Another is that it makes the analysis of policy-induced transfers straightforward. The PAM makes it possible to identify the net effect of a set of complex and contradictory policies and to sort out the individual effects of those policies.

A reason why the PAM has attracted much attention from agricultural policy specialists is that it is appropriate to circumstances in which the framework of

economic policy affecting agriculture is in flux. Such examples include policy changes which affect real exchange rates, real interest rates, input and output subsidies and taxes, border measures and marketing institutions (Kydd *et al*, 1997; Nelson & Panggabean, 1991).

With the PAM it is possible to identify, in an approximate fashion, which of a country's existing portfolio of commodity systems is likely to be negatively or positively affected by policy reforms, in terms of incomes and viability for the individuals in the system.

Furthermore, the PAM can be used to help in focusing technology development on the problems that have been identified. For example, it would be a major concern if a PAM revealed that policy changes were likely to undermine the viability of an existing commodity system on which a substantial population depended. By applying sensitivity analysis to the PAM for this system, it is possible to examine whether any achievable changes in the technological characteristics of the systems might restore viability (Nelson & Panggabean, 1991).

4.4 Construction of the PAM

The PAM is a tool consisting of two accounting identities. The first accounting identity states that profit is equal to revenue minus costs, measured in either private or social terms. The second identity (found in the third row of Table 4.1) measures the differences between observed values and the levels that would exist if the divergences between private and social prices (caused by distorting policies or market failures) were removed.

The two accounting identities generate policy indicators for which values can be estimated. Notable among these are the nominal protection coefficient, effective protection coefficient, private cost ratio and domestic resource cost ratio (these are discussed below). The following table gives a representation of how the PAM is typically organised.

Table 4.1: The policy analysis matrix to measure policy incentives and comparative advantage

	Benefits	Costs		Profits
	Gross Revenues	Tradable inputs	Domestic factors	
Private (market) Prices	$A = \sum P_x Q_x$	$B = \sum P_i Q_i$	$C = \sum P_j Q_j$	D
Social (shadow) Prices	$E = \sum P_x^* Q_x$	$F = \sum P_i^* Q_i$	$G = \sum P_j^* Q_j$	H
Policy effect (divergences)	I	J	K	L

Where:

P_x = market price of produce x

Q_x = quantity of produce x

P_i = market price of tradable inputs

Q_i = quantity of tradable inputs

P_x^* = world price of produce x

P_i^* = world price of tradable inputs

1. Private profits, D, equals A minus B minus C
2. Social profits, H, equals E minus F minus G
3. Output transfers, I, equals A minus E
4. Input transfers, J, equals B minus F
5. Factor transfers, K, equals C minus G
6. Net transfers, L, equals D minus H; or I minus J minus K

Source: Monke & Pearson, 1989

The PAM has four columns: the first for revenue, the second and third for costs and the fourth for profitability. The two cost columns are differentiated into a column for tradable inputs and a column for domestic factors or non-tradable inputs.

There are three rows in the PAM: the top row of the matrix is a budget showing costs of production and marketing at market prices; the second row in the matrix shows the same cost elements expressed at social prices, that is, social opportunity costs. For tradable products, adjusted world prices are normally taken as social prices, applying import or export parity measures where appropriate. The social price of domestic resources is taken as their opportunity cost, in other words, the return at the margin in the best available alternative.

The third row of the PAM is simply the first row minus the second. It shows the net impact of market failure, distorting policies, and efficient policies (those which correct market failure). The signs of the revenue and cost terms in the third row indicate whether the net effects of policy and market imperfections for these categories amount to an implicit subsidy or tax. If, for example, (I) was positive, the net effect of policy and/ or market failure is that the market price paid to the system is in excess of the social opportunity cost, i.e. output prices are subsidised. The right-hand entry in the third row, (L), summarises the net effect of policy and/ or market failures on the profitability of the system, known as 'net transfers'. If (D) is greater than (H), then the net effect of policy is to subsidise the system. In this case, policy reforms, to bring about greater economic efficiency, will reduce the gap between (D) and (H), and this will induce adjustments in the commodity system in question. This may involve changes in the proportions in which resources are used and, at least in the short term, some contraction in the scale of operation (Kydd *et al*, 1996; Ohene-Anyang, 1997).

If policies by the government to correct market failure do not exist (or are negligible), any differences between the first and second rows must be a result of distorting policies. The third row also reflects transfers between producers on one side, and government treasury and consumers on the other side. Under certain restrictive assumptions, transfers to producers are identical to producer surplus and transfers to consumers are identical to consumer surplus.

A major advantage of the PAM as an analytical tool, is the way it simplifies the analysis down to the essentials. For example, the difference between private output prices (A) and social output prices (E) is transfers resulting from policies affecting

output prices (I). Thus, the analysis is focused on the divergence between private and social prices and it is not strictly necessary to know precisely which policies are causing these effects (although it is obviously desirable to understand this).

The PAM measures two kinds of profits: private profits, which are measured in market prices, and social profits, which are measured in economic prices. The two are discussed below.

4.4.1 Private profitability

The term *private* refers to revenues and costs reflecting the actual market price received or paid by farmers, merchants, or processors in the agricultural system. The private, or actual market price, thus incorporates the underlying economic costs and valuations, plus the effects of all policies and market failures (Monke & Pearson, 1989).

Private profitability is the criterion used by farmers to assess and compare alternative plans open to them for exploiting resources at their disposal. Prices paid and received by farmers, however, do not reflect the economic (or social) cost of resources used and products generated, because of various market distortions and other restrictions on prices and trade, commonly imposed by government agencies for various purposes. Choices made by individual producers, therefore, may not correspond to the social optima and could lead to inefficient allocation of the country's resources (Ohene-Anyang, 1997).

With reference to Table 4.1, private profits (D) are the difference between revenues (A) and costs (B+C); all four entries in the top row are measured in observed prices. The calculation begins with the construction of separate budgets for farming, marketing, and processing (Figure 4.2). For the purpose of data collection and organisation, the PAM framework defines a commodity system to include four activities: - farm production, delivery from farm to processor, processing, and delivery from processor to the wholesale market. Figure 4.2 illustrates the structure of the commodity system model.

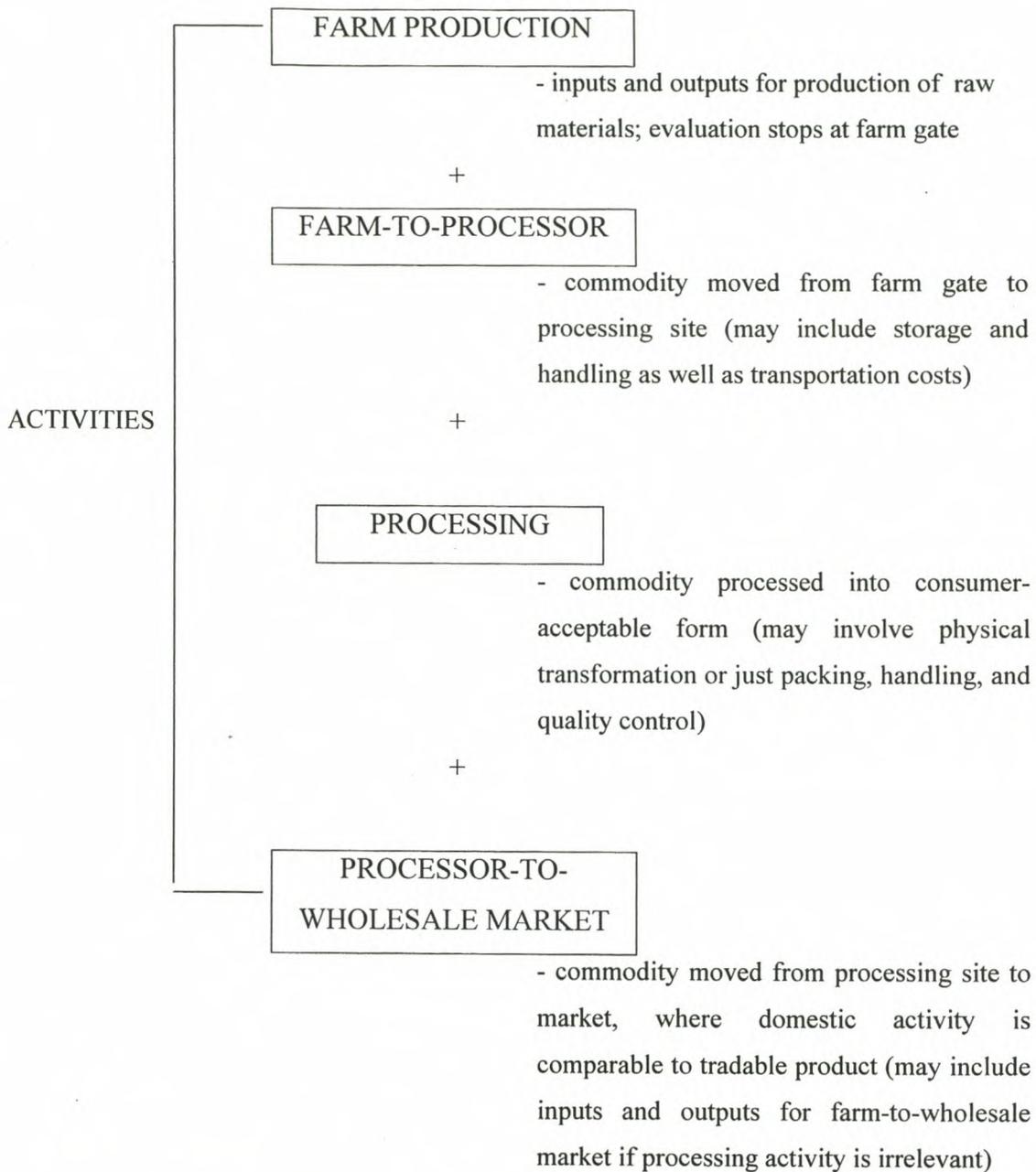


Figure 4.2: The Structure of the commodity system for PAM analysis

(Monke and Pearson, 1989)

For a study such as this, where the producer is the important factor that is being analysed, only two activities come into play, namely the 'Farm Production' and 'Producer to Processor' activities. Through this form of analysis, a PAM is given for the commercial farming of wheat in the Western Cape, and not a PAM for the Western Cape wheat industry itself.

4.4.2 Social profitability

The second row of the accounting matrix utilises social prices. Social profitability is obtained by deducting the social costs from the social revenue. Efficient outcomes are achieved when an economy's resources are used in activities that create the highest levels of outputs and income. These valuations measure comparative advantage or efficiency in the agricultural commodity system. This is due to the measurement of inputs and outputs with scarcity values or social opportunity costs being taken into consideration in the calculation of social profits. Therefore, the social profit can be used as an accurate indicator of comparative advantage (Monke & Pearson, 1989).

4.4.3 Effects of divergences

Divergences, which are always the result of either distorting policies or market failures, cause private valuations to depart from their social counterparts. Governments usually enact distorting policies to favour particular interest groups or with the intention of ensuring income distribution and food security. Similarly, certain markets may fail to bring about an efficient allocation of goods or services. The PAM provides indicators that conveniently measure the effects of various policies on agricultural production. If market failures are unimportant, these transfers measure mainly the effects of distorting policy (Monke & Pearson, 1989; Ohene-Anyang, 1997).

The following sub-sections provide brief descriptions of these divergences.

4.4.3.1 Output Transfers

(4)

$$I = A - E = (\sum P_x Q_x) - (\sum P_x^* Q_x)$$

An output transfer, I , is defined as the difference between the actual market price of a commodity produced by an agricultural system, A , and the efficiency valuation for that commodity, E (Monke & Pearson, 1989).

When the output transfer of a commodity has a positive value, it means the various policies increase private prices of the commodity over the corresponding world prices. A positive output transfer is an incentive to private farmers, since it causes the production system to realise higher private profit or cover greater private costs than it would without the aid of the policies. A negative output transfer implies lower private output prices compared to the corresponding world prices, and hence a disincentive to private farmers (Ohene-Anyang, 1997).

4.4.3.2 *Tradable-input transfers*

(5)

$$J = B - F = (\sum P_i Q_i) - (\sum P_i^* Q_i)$$

The tradable-input transfers, J, are defined as the difference between the total costs of the tradable inputs valued in private prices, B, and the total costs of the same inputs measured in social prices, F (Monke & Pearson, 1989).

The principles underlying the interpretation of tradable-input transfers are equivalent to those set out for output transfers. World prices serve as social valuations of all tradable inputs. Non-tradable inputs are decomposed into their component tradable-input and primary factor costs to permit social valuation. A positive tradable input transfer serves as a disincentive to private farmers, since it indicates higher private prices of tradable inputs than the corresponding world prices. This means a positive tradable-input transfer can rather make a production process socially profitable, but privately unprofitable. These transfers may be the result of policies such as import restriction (for imported products) or taxes on domestic consumption of those goods. To reduce input costs, a government can subsidise importables, restrict exportables by imposing export taxes or quotas, or subsidise all domestic consumption of the input item (Ohene-Anyang, 1989).

4.4.3.3 *Domestic factor transfer*

(6)

$$K = C - G = (\sum P_j Q_j) - (\sum P_j^* Q_j)$$

Domestic factor transfer is defined as the difference between the cost of all the domestic factors employed in a production process, measured in actual market prices, and the social costs of these factors (Monke & Pearson, 1989). These transfers are disincentives to private farmers, since they reduce private profits, but negative domestic factor transfers increase private profits and are therefore incentives to private farmers.

4.4.3.4 *Net policy effects*

(7)

$$L = D - H$$

The value of L shows the extent of inefficiency in an agricultural system. If market failures are a large source of the net transfer, this measure indicates how much long-term government effort (price policy, investment, and regulation) will be required to eventually permit the economy to operate efficiently (Monke & Pearson, 1989).

4.5 Indicators in the PAM

The basic PAM permits twelve indicators of economic efficiency, six of which are ratio indicators and six non-ratio indicators. Ratio measures are more useful for comparison of commodity systems, which are dissimilar in the relative proportions in which they use inputs (Kydd *et al*, 1996).

Selected indicators derived from the PAM include:

4.5.1 Resource Cost Ratio

The domestic resource cost (DRC) measures in one ratio the relationship between the true cost of producing an item and the return to selling it. The DRC 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.

(8)

$$DRC = G / (E-F)$$

A DRC value less than one indicates that the opportunity cost of the domestic resources used is less than the value added that is earned from the sale of those resources. Comparing across activities, the one with the lowest DRC is the one that earns the most value with the least value of inputs.

4.5.2 Nominal Protection Coefficient on Outputs

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.

(9)

$$\text{NPCO} = A / E$$

By definition, an NCPO 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 because of government policies or market imperfections that cause the market price to differ from the economic price.

4.5.3 Nominal Protection Coefficient on Inputs

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.

(10)

$$\text{NPCI} = B / F$$

Like the NCPO, the NCPI measures financial transfers caused by government policies of market imperfection. The NCPI measures the extent to which the market price of tradable inputs exceeds their social price. An NCPI above unity indicates that smallholders undertaking that activity pay a premium for their tradable inputs.

4.5.4 Effective Protection Coefficient

The fourth indicator is the effective protection coefficient (EPC). This indicator measures the effects of policies and market imperfections that affect the market for outputs and tradable input. It measures the divergence between the value added by domestic inputs as measured with private prices and that measured with social prices.

(11)

$$\text{EPC} = (A-B) / (E-F)$$

Value added by domestic inputs is product revenue minus costs paid for tradable inputs. An EPC greater than unity indicates that the profitability of an 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.

4.5.5 Profitability Coefficient

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.

(12)

$$\text{PC} = D / H$$

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.

4.5.6 Subsidy Ratio to Producers

The sixth and last indicator 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.

(13)

$$\text{SRP} = L / E = (D-H) / E$$

The SRP is a measurement of the profits derived from a financial transfer from consumers of a good to its producers.

4.6 Conclusion

Although the PAM is appropriately designed for this study, it is a static model that cannot capture the potential changes in prices and productivity, and the results are subject to changes in market conditions. To overcome the limitations, a set of sensitivity analyses should be conducted (Yao, 1997).

The choice of the PAM model requires particular theory pertaining to the structure of the model; this was dealt with in Chapter Four, but important theory, with respect to certain concepts, still needs defining. Concepts such as market and economic prices, shadow pricing and conversion factors will be discussed in Chapter Five.

CHAPTER FIVE

METHODOLOGIES FOR THE CALCULATION OF EFFICIENCY PRICES

5.1 Introduction

Accurate estimation of shadow prices of inputs and outputs is critically important in the use of the PAM, because these prices represent the opportunity cost of the inputs and outputs to the economy. This means that they make it possible to identify the contribution each commodity makes to the national income.

This chapter describes the methodologies used in the calculation of shadow prices for the inputs and outputs found in the study area budgets.

5.2 Market prices

Market prices are those perceived prices at which products and services trade, irrespective of interference in the market; for example, the market wages of labour, the price of 2kg of maize meal, the price of 1 kilowatt-hour of electricity, etc. The market prices in the study area budgets were ascertained from the data obtained at the various district co-operatives, from the September 1998 COMBUD results, and from individuals operating in the industry.

5.3 Shadow prices

Shadow prices are the opportunity costs of products and services when the market price, for whatever reason, does not reflect these costs. Examples are: shadow wages of labour, where the fact that minimum wages are fixed is taken into account; a shadow price for fuel, where taxes and subsidies are excluded; the marginal cost of generating one kilowatt-hour of electricity, etc. (CEAS, 1989).

5.3.1 Principles in the Calculation of Shadow Prices

There are various means of calculating shadow prices, but three stand out from the rest. The first is the world price approach, the second is the opportunity cost approach, and the third important approach rests on the willingness of the community or groups in the community to pay for goods or services. This last approach of willingness-to-pay is recommended only as a method of calculating surrogate prices under certain circumstances, for example, the valuation of externalities; it is the first two approaches that form the basis of shadow price calculation, and so they alone will be discussed (CEAS, 1989).

5.3.1.1 *World price approach*

The world price approach takes into account world prices of products and services, especially with regard to those goods that are freely traded on international markets. Such goods include agricultural and mineral products, for which an active free international market exists.

The world price is used as a shadow price when the local market prices have been distorted through government intervention or market irregularities / failures. Adjustments are made to the world price, with respect to import or export costs, and then the final parity price² is used as the shadow price.

A problem with the reliability of this approach is that firstly, the scarcity value of a currency is not always reflected, due to the government pegging the currency at an artificial level. Adjustments are then required in the value of the currency. Secondly, certain inputs, such as labour, cannot necessarily be converted to a currency value. The reason for this is that no free international market exists for such inputs, and therefore it is impossible to attach a currency value to surplus labour (CEAS, 1989).

5.3.1.2 *Opportunity cost approach*

This approach follows the general principle behind opportunity cost, namely, the production that is given up elsewhere, by withdrawing the relevant inputs for alternative use, is used as the shadow price of those inputs. The value used for the

² Parity pricing is the concept of adding the cost of delivery/ transport of a good to a certain market, to the cost of production (Harvard Institute, 1991).

shadow price of outputs is the additional benefit achieved by undertaking a certain project relative to the second best project.

Due to various problems or shortcomings with both the world price and opportunity cost approaches, a combined approach would calculate shadow prices more accurately. For example, the output shadow price for wheat on the Western Cape market would be the parity price achieved from the world price, whereas the input shadow price for labour in the Western Cape wheat industry would be the opportunity cost of that input if used in another sector; i.e. the possible wage that could be earned if that unit of labour was in another industry. This combined approach provides a more precise and flexible process of shadow price determination and eliminates the disadvantages of each of the world price and opportunity cost approaches.

5.3.2 General Problems with the Determination of Shadow Prices

Shadow prices should be determined as scientifically as possible, so that different evaluators can achieve the same results (CEAS, 1989). Therefore, it is important to deal with, and record the manner in which externalities, inflation, taxation and subsidies, and the value of currency, will be handled.

5.3.2.1 Externalities

External effects are costs or benefits not reflected fully in decision-making or in prices. Since all 'market failures' are a result of a divergence of private and social costs or benefits, all 'market failures' may be viewed in some sense as externalities. In practice, most external effects reflect the high cost of running a market, because those who would benefit from some action do not pay for the benefit, either because: (1) – for technological reasons it is too difficult to collect from potential payers, or (2) – the absence of ownership or other legal barriers does not allow collection of payments for provision of the good (Zerbe & Dively, 1994).

5.3.2.2 Currency

The price of any imported product or mineral is converted by means of an exchange rate to internal price levels. Irrespective of restrictions on the flow of capital, the commercial Rand is fairly representative of the forces of supply and demand, as

determined by imports and exports, and is therefore used as the shadow price of currency.

Other reasons for using the commercial Rand as the shadow price of currency is due to the highly complicated ways of calculating a shadow exchange rate which involves the difference between two currencies and leads to much uncertainty. Two methods are used in calculating a shadow exchange rate, namely the 'Big Mac' index and the 'BER' method to calculate the purchasing-power parity (PPP) exchange rate between the US dollar and the Rand. These calculations of exchange rate need not be dealt with as wheat is not exported from the Western Cape to other countries, therefore the shadow exchange rate does not play a role in this study.

5.3.2.3 Inflation

Inflation is the continued rise in general price levels that makes the determination of relative scarcity values more difficult (Appendix A.1). Inflation is not taken into account in the economic analysis, and all evaluations are done in base year prices, with allowance for relative price shifts.

5.3.2.4 Indirect taxes and subsidies

Indirect taxes (e.g.: income tax) and subsidies are transfer payments, and when new inputs that have to be taxed or subsidised, are looked at in the national interest, the value is calculated from the point of view of the producer, by subtracting taxes and adding subsidies. When the effect on the local economy has to be taken into account, the market prices, including the taxes and after deducting subsidies, indicate the social marginal value of the input or benefit. All indirect taxation is excluded in the financial analysis, but direct taxation (e.g.: value added tax) is taken into account in the economic analysis.

5.3.2.5 Adjustment for direct transfer payments

Transfer payments are levies such as value added tax (vat), which applies to imports as well as domestic production. They are also payments for resources (inputs) used in production. These payments are taken into consideration in this thesis, as they represent a policy distortion influencing the cost structure of the enterprise budgets,

but they are not included in the financial and economic analysis. The reasoning for this is given below.

The current statutory levy on winter cereal is R4.50 per metric ton and serves to finance information and research. It came into operation on the 1st of October 1998 and will lapse on the 30th of September 2002. The consumer bears the whole economic burden. The consumer's burden increases as the demand curve becomes relatively more elastic, while the burden decreases when the demand curve becomes relatively more inelastic (Seitz *et al*, 1994).

This thesis is concerned with the calculation of the productivity of commercial wheat farming and vat on inputs is claimed back by commercial farmers from the government, but the value added to the inputs is taxed at a rate of 14 percent. The farmer is therefore affected by this policy distortion in that vat is payable equal to 14 percent of the producers nett income.

At the end of each two-month period vat is claimable from the receiver of revenue on purchased inputs. Inputs purchased from co-operatives by vat registered producers do not have vat included (e.g.: fertiliser, chemicals, and fuel), but some inputs purchased elsewhere carry the 14 percent vat (e.g.: vehicles). This vat is subtracted from the vat payable by the producer. The vat payable is equal to 14 percent of the producer's gross receipts.

The argument against including this policy distortion into the PAM, revolves around the theory that the vat paid by the producer to the government is money that was never the producer's. As stated above, the consumer bears the entire vat burden. In a situation of zero value added taxation, the producer would receive the same gross receipts as in the current situation, and not the 14 percent increase caused by vat.

5.4 Shadow pricing tradable commodities

The social price, or shadow price, of a tradable input or output is generally its trade parity price (Harvard Institute, 1991). Tradable goods, by definition, have border prices. The goods produced by a commodity system are usually tradable, so the

shadow prices for the 'revenues' column in the PAM, as well as the 'tradable inputs' column, are usually easy to compute. Tradable goods may be divided into four categories:

- Exported output
- Diverted export
- Import substitutes
- Imported and importable inputs

5.4.1 Exported output

The price is the FOB (free on board) value of commodities actually exported. If the small country assumption³ does not hold, and the country's sales volume affects the international price, the shadow price is the marginal export price. This category is not applicable in this study.

5.4.2 Diverted export

The price is the FOB value of commodities that would be exported, if they were not used as inputs elsewhere in the domestic economy. This category is not applicable in this study.

5.4.3 Import substitutes

The price is the CIF (cost, insurance, and freight) value of commodities that would be imported, if there were no domestic production by the commodity system. This category is applicable in this study.

5.4.4 Imported and importable inputs

The price is the CIF value of imported goods used by the commodity system to produce outputs, or of importable goods similar to domestic goods used in the same fashion. This category is applicable in this study.

South Africa is a net importer of wheat. The import parity price of wheat at the various producing areas is therefore used to calculate the social revenue of wheat. In

³ If a country's world market share for a commodity is too small to have any significant effect on the world price, the shadow price is the export parity price using world prices.

calculating the parity price, the world price is used, due to the small country assumption (South Africa's share of the world wheat market is too small to have any significant effect on the world price).

The shadow price of imported inputs, such as herbicides, is calculated using the purchase price (CIF) minus the applicable percentage import tariff. For herbicides this would mean the CIF price minus the 10 percent import tariff.

5.5 Shadow pricing non-traded commodities

The social price of a non-tradable input or output is generally its domestic equilibrium price net of distorting policy influences (Harvard Institute, 1991).

5.5.1 Capital Goods

Capital goods are those production inputs that are not used up in a single period in the production process.

The cost of capital for the producer is the annual amount paid to the bank for long-term loans on capital goods. This cost is greatly affected by the nominal interest rate charged on the sum loaned. The shadow price for the cost of capital is calculated subjectively through the determination of the real interest rate.

The calculation of the real interest rate is subjective. Simplistically seen, this figure would be the inflation rate combined with the long-term real interest rate. The current South African inflation rate is 2.9 percent. The current long-term real interest rate should be between 2 and 4 percent but lies between 8 and 10 percent. Therefore taking the maximum possibilities for a real interest rate would result in a figure of 13 percent, which is around 4 percent below the current nominal interest rate of 16 percent (SARB, 1999).

This nominal interest rate can be attributed to one of two causes. The first is the action of government and the second the action of market forces. Were the cause to be the action of government regulation (the Reserve Bank intervening by targeting interest rates for regulation of the economy), then this phenomenon must be included

in this thesis due to it being a policy distortion. On the other hand, were the cause a result of market forces, then the social cost of capital would be the same as the private cost of capital due to the nominal interest rate being a direct result of market tendencies.

This argument is subjective, yet the fact that the South African economy is in transition, and that interest rates therefore reflect a political premium, leads to the conclusion that market forces dominate. Therefore, the private and social cost of capital is calculated using the nominal interest rate, hence they are the same.

For the purpose of this study, capital goods are divided into three groups (CEAS, 1989):

- Land
- Buildings
- Machinery and equipment

5.5.1.1 Land

The market price of a given piece of land cannot simply be accepted as a measure of its scarcity. The inherent value of land is dependent on its physical characteristics, the climate, and the production technology used on it. The shadow price of land is based on its opportunity cost, in other words, the optimal alternative use to which it can be put. In order to calculate this price, the following information must be available:

- i) the historical use of the land;
- ii) the value of the output derived from it in the past; and
- iii) the developments in the area which can affect it.

5.5.1.2 Buildings

In order to determine prices correctly, the following information is necessary:

- i) the date on which the building was built;
- ii) the current building cost of an equivalent building (book value); and
- iii) alternative applications of the building

5.5.1.3 *Machinery and equipment*

Depreciation is taken into account indirectly, in that the cost of fixed assets normally appears at the beginning of the analysis period, and the scrap or residual value appears as a credit at the end. The shadow price of machinery and equipment is determined in the same way as that of raw materials.

5.5.2 Raw Materials

Raw materials are found in a variety of forms, and are converted through a variety of processes, by the addition of labour and capital, into goods and services. The shadow price of the raw material depends on a number of factors:

- i) it cannot simply be accepted that the market price reflects the relative scarcity of a diminishing raw material e.g. coal; for the government often influences the price for other reasons;
- ii) monopolies could force a raw material price up to an artificial level that is higher than the scarcity value;
- iii) subsidising or taxing the use of raw materials will distort the prices so that they no longer reflect scarcity values; and
- iv) rationing restricts the demand for, or supply of, certain goods, and distorts the market prices so that economic value is not reflected in the price.

5.5.3 Labour

Factors exist in the labour market that result in the labour wage not reflecting relative scarcity. One such example is the fixing of minimum wages; this forces the wage above the marginal product of labour, and thus limits employment. The shadow price of labour for this study on the Western Cape wheat industry will follow the opportunity cost approach; the shadow price is the best alternative employment possibility in the immediate region.

5.5.4 Services

Purchased services are not always visible in the final product that is produced, but nevertheless form an integral part of the production process, e.g. electricity, water, transport, research and development. The opportunity cost of such services is the

value that the rest of the community has to forgo if they are denied the service, or the cost imposed on them to deliver the service (CEAS, 1989)

5.6 Conclusion

The use of shadow prices is essential for this study, because all the indicators of comparative advantage and policy incentives which are calculated from the PAM require the use of both financial and economic prices. The shadow prices make it possible to identify the effects of problematic agricultural policies that hinder production and the marketing of agricultural goods in South Africa.

The next chapter, Chapter Six, deals with the application and results derived from the Policy Analysis Matrix.

CHAPTER SIX

APPLICATION AND RESULTS OF THE POLICY ANALYSIS MATRIX

6.1 Introduction

The approach used in PAM analysis begins with the calculation of existing levels of private (actual market) and social (efficiency) revenues, costs, and profits. This calculation reveals the extent to which actual profits are generated by policy transfers, rather than by underlying economic efficiency.

6.2 Data selection

The selection and verification of data is probably the single most important issue in this type of study. In order to compile a comprehensive and worthwhile study, accurate and representative data must be used. However, resources are scarce, and hard decisions have to be made about the exact data to be used.

6.2.1 Correct data

In order to create a PAM that is representative of the wheat industry in the Western Cape as a whole, the following was decided:

1. In calculating private prices, the structure of the COMBUD⁴ budgets is utilised for the construction of specific area and system budgets, with the input of regional co-operatives' costing and revenue data, as well as data from the COMBUD. Questionnaires were formulated to represent a typical enterprise budget for a typical wheat farming system. These questionnaires were sent to the relevant co-operatives (Appendix A.3).

⁴ In the construction of COMBUD budgets, three data sources are used: 1. Data obtained from the Provincial GIS and other data bases; 2. Data obtained from group discussions with farmers and other experts; 3. Individual farmer data

The co-operatives used in this study include:

- WPK
Head Office: Malmesbury
Telephone No. 02248 22951
Fax No. 02248 21953

- PLK
(Porteville/Piketberg Co-operative)
Head Office: Piketberg
Telephone No. 022 9312134
Fax No. 022 9312421

- CRK
(Caledon Riviersonderend Co-operative)
Head Office: Caledon
Telephone No. 02821 21130
Fax No. 02821 21521

- SSK
(Central-South Co-operative)
Head Office: Swellendam
Telephone No. 02851 41130
Fax No. 02851 41169

- Tuinroete
(Garden-Route)
Head Office: Mossel Bay
Telephone No. 044 6011200
Fax No. 044 6951746

- BNK
(Bredasdorp-Napier Co-operative)
Head Office: Bredasdorp
Telephone No. 02841 41120
Fax No. 02841 42111

 - MBK
(Moorreesburg Farmers Co-operative)
Head Office: Moorreesburg
Telephone No. 022 4332213
2. The algorithms for the calculation of private and economic prices are shown in Appendix A.1 (Calculation Means), and A.2 (Calculation Assumptions).
 3. Typical farming systems are modelled, i.e. the most popular method of farming used in a specific area. This will be either monoculture or a form of rotational farming.
 4. Two yield/ha figures are used in each case study to represent an average producer and an efficient producer. The average producer prices are deduced from study groups in the specific regions, and the efficient producer being the best producer, with net income as the measure.
 5. In an effort to cover all bases, matrices were constructed in three formats:
 - the first is the basic wheat system for a single year;
 - the second, the basic wheat year during a rotation cycle; and
 - the third, an average of the wheat system year from the past few years, to account for the effect of the good and bad years.
 6. Information for tariff levels was obtained from Customs and Excise, Cape Town.

6.2.2 Relevant areas

As stated in Chapter 1, there are thirteen farming areas in the two sub-regions chosen to represent the Western Cape Wheat industry. However, only those areas where most of the wheat is grown were included for the purposes of the calculations.

The study of Ohene-Anyang (1997) was limited to even fewer areas, mainly due to problems incurred in the acquisition of the appropriate data. He suggested that future studies should cover larger areas. It is evident that the following areas with their respective wheat production systems are more representative than any of the earlier studies, and can be considered representative of the Western Cape wheat industry:

Swartland

A) Middle Swartland:

(Moorreesburg region)

1. wheat after canola; minimum tillage
2. wheat after lupin; minimum tillage

B) Piketberg-Porterville mountains:

1. wheat after wheat; minimum tillage
2. wheat after wheat; conventional tillage

C) High rainfall Koeberg-Malmesbury area:

1. wheat after wheat

South Coast

D) Malgas/ Heidelbergvlakte:

(Witsand region)

1. wheat after wheat; less tillage
2. wheat after medics; less tillage
3. wheat after lucerne; less tillage

E) Ruens:

1. wheat after medics; conventional tillage
2. wheat after wheat; minimum tillage

F) Riversdal:

1. wheat after lucerne; less tillage

G) Slang River:

1. wheat after medics; less tillage
2. wheat after lucerne; less tillage

H) Bredasdorp:

1. wheat after wheat; minimum tillage

An enterprise budget for each regional system is provided in Appendices B1 to B17. Due to similarities in these budgets, an associated PAM calculation is presented only for those systems that show a marked divergence from the average. As a result, only eleven of the seventeen budgets are subject to a PAM analysis. For the sake of brevity, the discussion is introduced by a detailed analysis of the budget for the middle Swartland region, followed by a summary discussion of the other 10 matrix results.

6.3 A PAM analysis for the Middle Swartland (Moorreesburg Region)

Information source: COMBUD; Moorreesburg Farmers Co-operative (MBK).

The enterprise budget, budget summary, and PAM calculations are shown in Appendix B.1. The primary activity in this area is dryland wheat production after canola with minimum tillage practices. The yield average is 2.82 tons/ha.

Table 6.1 Policy Analysis Matrix for wheat production in the Moorreesburg region, Swartland, 1997/98 (R/ha)

	Benefits	Costs		Profits
	Gross Revenues	Tradable Inputs	Domestic factors	
Private (market) prices	2538,00	1749,93	440,34	347,63
Social (shadow) prices	1763,91	1415,20	779,64	-430,93
Policy effect (divergences)	774,09	334,73	-339,30	778,56

DRC= 2,24 NPCO= 1,44 NPCI=1,24 EPC= 2,26 PC=-0,81 SRP= 0,44

Table 6.1 shows the results of the PAM calculations, with the twelve summary values that indicate the effects of market distortions. The six ratios below the table provide further information with regard to comparative advantage and the efficiency of resource utilisation in the wheat industry. A detailed analysis of these values is given below.

Gross Receipts:

At the average market price for wheat in this region the private gross revenue is R2538.00/ha. This ranks third highest amongst all the study regions (Appendix C.2), which reflect an average private gross revenue of R2 338.11/ha (Appendix C.1). Private gross revenue is, however, well above the social gross revenue of R1763.91/ha for this region. The social gross revenue is obtained by subtracting the tariff on wheat imports from the import parity price at Cape Town harbour (Appendix A.2). The output transfer (R774.09/ha) represents the difference between the private and social gross revenue. The high positive level of this output transfer represents a disincentive to producers to continue production, unless they believe that they will continue to be protected by the tariff⁵.

⁵ As the tariff is currently well below the bound rates negotiated under the Uruguay Round, and may, thus, even increase in the future.

Allocated Costs:

The average of the allocated costs of wheat production in the Western Cape is R2 344.57/ha, compared to R2 190.37/ha (1 749.93/ha + 440.34/ha) in Moorreesburg. The main reason for the lower cost of production in Moorreesburg is the combination of low **purchased input cost** (R640.47/ha, Appendix C.6), **machinery variable cost** (R142.52/ha, Appendix C.8), and **contract hire cost** (R57.00/ha, Appendix C.11). Private allocated cost for Moorreesburg is the sixth lowest of the study regions and exceeds the social allocated costs by only R4.47/ha; the smallest difference of all the regions (Appendix C.5). This difference is represented by the two divergences, namely the **tradable-input** and **domestic factor transfers**.

The **tradable-input transfer** (R334.73/ha) makes the production process socially profitable, but privately unprofitable. This situation arises because farmers are paying more for certain inputs than they would in a free market. The most important divergences include the import tax on herbicides (10 percent), and the tax on fuel (43 percent). The tax on diesel has little effect on the comparative advantage of this region but a substantial effect on the profitability of farmers over the short term. The tradable-input transfer for Moorreesburg is one of the lowest of the various regions and is far below the average of R409.10/ha (See Table 6.2 below). This indicates that farmers have adapted to this disincentive by using fewer taxable inputs such as fuel and herbicides.

The negative **domestic factor transfer** (-R339.30/ha) represents an incentive to farmers to continue producing wheat, since negative transfers reflect the potential for increased private profits. This figure is below the average (-R368.47/ha) for the eleven selected regions, which is an indication that there is a small non-tradable component of economic costs and a small difference between the social cost and the private cost of labour for this region.

Profits:

This region is one of six to have a positive private profit (Appendix C.1). The average private profit for all 17 regions is approximately -R6.00/ha with eleven showing a negative profit. Therefore, the private profit is quite good and the social loss is amongst the lowest (private = R347.63/ha; social = -R430.93/ha). The reason

why private profit is relatively high and social loss relatively low in Moorreesburg stems from the combination of above average gross receipts and below average allocated costs.

The difference between these two values (private profit and social loss) is represented by the divergence or **net policy effect** (R778.56/ha). This value is above the average net policy effect of R641.10/ha and is the second highest of the eleven selected regions (Table 6.2). The high net policy effect indicates the great extent to which government policy affects this region, by increasing the cost of allocated tradable inputs and protecting farmers through the tariff.

Ratios:

The **DRC** indicator is a measure of comparative advantage (Balassa & Schydlosky, 1972). A DRC value between zero and one indicates that the opportunity cost of the domestic resources used is less than the value added that is earned from the sale of those resources. Comparing across activities, the one with the lowest DRC is the one that earns the most value with the least value of inputs. Not one of the eleven regions has a DRC value of less than unity, which means that all the regions are 'wasting' domestic resources in wheat production.

The DRC value of 2.24 for the Moorreesburg region is below the average DRC of 2.55 for the Western Cape as a whole. In one sense, therefore, the extent of economic waste is lower here than in the other regions. Table 6.3 shows that, at private prices, this region is amongst the most efficient in the production of wheat in terms of its ability to earn the most value with the smallest value of inputs. Nevertheless, while the region may be said to have a comparative advantage in wheat production compared to other parts of the Western Cape industry, it remains true that farmers would not be able to compete with wheat imports in the absence of the tariff⁶.

The R180.00/ton import tariff had quite an impact on the comparative advantage of domestic producers. When the import parity price is used as the basis for the calculation (i.e. with the tariff in place), the DRC for this region is below unity

⁶ Here it is also instructive to note that, historically, the main source of wheat imports has been Australia, where farmers receive smaller subsidies than their South African counterparts.

DRC = 0.91. With the new tariff in place (R269/ton), the DRC value is even lower at 0.70. This indicates that producers in the Moorreesburg region have a slight comparative advantage over imported wheat. The tariff can, therefore, be regarded as a measure that will allow these farmers to buy time in the process of finding ways of reducing their costs of production.

From the **NPCO** value of 1.44 one can deduce that the local wheat price is 69.44 percent higher than the landed price. The landed wheat price (R625.50/ton) is lower than the domestic wheat price by almost R300/ ton. This means that domestically produced wheat is not competitive compared with imported wheat. The import parity price, however, is very similar to the domestic price due to the wheat import tariff (Appendix A.2). The import parity price at Durbanville is approximately R805.50/ton (April, 1999), which is still below the local price, which ranges between R850 to R950/ton depending on a number of factors⁷.

The reason for using a conservative domestic wheat price in these calculations lies in the difficulty faced in arriving at an exact price level. In the deregulated wheat market in South Africa, each farmer can obtain a different contract price for his or her wheat; at present this price generally ranges between R800 and R1 000/ton. Factors that determine the price a farmer can achieve include: transport (distance from the buyer), quality of the wheat, and prescience or good fortune. Farmers indicate transport costs from the farm gate to the co-operative silo in their budgets, while the transport cost from the silo to the buyer is hidden in the wheat price and difficult to separate out (Appendix A.1).

The quality of wheat and the cultivar produced also influence the price of wheat. A single farmer can produce different grades of different types of wheat, and obtain varying prices for each grade and cultivar. These two factors, and the final factor of good fortune, i.e. being in the right place at the right time, makes it difficult to set different prices for each region, and still retain accuracy. Therefore, an average price

⁷ At these prices, importers are able to find a market for foreign wheat on the Western Cape market. However, high domestic transport costs protect producers in the interior. For this reason, a 48.6 percent increase in the import tariff on wheat (from R181/ton to R269/ton) has been implemented in an attempt to protect Western Cape producers, albeit at a greater social cost.

of R900/ton was chosen to represent the average price that a farmer can obtain for a ton of wheat. This price was, however, adapted to reflect transport costs from silo to buyer (Appendix D).

Another policy distortion that presumably affects the producer by reducing private gross revenue is the Value Added Tax on net returns (pg. 43, Adjustments for direct transfer payments). Vat is, however, not viewed as a policy distortion for wheat producers as vat on inputs can be claimed back, while vat on outputs does not affect gross revenues.

The **NPCI** value for Moorreesburg (1.24) is lower than the average for all producers of wheat in the Western Cape (1.28) but is still above unity, which means that farmers in this region pay a premium for their tradable inputs. Accounting for the tax on diesel results in a reduction of the NPCI. Even though farmers make a profit, the results show that their profits are still sub-normal.

Following on from the NCPO and NPCI is the **EPC**. The average value for Moorreesburg (2.26) shows that private profit is far higher than it should have been, despite the distortion in the prices of some tradable inputs. An EPC greater than unity indicates that the profitability of an activity, given current policy and market conditions, exceeds the level it would have reached in a free market, i.e. if subsidies or other distortions were removed. The EPC for the Western Cape as a whole is 2.02. The EPC indicates that policy and market conditions for both outputs and purchased inputs have created an incentive to undertake this activity (Janovsky, *et al* 1999).

The **PC** (-0.81) is weaker than the average of -0.26 but all the regions vary marginally (-1.23 to 0.39). The reason behind this is that private and social profit figures differ slightly. Accounting for the tax on diesel results in an improvement of the PC. The last indicator, the **SRP** (0.44), is almost identical to the other regions, which range between 0.36 and 0.44. This measurement of the profits derived from a financial transfer from consumers to producers gives an indication of the favourable *status quo* for producers in this region. This value of 0.44 indicates that producers receive a premium for undertaking this activity, although it is the lowest of all the regions.

6.4 A Summary PAM analysis for Western Cape wheat

Table 6.2 provides a summary analysis of revenues, costs and profits for the entire Western Cape wheat industry. From the four divergences shown in the table, a conclusive analysis can be made of the comparative advantage and competitive position of all eleven regions included in this analysis.

Table 6.2 Summary of budgetary divergences from the PAM

REGION	Output transfer	Tradable-input transfer	Domestic factor transfer	Net policy effect
Moorreesburg-B1	774.09	334.73	-339.30	778.56
Moorreesburg-B3	743.89	446.82	-412.12	709.19
Piketberg-B4	669.31	362.37	-330.98	700.70
Malmesbury-B6	785.39	449.55	-350.55	686.39
Malmesbury-B8	981.04	505.25	-467.59	932.39
Heidelberg-B9	598.07	444.02	-384.68	538.74
Heidelberg-B10	717.69	429.97	-359.31	647.03
Ruens-B13	646.15	325.71	-294.01	614.45
Riversdal-B14	509.00	419.09	-382.25	472.16
Slang River-B15	598.07	404.14	-396.20	524.93
Bredasdorp-B17	491.18	378.47	-336.15	447.51
Average	683.08	409.10	-368.47	641.10

The average **output transfer** is R683.08/ha, and all the regions show a positive result. The results vary from roughly 70% of the average to about 150%, a reflection of the importance of transport costs in this industry. The **tradable input transfer** is also positive in all cases, with a smaller variation of between 80% and 125% of the average.

The **domestic factor transfer** is always negative, mainly due to the high social cost of labour. The extent of this transfer is shown by the average of -R368.47/ha. A major component of the domestic factors is the cost of operating capital. This cost is

greatly affected by the high interest rates on borrowed capital (pg. 46, Capital goods). Were interest rates to drop, capital would be more accessible to farmers and the debt burden for farmers would be reduced.

Finally the average **net policy effect** of R641.10/ha shows that there is a disincentive to the production of wheat in all parts of the Western Cape due to the decrease in net returns that producer would face were there no policy distortions.

Table 6.3 shows the summarised ratios calculated from the PAM analysis for each of the regions included in this study. Analysing the indicators by comparing one to another is one means of determining the degree of comparative advantage of a region compared to the rest. The **DRC** values range from -6.34 to 14.44. All the regions' figures are positive, except for Heidelberg B9, Riversdal B14, and Slang River B15 regions, which, due to irregularities in production, have social tradable input costs greater than social gross receipts.

Table 6.3 Summary of ratio indicators from the PAM

REGION	DRC	NPCO	NPCI	EPC	PC	SRP
Moorreesburg-B1	2.24	1.44	1.24	2.26	-0.81	0.44
Moorreesburg-B3	8.15	1.44	1.28	3.78	0.07	0.42
Piketberg-B4	8.49	1.43	1.24	4.85	-0.02	0.41
Malmesbury-B6	5.81	1.45	1.28	3.01	0.15	0.39
Malmesbury-B8	1.93	1.45	1.29	2.02	-1.23	0.42
Heidelberg-B9	-6.34	1.41	1.28	-0.52	0.32	0.37
Heidelberg-B10	1.78	1.41	1.31	1.76	-1.20	0.37
Ruens-B13	1.75	1.41	1.28	1.84	-1.16	0.39
Riversdal-B14	-6.30	1.41	1.31	0.15	0.39	0.38
Slang River-B15	-3.94	1.41	1.25	-0.18	0.30	0.36
Bredasdorp-B17	14.44	1.41	1.33	3.20	0.35	0.37
Average	2.55	1.42	1.28	2.02	-0.26	0.39

For all the PAM's, the **NPCO** is similar in value, as the domestic wheat price is similar in each case. The **NPCI**'s are also almost identical, due to the similarities in the production structure for wheat and the duties imposed on production inputs. These include the 10 percent import tariff on herbicides and the tax on fuel (Excise duty and fuel levy = R0.80/litre). All the **EPC**'s lie between -0.25 and 4.85, with only Heidelberg B9 and Slang River B15 regions having negative EPC's.

The **PC**'s from all the calculations vary marginally (-1.23 to 0.39). The reason behind this is that private and social profit figures differ slightly. The last indicator, the **SRP**, is almost identical for each region, with a range of between 0.36 and 0.44. This measurement of the profits derived from a financial transfer from consumers to producers gives an indication of the favourable *status quo* for producers in the wheat industry. The positive figures indicate that producers receive a premium for undertaking this activity.

6.5 Sensitivity analysis

The values of the Domestic Resource Cost ratios, which were calculated in the various matrices, indicate that none of the regions have a comparative advantage in the production of wheat for the South African wheat market. However, the Policy Analysis Matrix technique, as stated previously in Chapter Four, is a static model and cannot capture the effects of potential changes in prices and productivity. This means that the DRC results are subject to change as a result of changes in market conditions. The market price per ton of wheat offered to the average farmer, either on SAFEX, through Cape Grain, or a private sale, fluctuates throughout the year. Parity prices also fluctuate with market and economic fluctuations, which include exchange rate fluctuations, causing the social prices to vary.

If the wheat price should increase by the end of the season, or average yield levels increase slightly with favourable weather conditions, for example, the DRC for all regions would then decrease and reflect a higher comparative advantage.

In conducting a sensitivity analysis, various aspects should be considered. The condition of the Western Cape wheat industry is reflected in this thesis as being very uncompetitive. This comparative analysis study has concluded that no area has a comparative advantage over imported wheat. Therefore the sensitivity analysis will only focus on potential improvements in the industry's performance and their affect on the various regions. The results for five scenarios that assume changes in these conditions for eight of the regions are shown in Table 6.4.

These sensitivity analysis calculations have been adjusted in certain cases. For example, if the value of the currency changes as a result of a depreciation of the Rand, the relative prices of tradable and non-tradable inputs would change and farmers would adjust their input mix. Therefore, the results were adjusted to accommodate the change in production practices.

From Table 6.4 it is apparent that all five scenarios result in positive change. DRC figures below unity represent regions with a comparative advantage, as opposed to figures above one, which represent unprofitable and uncompetitive farming operations.

Scenario one assumes a devaluation of the Rand in the order of twenty five percent. This devaluation results in an increase in the price of imports and an increased incentive for certain industries to export. As a result, four of the eight regions show a slight comparative advantage over imported wheat, with the Malgas-Heidelberg region having the best DRC value (0.82). Moorreesburg also has a comparative advantage, shown by the DRC value of 0.84.

Scenario two assumes a ten per cent increase in the world price of wheat. This has similar consequences as scenario one in that the social price, or competitive price of imported wheat, is reflected as being slightly higher. Although all eight regions show improved comparative advantage, none have a DRC value below one. This means that all regions are still comparatively weaker than imported wheat, with the Moorreesburg region being the closest to achieving a comparative advantage (DRC = 1.20).

Table 6.4: Sensitivity analyses on DRC's for wheat production

	1	2	3	4	5	6	7	8	Ave
Basic scenario	2.24	8.49	1.93	1.78	1.75	-6.30	-3.94	14.44	5.11
Single input price changes:									
1) 25% devaluation in the exchange rate	0.84	1.51	0.89	0.82	0.86	3.25	3.21	2.10	1.69
2) 10% increase in the world price	1.20	2.98	1.31	1.21	1.24	35.76	-24.26	4.30	2.97
3) 20% reduction in cost of tradables	1.23	1.89	1.11	1.03	1.08	4.06	4.01	2.62	2.12
4) 50% reduction in cost of tradables	0.74	0.87	0.68	0.63	0.69	1.17	1.00	1.18	0.87
5) 20% increase in producer yield levels	0.93	1.81	1.00	0.92	0.96	4.66	5.03	2.51	2.23
Multi input price changes:									
6) Combination of scenarios 1,2 &5	0.48	0.68	0.49	0.46	0.49	1.00	0.87	0.92	0.67

- 1- Moorreesburg B1; 2- Piketberg-Porterville B4; 3- Koeberg-Malmesbury B8;
4- Malgas-Heidelberg B10; 5- Ruens B13; 6- Riversdal B14; 7- Slang River B15;
8- Bredasdorp B17

Scenario three represents the results of a twenty percent reduction in the cost of tradable inputs achieved by producers reducing tillage practices. This reduction in cost is achievable through a change in farming practices, increased efficiency, or a reduction in the price of certain inputs. The results show that a reduction in costs has a slight effect in all eight regions. All show improvements but none have a comparative advantage when compared with imported wheat. The average DRC value is 2.12, with the highest comparative advantage being shown by the Malgas-Heidelberg B10 region.

Scenario four represents the results of a fifty percent reduction in the cost of tradable inputs achieved by producers switching to minimum- and no-till production practices. This reduction in cost is achievable through a greater change in farming practices than in scenario three, increased efficiency, or a reduction in the price of certain inputs. The results show that a reduction in costs has a most advantageous effect in all eight regions. All show vast improvements in the comparative advantage measure, with five regions below unity and the average DRC value at 0.87.

Scenario five assumes an increase in producer yield levels, which is generally only achievable through improved farming practices such as improved cultivar selection. The results show that even with a 20 per cent improvement in yields, only three regions show some comparative advantage over imported wheat. The average DRC for the Western Cape remains above unity (DRC = 2.51), showing that the region cannot rely on an increased yield to build comparative advantage.

Scenario six represents an amalgam of three of the above scenarios. Here it is assumed that the exchange rate depreciates and the world price and yields increase. Obviously, the effect on DRC is greater than in the case of the separate scenarios. All regions in the Western Cape now have a comparative advantage in wheat production, with the sole exception of the Riversdal region, which has a DRC value of 1.00.

6.6 Conclusion

Private profits are greater than social profits in the Western Cape wheat industry. Although deregulation has occurred in the wheat sector, the government still influences the wheat price by imposing import tariffs on certain chemical inputs, by taxing fuel, and by levying a tariff on imported wheat. The aggregated result of these interventions is that the profit that farmers would have made in a free market are lower than those they are actually making today (measured as a positive net policy effect in terms of the PAM). Thus, in a strict interpretation of these results, farmers should at least consider suspending the production of wheat in the Western Cape.

However, the results show that the region will have a comparative advantage in wheat production if:

- The tariff is kept in place;
- The exchange rate depreciates;
- Farmers succeed in lowering their cost of production.

These scenarios are based on reality. **First**, as the existing tariff is below the bound rates of the Uruguay Round, the scope for an increase exists, and the government has already implemented such an increase. **Second**, there is a consensus in the market regarding a depreciation of the exchange rate. **Third**, there is anecdotal evidence that wheat farmers in the Western Cape have targeted production costs as the most important variable in improving the profitability of production. This includes finding ways of decreasing their use of individual inputs as well as changes to the mode of production. Finally, the results show that increased yields are insufficient to ensure the long-term survival of the industry.

CHAPTER SEVEN

CONCLUSIONS

7.1 Introduction

The purpose in this study was to investigate whether any comparative advantages exist in the commercial production of wheat in the Western Cape, using the Policy Analysis Matrix as the key analytical tool. To this end, representative data that reflect the conditions in the industry as closely as possible had to be gathered. These data were then used to construct the matrix, and a series of sensitivity analyses were conducted to establish the robustness of the results. The findings of the research are summarised in this Chapter. On this basis, a number of proposals for future policy and investigation are made.

7.2 Summary

7.2.1 Agricultural policy

The distortions created by South African agricultural policy and the wider social and economic effects have been widely analysed and documented. However, much of the attention has been focused on the period prior to the final deregulation of the agricultural marketing system in 1996, whereas numerous distortions still remain today. Thus, although deregulation has occurred, many farmers are unaware of the continued effect that Government still has on the agricultural sector.

In this study it was found that the Government protects the sector mainly through the imposition of a tariff on imported wheat, and tax farmers through tariffs and taxes on certain key inputs, the most important being the 10 percent import tariff on herbicides and the diesel fuel tax. This prevents certain farmers from increasing efficiency, due to the higher cost of particular inputs. The main purpose of this research was to ascertain whether the net effect of these interventions on farmers, and on society as a whole, is positive or negative.

7.2.2 Results

The main conclusion drawn from this analysis of the wide range of wheat farming practices and farming systems in the Western Cape, is that Western Cape wheat farmers do not at present have a comparative advantage in wheat production. The following conclusions can be drawn from the results of the PAM analysis, based on an average for the regions investigated:

- The average **DRC** value of 2.55 (Table 6.2) shows that the Western Cape does not have a comparative advantage in the production of wheat. This figure indicates that the opportunity cost of the domestic resources used, is higher than the value added that is earned from the sale of those resources. In other words, the resources available to farmers are not being utilised to their optimum in wheat production.
- The average **NPCO** value of 1.42 indicates that wheat producers in the Western Cape are receiving a price premium that represents a financial transfer from consumers of wheat products to the producers. The transfer occurs mainly because of the ruling import tariff of R181/ton on wheat. The tariff protects Western Cape wheat farmers against competition from imported wheat. The analysis also shows that this tariff will probably remain in place for some time, and that it may even be increased over the short term⁸. However, farmers should use the breathing space provided to promote efficiency in production, as there is no guarantee that it will remain in place indefinitely.
- The average **NPCI** value of 1.28 indicates that producers pay a premium for their tradable inputs. The two inputs that have the most influence on the NPCI are the cost of fuel (diesel) and the purchased input cost of chemicals. While the tax on diesel has little effect on the long run comparative advantage of Western Cape commercial farmers, as they have proven able to adapt by becoming more fuel-efficient (Appendix A.1), it does have a substantial effect on the profitability of farmers over the short term.

- The **EPC** value of 2.02 indicates that the profitability of wheat farming in the Western Cape, given the current policy and market conditions, does not exceed what it would be if all distortions were removed. The conclusion is thus that the implicit tax that farmers pay on more expensive inputs is smaller than the implicit subsidy they receive as a result of the tariff.
- The **PC** and **SRP**, with values of -0.26 and 0.39 respectively, reinforce the notion that policy assists farmers, who currently enjoy a comparative advantage due to the imposition of the tariff. The PC ratio measures the extent to which policy conditions have created an incentive to undertake the activity of wheat farming in the Western Cape (the negative value shows a disincentive). The SRP is a measure of the profits derived from a financial transfer from the consumers to the producers (the value reflects the positive net policy effect that is common in all the budgets).

Although these ratios deliver a conclusive picture of the wheat industry, the PAM is a static model and cannot capture the potential changes in prices and productivity. Therefore, the DRC values of the various regions are subject to change as a result of changes in market conditions. The sensitivity analysis is therefore necessary to determine the robustness of the DRC's against price and yield changes.

The sensitivity analysis shows that a weaker exchange rate would lead to an increase in comparative advantage for all regions. According to Troskie and Wallace (1996) though, the effect would lead to a decrease in the area with high profitability over the medium term, and over the long term, secondary and tertiary effects would lead to a return to the *status quo*. A devaluation of the Rand would therefore not ensure the long-term competitiveness of the industry, but will provide a welcome breather for producers to make structural changes to their operations.

The sensitivity analysis also shows that an increase in the world price of wheat has similar consequences as the above scenario. A slight reduction in the cost of tradable inputs, achieved by producers reducing tillage practices, has little effect though.

⁸ As of the 11th of June, 1999 the import tariff on wheat increased from the R181/ton to R269/ton

Through a greater change in farming practices a large reduction in cost is achievable, and this results in vast improvements in the comparative advantage measure. An improvement of co-ordination of activities and increased management proficiency can achieve reduced machinery hours and result in lower variable costs. Research has shown that in the past farmers have been successful at doing so. Reducing variable costs, such as fuel, can have a substantial effect on the profitability of farmers over the short term (Vink & Kirsten, 2000). This will also reduce the number of man-hours. The labour cost is extraordinarily high for a region with the possibility of contracting.

Finally, the sensitivity analysis shows that regions cannot rely on an increased yield to build comparative advantage. Yield increases on current production are difficult to achieve without concomitant cost increases, and therefore irrelevant as a measure to increase comparative advantage.

7.3 General conclusions and policy proposals

According to Tweeten and Zulauf, the new paradigm for agriculture for any country should focus on public policy for agriculture, emphasising market efficiency through four general concepts:

- The removal of market barriers,
- The provision of public goods and policies aimed at the internalisation of externalities,
- The promotion of economic equity with a safety net, and
- Food security through the private sector.

The opportunity lies in what might be called “the commercialisation of commercial agriculture”. Without subsidies and the distortions that result from interventionist policies, farmers are more likely to respond normally to market-determined price signals, and to behave in ways more consistent with economic rationality. Thus, a new research environment is emerging, one in which existing theory and methods can

(SAGIS, 1999)

be more thoroughly applied, stronger conclusions drawn, and aggregate economic behaviour better predicted. In this environment, the level of quantitative analysis can be increased significantly, and be given the mandate for better policy support in a time of rapid adjustment and change (WCAGRSAM, 1997).

South African farmers have faced high nominal interest rates in recent times, creating cash flow problems. Furthermore, real interest rates have recently seen record high levels in South Africa, and this has a major depressing effect on land prices and the collateral of farmers. The high real interest rates have kept the Rand exchange rate artificially high, acting as a tax on exports and a subsidy on imports, while major agricultural producing countries such as the USA and Western Europe experience low interest rates and near zero inflation rates. The depressed economic situation in South Africa has also had a major negative effect on the demand for food.

Nieuwoudt (1999) explains that food demand, especially for livestock and other high value products, can 'explode' with higher income growth due to high-income elasticities of demand. As income per capita growth has been negative in recent years in South Africa, but one can expect that food demand will increase slowly, and is limited to the growth in population.

On the other hand, Rwelamira & Kleynhans (1998) show that, given South Africa's dominance in industrial development and relatively limited agricultural resource base, one can expect that opportunities for agricultural production in other SADC countries will open up over the longer term. However, this will require strong research and extension support and considerable investment in human skills and physical and social infrastructure. With this phenomenon will come increased competition for South African producers, which includes wheat farmers.

The competitive advantage for the Western Cape, or for that matter the South African wheat industry, depends on the industry's ability to sustain continued increases in productivity throughout the supply chain. Thus, success ultimately depends on a positive synergy between the following five variables:

- Factor conditions
- Demand conditions
- Related and support industries
- Role that government plays
- Individual firm strategy

There are a number of factors that militate against success in the Western Cape context. The province's wheat farmers are not protected by high transport costs to interior markets as are, for example, farmers in the Free State, and farmers face relatively low, albeit stable rainfall (the average annual rainfall for the Western Cape, at around 450 mm per annum, is lower than the South African average of 497 mm). To put these figures in perspective, a comparison could be made with the world average, which stands at 860 mm (Agrimark Tendense, 1999). Nevertheless, farmers have already shown themselves capable of adapting to the changed circumstances, and could build competitive advantage if they pursued appropriate strategies.

In the South African wheat industry, the challenge lies in meeting the need for more and better analysis to support, direct and ease the major adjustments now underway. In this changing environment, it is essential that policy makers, producers, consumers and the market be better informed of the issues before them, and of the consequences of alternative policy decisions. This is nowhere more important than in the Western Cape province, where agriculture is extremely diverse and remains a strong source of economic growth, export earnings, jobs and incomes for the poor (Eckert & Viljoen, 1995).

Various bodies and institutions are underway in establishing this strengthened wheat industry. Research and development are prime aims of such institutions. These include SAGIS⁹, Cape Grain, SENSAGO, the ARC (Grains Crop Institute), Department of Agriculture at Elsenburg, and many of the Western Cape Co-operatives and farmers' organisations.

⁹ The main objective of SAGIS is to obtain and process domestic grain information and to make available macro-economic information locally and internationally to enable role players in the grain industry (commercial and emerging sectors) to continue making meaningful decisions.

A step in searching for creative solutions though, will be to raise awareness among producers, input suppliers, service organisations and processors of their mutual interdependence (Street *et al*, 1998). This will have to be supplemented by a target costing approach (Appendix F) by Western Cape wheat producers in order to increase their national and international competitiveness. This involves reversed engineering procedures, which is suggested as a means of ensuring that Western Cape wheat farmers can survive in the market place.

Considering all the fore-mentioned arguments and statements, the future of the Western Cape wheat industry ultimately lies in the ability of supporting organisations to assist the wheat farmer in a combined effort to establish a stable and competitive environment.

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Appendices

Appendix A.1:

Calculation means

1) Depreciation cost/ annum:

Equal to the purchase price minus the salvage value; divide by assets lifetime (yrs.)

2) Salvage value:

Equal to 10% of the purchase price

3) Inflation Rates:

The current rate of inflation in South Africa is 1.9 percent. At the level of production prices, inflation over one year accelerated from 2,3 per cent in March 1998 to 6,4 per cent in June 1999 and 6,2 per cent in July. The prices of imported goods, which had declined by 2,3 per cent in the year to February 1998, rose by 10,3 per cent in the year to June 1999 and 7,0 per cent in the year to July, contributing to the accumulation of inflationary pressures. The rise in the prices of imported goods, in turn, was strongly affected by an increase of almost 40 per cent in the price of imported crude oil from the first quarter of 1999 to the second quarter (SARB, 1999).

4) Land Rental Value:

There are various methods for the calculation of land rental values. The two used in this study are:

* 4 -7 % of the real value of the land (Nieuwoudt, W., 1980)

* Farmers' personal valuations

5) Social cost of labour

Calculation is very subjective. Central Statistics has country-wide averages as of December 1997:

Average Wage Rate per annum

Manufacturing sector	- blacks (R 27 684)
	- coloureds (R33 000)
Construction	- blacks (R 18 816)
	- coloureds (R 30 180)
Wholesale/Retail	- blacks (R23 892)
	- coloureds (R29 352)

Private research in the Boland has shown that the average semi-skilled farm labourer would otherwise be working in a similar position as a restaurant kitchen/scullery staff; service station employee or a similar paying position.

Figures as of May 1999:

Average Wage Rate per annum

Service Industry - black/coloured @ R7.50/hr maximum
= R14 400 per annum

Therefore, from these figures comes an average figure for each region according to the average alternate employment opportunity specific to each region. The size of the labour group is calculated using the average of 6 employees per 500ha for a farm that only uses permanent labour and minimal contracting (WPK-Malmesbury).

6) Social cost of chemicals: Customs and Excise (May 24, 1999)

Insecticides and Fungicides – no tariff

Herbicides – 10% tariff

7) Fertiliser: – no tariff

8) The social cost of fuel:

Diesel price R2.14/l (May 25, 1999)

Excise duty (R 0.03817/l)

+ Fuel levy (R 0.76/l)

= R0.80/l duty on diesel

Social price: R2.14 – R0.80 = R1.34/l

The effect of taxation on diesel (December, 1999)

WHOLESALE PRICE (DECEMBER 1999)	
COAST:	230.55 C/L
GAUTENG:	241.75 C/L
EQUALISATION FUND	8.0 C/L
ROAD ACCIDENT FUND	10.3 C/L
CUSTOMS AND EXCISE	4.0 C/L
FUEL TAX (INCLUDES THE ROAD FUND)	76.1 C/L
TOTAL	98.4 C/L

DISTORTION (%)	
COAST:	42.68%
GAUTENG:	40.7%

This exhibit illustrates the composition of the price of diesel during December 1999. This shows that the distortion in the price is close to 43%, while the distortion caused by the fuel tax is 33%. The tax on diesel is justified by considerations such as the intermodal transport equity and environmental considerations (Vink & Kirsten, 2000).

9) Machinery : No tariff on tractors and harvesters

10) In the absence of data from the co-operatives, the non-tradable portion of economic prices are calculated as follows (percentage of private price):

Purchased inputs – 20%

Machinery costs – 10%

Implement costs – 10%

Contract/hire service – 35%

Crop insurance – 5%

11) Transport Cost

1- Farm gate to Silo

The transport cost of wheat from the farm gate to the silo is, for the most part, incorporated into the enterprise budgets. In cases where the cost is not

incorporated, the cost of transport is calculated using the assumption of putting transport cost into three categories for farmers of varying distance from the silo (WPK, 1999):

- radius smaller than 15km : R6.92 per ton
- radius between 15 and 30km : R17.31 per ton
- radius greater than 30km : R34.62 per ton

2- Silo to final destination

This cost is calculated from averages around the Western Cape, obtained from various Co-operatives and organisations such as Cape Grain. Exact costs could not be obtained due to various transport companies not disclosing information for matters of competitiveness (Appendix D).

Appendix A.2:**Calculation Assumptions**

- 1) All figures are calculated in a manner to reflect recent trends in the wheat industry. All cost data is calculated or adjusted to be as near to 30th April, 1999 as possible. Other data, such as tariff levels and wheat prices are also taken as of 30th April, 1999. The reasoning behind this is that the input prices have stayed reasonably constant for the latter end of 1998 and the first quarter of 1999.

- 2) Tariff level:
 Prior to June 1999 the tariff level was R181.00/ ton (25% *ad valorem*) (Customs and Excise, 1999). A 48.6 percent (R88/ ton) increase has resulted in a tariff level of R269.00/ ton as of 11th June 1999 (37% *ad valorem*), (SAGIS, 1999; Horn, 1999).

- 3) World Wheat price (US no.2 HRW fob Gulf) –(SAGA, 1999)
 \$ 112.67 =R 694.39 (\$1:R6.163– 31st July, 1999)
 \$ 104.24 =R625.50 (\$1:R6.00 - 1999 average)

- 4) Domestic Wheat price
 As of May 31, 1999, the SAFEX wheat price for highest quality wheat (BPS) stood at R1 192-00 per ton (Randfontein). Although the 1999 Wheat price has been fluctuating between R930/t and R950/t for average quality wheat, R 900.00/t is a stable, conservative representative figure (SAGA). Variations are made in order to reflect the transport variable from the silo to the buyer.

- 5) Import Parity price:
 Delivered price HRW (Randfontein)– R 986.47
 Delivered price DNS (Randfontein) – R 1174.82
 (These prices form the basis for calculating economic/ social revenue price: The Hard red winter price is used instead of the Dark northern spring, due to the relative imported quantity levels.)

Delivered price HRW (Durbanville)- R806.50

The first two parity prices are for Randfontein. This can be compared to the Normal wheat contract which differs from the Cape wheat contract (Durbanville) by the transport cost of approximately R180. However, if imported wheat arrived in the Cape Town harbour, it is presumed that the Randfontein and Durbanville prices would differ by the transport cost.

6) Social price of wheat:

The social price for wheat is the landing price at Cape Town harbour. This price is the delivered price at Durbanville (R806.50) minus the import tariff (R181), i.e. R625.50. The reason for deducting the import tariff is due to this being a form of government regulation.

7) A final assumption is that if the social price of an input cost is, for some reason, incalculable, the social price will be the same as the private price in an effort to retain the budget's accuracy.

Appendix A.3: Example of Questionnaire sent to Co-operatives

**ENTERPRISE BUDGET FOR WHEAT PRODUCTION IN _____
AREA**

Date: _____ **Sub-total** **Total/ha** **Total/ton**

GROSS INCOME

Product income:

- Grain
- Silage and hay

ALLOCATED COSTS

Purchased inputs:

- Wheat seed
- Lime
- Fertilizer
- Crop chemicals

Machinery fixed costs:

- Depreciation
- Interest

Machinery variable costs:

- Fuel
- Repairs/Maintenance
- Tyres

Implements fixed costs:

- Depreciation
- Interest

Implements variable costs:

- Repairs

Contract hire service:

- Air spray
- Bird spray
- Harvesting
- Bailing twine
- Transport

Other:

- Crop insurance
- Labour cost
- Interest on operating capital
- Cost of land

	Sub-total	Total/ha	Total/ton
GROSS INCOME			
Product income:			
-Grain			
-Silage and hay			
ALLOCATED COSTS			
Purchased inputs:			
-Wheat seed			
-Lime			
-Fertilizer			
-Crop chemicals			
Machinery fixed costs:			
-Depreciation			
-Interest			
Machinery variable costs:			
-Fuel			
-Repairs/Maintenance			
-Tyres			
Implements fixed costs:			
-Depreciation			
-Interest			
Implements variable costs:			
-Repairs			
Contract hire service:			
-Air spray			
-Bird spray			
-Harvesting			
-Bailing twine			
-Transport			
Other:			
-Crop insurance			
-Labour cost			
-Interest on operating capital			
-Cost of land			

Appendix B.1: Enterprise budget (R/ha) for wheat production in the Moorreesburg region, wheat after canola- minimum tillage; 1997/98

	PRIVATE PRICES	ECONOMIC PRICES	COMPONENTS OF ECONOMIC PRICES	
			Non-tradable	Tradable
GROSS RECEIPTS	(2,82t*900)	(2,82t*625,5)		
	2538,00	1763,91		1763,91
ALLOCATED COSTS	2190,37	2194,84		
Purchased inputs:	640,47	618,47	123,69	494,78
Wheat seed	163,90	163,90	32,78	131,12
Lime	8,40	8,40	1,68	6,72
Fertiliser	257,15	257,15	51,43	205,72
Crop Chemicals	211,02	189,92	37,98	151,94
Machinery fixed costs:	397,09	397,09	39,71	357,38
Depreciation	244,43	244,43	24,44	219,99
Interest	152,66	152,66	15,27	137,39
Machinery variable costs:	142,52	121,37	37,17	84,20
Fuel	56,58	35,43	7,09	28,34
Repairs/ maintenance	85,94	85,94	30,08	55,86
Implements fixed costs:	394,91	394,91	39,49	355,42
Depreciation	206,19	206,19	20,62	185,57
Interest	188,72	188,72	18,87	169,85
Implements variable costs:	85,57	85,57	29,95	55,62
Contract hire service:	57,00	57,00	19,95	37,05
Spraying	42,00	42,00		
Sowing	15,00	15,00		
Other:	472,71	520,43		
Crop insurance	32,37	32,37	1,62	30,75
Labour	117,42	165,14		
Interest on operating capital	218,33	218,33		
Land	104,59	104,59		
NET RETURN	347,63	-430,93		

**Budget summary: Wheat production in the Moorreesburg region, Swartland,
1997/98 (R/ha)**

	PRIVATE PRICES	ECONOMIC PRICES
Gross receipts	2538,00	1763,91
Allocated costs	2190,37	2194,84
Tradables:	1749,93	1415,20
Purchased inputs	640,47	494,78
Machinery costs	539,61	441,58
Implement costs	480,48	411,04
Contract/hire service	57,00	37,05
Crop insurance	32,37	30,75
Domestic factors:	440,34	779,64
Cost of land	104,59	104,59
Labour costs	117,42	165,14
Cost of operating capital	218,33	218,33
Components of tradables		291,58
Net Returns	347,63	-430,93

**Appendix B.2: Enterprise budget (R/ha) for wheat production in the
Moorreesburg region, wheat after medics-conventional tillage; 1997/98**

	PRIVATE PRICES	ECONOMIC PRICES	COMPONENTS OF ECONOMIC PRICES	
			Non-tradable	Tradable
GROSS RECEIPTS	(2,8t*900)	(2,8t*625,5)		
	2520,00	1751,40		1751,40
ALLOCATED COSTS	2243,68	2249,11		
Purchased inputs:	642,78	621,68	124,34	467,34
Wheat seed	163,90	163,90	32,74	131,12
Lime	13,86	13,86	2,77	11,09
Fertiliser	254,00	254,00	50,80	203,20
Crop Chemicals	211,02	189,92	37,98	151,94
Machinery fixed costs:	397,09	397,09	39,71	357,38
Depreciation	244,43	244,43	24,44	219,99
Interest	152,66	152,66	15,27	137,39
Machinery variable costs:	142,52	121,43	37,18	84,25
Fuel	56,58	35,49	7,10	28,39
Repairs/ maintenance	85,94	85,94	30,08	55,86
Implements fixed costs:	394,91	394,91	39,49	355,42
Depreciation	206,19	206,19	20,62	185,57
Interest	188,72	188,72	18,87	169,85
Implements variable costs:	85,57	85,57	29,95	55,62
Contract hire service:	108,00	108,00	37,80	70,20
Spraying	35,00	35,00		
Sowing	15,00	15,00		
Soil tests	58,00	58,00		
Other:	472,71	520,43		
Crop insurance	32,37	32,37	1,62	30,75
Labour	117,42	165,14		
Interest on operating capital	218,33	218,33		
Land	104,59	104,59		
NET RETURN	276,32	-497,71		

Appendix B.3: Enterprise budget (R/ha) for a wheat production system in the Moorreesburg region, Swartland. Wheat after wheat- minimum tillage; 1997/98

	PRIVATE PRICES	ECONOMIC PRICES	COMPONENTS OF ECONOMIC PRICES	
			Non-tradable	Tradable
GROSS RECEIPTS	(2,71t*900)	(2,71t*625,5)		
	2439,00	1695,11		1695,11
ALLOCATED COSTS	2494,18	2459,38		
Purchased inputs:	595,00	579,78	115,95	463,83
Wheat seed	206,02	206,02	41,20	164,82
Fertiliser	236,75	236,75	47,35	189,40
Crop Chemicals	152,23	137,01	27,40	109,61
Machinery fixed costs:	397,09	397,09	39,71	357,38
Depreciation	244,43	244,43	24,44	219,99
Interest	152,66	152,66	15,27	137,39
Machinery variable costs:	238,28	189,77	54,23	135,54
Fuel	129,76	81,25	16,25	65,00
Repairs/ maintenance	108,52	108,52	37,98	70,54
Implements fixed costs:	394,91	394,91	39,49	355,42
Depreciation	206,19	206,19	20,62	185,57
Interest	188,72	188,72	18,87	169,85
Implements variable costs:	85,57	85,57	29,95	55,62
Contract hire service:	291,83	291,83	102,14	189,69
Marketing	197,11	197,11		
Transport	41,45	41,45		
Diverse	53,27	53,27		
Other:	491,40	520,43		
Crop insurance	32,37	32,37	1,62	30,75
Labour	136,11	165,14		
Interest on operating capital	218,33	218,33		
Land	104,59	104,59		
NET RETURN	-55,18	-764,27		

Budget summary: Wheat production in the Moorreesburg reigon, Swartland, 1997/98 (R/ha)

	PRIVATE PRICES	ECONOMIC PRICES
Gross receipts	2439,00	1695,11
Allocated costs	2494,08	2459,38
Tradables:	2035,05	1588,23
Purchased inputs	595,00	463,83
Machinery costs	635,37	492,92
Implement costs	480,48	411,04
Contract/hire service	291,83	189,69
Crop insurance	32,37	30,75
Domestic factors:	459,03	871,15
Cost of land	104,59	104,59
Labour costs	136,11	165,14
Cost of operating capital	218,33	218,33
Components of tradables		383,09
Net Returns	-55,08	-764,27

Policy Analysis Matrix for wheat production in the Moorreesburg region, Swartland, 1997/98 (R/ha)

	Benefits	Costs		Profits
	Gross Revenues	Tradable inputs	Domestic factors	
Private (market) prices	2439,00	2035,05	459,03	-55,08
Social (shadow) prices	1695,11	1588,23	871,15	-764,27
Policy effect (divergences)	743,89	446,82	-412,12	709,19

DRC =8,15 NPCO =1,44 NPCI=1,28 EPC =3,78 PC =0,07 SRP=0,42

Appendix B.4: Enterprise budget (R/ha) for wheat production in the Piketberg-Porterville region, Swartland. Wheat after wheat- minimum tillage; 1997/98

	PRIVATE PRICES	ECONOMIC PRICES	COMPONENTS OF ECONOMIC PRICES	
			Non-tradable	Tradable
GROSS RECEIPTS	(2,6t * 895)	(2,6t * 625,5)		
	2327,00	1626,30		1626,30
ALLOCATED COSTS	2315,67	2284,28		
Purchased inputs:	798,56	774,66	154,93	619,73
Wheat seed	178,80	178,80	35,76	143,04
Lime	16,80	16,80	3,36	13,44
Fertiliser	363,92	363,92	72,78	291,14
Crop Chemicals	239,04	215,14	43,03	172,11
Machinery fixed costs:	409,43	409,43	40,94	368,49
Depreciation	253,85	253,85	25,39	228,47
Interest	155,58	155,58	15,56	140,02
Machinery variable costs:	146,95	125,49	38,53	86,96
Fuel	57,41	35,95	7,19	28,76
Repairs/ maintenance	89,54	89,54	31,34	58,20
Implements fixed costs:	394,91	394,91	39,49	355,42
Depreciation	206,19	206,19	20,62	185,57
Interest	188,72	188,72	18,87	169,85
Implements variable costs:	85,57	85,57	29,95	55,62
Contract hire service:	33,00	33,00	11,55	21,45
Sowing	15,00	15,00		
Transport	18,00	18,00		
Other:	447,25	461,22		
Crop insurance	32,37	32,37	1,62	30,75
Labour	46,55	60,52		
Interest on operating capital	218,33	218,33		
Land	150,000	150,00		
NET RETURN	11,33	-657,98		

Budget summary: Wheat production in the Piketberg-Porterville region, Swartland, 1997/98 (R/ha)

	PRIVATE PRICES	ECONOMIC PRICES
Gross receipts	2327,00	1626,30
Allocated costs	2315,67	2284,28
Tradables:	1900,79	1538,42
Purchased inputs	788,56	619,73
Machinery costs	556,38	455,45
Implement costs	480,48	411,04
Contract/hire service	33,00	21,45
Crop insurance	32,37	30,75
Domestic factors:	414,88	745,86
Cost of land	150,00	150,00
Labour costs	46,55	60,52
Cost of operating capital	218,33	218,33
Components of tradables		317,01
Net return	11,33	-657,98

Policy Analysis Matrix for wheat production in the Piketberg-Porterville region, Swartland, 1997/98 (R/ha)

	<u>Benefits</u>	<u>Costs</u>		Profits
	Gross Revenues	Tradable inputs	Domestic factors	
Private (market) prices	2327,00	1900,79	414,88	11,33
Social (shadow) prices	1626,30	1538,42	745,86	-657,98
Policy effect (divergences)	700,70	362,37	-330,98	669,31

DCR =8,49 NPCO =1,43 NPCI=1,24 EPC =4,85 PC =-0,02 SRP=0,41

Appendix B.5: Enterprise budget (R/ha) for wheat production in the Piketberg-Porterville region, Swartland. Wheat after wheat- conventional tillage; 1997/98

	PRIVATE PRICES	ECONOMIC PRICES	COMPONENTS OF ECONOMIC PRICES	
			Non-tradable	Tradable
GROSS RECEIPTS	(2,8t * 895)	(2,8t * 625,5)		
	2506,00	1751,40		1751,40
ALLOCATED COSTS	2801,17	2718,03		
Purchased inputs:	827,37	800,36	160,07	640,29
Wheat seed	186,25	186,25	37,25	149,00
Fertiliser	371,00	371,00	74,20	296,80
Crop Chemicals	270,12	243,11	48,62	194,49
Machinery fixed costs:	527,64	527,64	52,76	474,88
Depreciation	326,93	326,93	32,69	294,24
Interest	200,71	200,71	20,07	180,64
Machinery variable costs:	485,43	415,33	127,75	287,58
Fuel	187,52	117,42	23,48	93,94
Repairs/ maintenance	297,91	297,91	104,27	193,64
Implements fixed costs:	394,91	394,91	39,49	355,42
Depreciation	206,19	206,19	20,62	185,57
Interest	188,72	188,72	18,87	169,85
Implements variable costs:	85,57	85,57	29,95	55,62
Contract hire service:	33,00	33,00	11,55	21,45
Spraying	15,00	15,00		
Transport	18,00	18,00		
Other:	447,25	461,22		
Crop insurance	32,37	32,37	1,62	30,75
Labour	46,55	60,52		
Interest on operating capital	218,33	218,33		
Land	150,00	150,00		
NET RETURN	-295,17	-966,63		

Appendix B.6: Enterprise budget (R/ha) for wheat production in the Malmesbury region, Swartland. Wheat after wheat system; 1990-98 average.

	PRIVATE PRICES	ECONOMIC PRICES	COMPONENTS OF ECONOMIC PRICES	
			Non-tradable	Tradable
GROSS RECEIPTS	(2,81t * 905)	(2,81t* 625,5)		
	2543,05	1757,66		1757,66
ALLOCATED COSTS	2659,95	2560,95		
Purchased inputs:	1000,12	999,16	199,83	799,33
Wheat seed	181,17	181,17	36,23	144,94
Lime	27,20	27,20	5,44	21,76
Fertiliser	529,20	529,20	105,84	423,36
Crop Chemicals	290,66	261,59	52,32	209,27
Machinery fixed costs:	432,25	432,25	43,23	389,03
Depreciation	288,57	288,57	28,86	259,71
Interest	143,68	143,68	14,37	129,31
Machinery variable costs:	354,97	296,93	89,35	207,58
Fuel	155,23	97,20	19,44	77,76
Repairs/ maintenance	199,73	199,73	69,91	129,82
Implements fixed costs:	88,02	88,02	8,80	79,22
Depreciation	54,54	54,54	5,45	49,09
Interest	33,48	33,48	3,35	30,13
Implements variable costs:	56,77	56,77	19,87	36,90
Contract hire service:	80,19	80,19	28,07	52,12
Spraying	70,75	70,75		
Harvesting	9,49	9,49		
Other:	647,63	607,63		
Crop insurance	27,97	27,97	1,40	26,57
Labour	220,00	180,00		
Interest on operating capital	131,78	131,78		
Land	150,00	150,00		
Diverse	117,88	117,88		
NET RETURN	-116,90	-803,29		

Budget summary: Wheat production in the Koeberg-Malmesbury region, Swartland, 1990-98 average (R/ha)

	PRIVATE PRICES	ECONOMIC PRICES
Gross receipts	2543,05	1757,66
Allocated costs	2659,95	2560,95
Tradables:	2040,29	1590,74
Purchased inputs	1000,12	799,33
Machinery costs	787,22	596,60
Implement costs	144,79	116,12
Contract/hire service	80,19	52,12
Crop insurance	27,97	26,57
Domestic factors:	619,66	970,21
Cost of land	150,00	150,00
Labour costs	220,00	180,00
Cost of operating capital	131,78	131,78
Components of tradables		390,55
Diverse	117,88	117,88
Net Return	-116,90	-803,29

Policy Analysis Matrix for wheat production in the Koeberg-Malmesbury region, Swartland, 1990-98 average (R/ha)

	Benefits	Costs		Profits
	Gross Revenues	Tradable inputs	Domestic factors	
Private (market) prices	2543,05	2040,29	619,66	-116,90
Social (shadow) prices	1757,66	1590,74	970,21	-803,29
Policy effect (divergences)	785,39	449,55	-350,55	686,39

DRC= 5,81 NPCO= 1,45 NPCI=1,28 EPC= 3,01 PC= 0,15 SRP= 0,39

Appendix B.7: Enterprise budget (R/ha) for wheat production in the Koeberg-Malmesbury region, wheat after wheat system; 1997/98.

	PRIVATE PRICES	ECONOMIC PRICES	COMPONENTS OF ECONOMIC PRICES	
			Non-tradable	Tradable
GROSS RECEIPTS	(2,8t * 905)	(2,8t * 625,5)		
	2534,00	1751,40		1751,40
ALLOCATED COSTS	2822,92	2656,81		
Purchased inputs:	1036,98	959,54	191,91	767,63
Wheat seed	151,65	151,65	30,33	121,32
Lime	17,19	17,19	3,44	13,75
Fertiliser	520,26	520,26	104,05	416,21
Crop Chemicals	300,49	270,44	54,09	216,35
Machinery fixed costs:	465,73	465,73	46,57	419,16
Depreciation	288,57	288,57	28,86	259,71
Interest	177,16	177,16	17,72	159,44
Machinery variable costs:	556,00	479,28	148,42	330,76
Fuel	205,46	128,64	25,73	102,91
Repairs/ maintenance	350,54	350,54	122,69	227,85
Implements fixed costs:	88,02	88,02	8,80	79,22
Depreciation	54,54	54,54	5,45	49,09
Interest	34,38	34,38	3,35	30,13
Implements variable costs:	91,64	91,64	32,07	59,57
Contract hire service:	71,26	71,26	24,94	46,32
Fertilising and spraying	66,29	66,29		
Machinery	4,97	4,97		
Other:	513,29	501,34		
Crop insurance	27,52	27,52	1,40	26,57
Labour	196,60	184,65		
Interest on operating capital	131,78	131,78		
Land	150,00	150,00		
Sundries	7,39	7,39		
NET RETURN	-288,92	-905,41		

Appendix B.8: Enterprise budget (R/ha) for wheat production in the Malmesbury region, Swartland. Wheat after wheat- 1997/98 best producer.

	PRIVATE PRICES	ECONOMIC PRICES	COMPONENTS OF ECONOMIC PRICES	
			Non-tradable	Tradable
GROSS RECEIPTS	(3,51 t *905)	(3,51t *625,5)		
	3176,55	2195,51		2195,51
ALLOCATED COSTS	2662,96	2614,30		
Purchased inputs:	1181,13	1165,03	233,01	932,02
Wheat seed	173,87	173,87	34,77	139,10
Lime	85,94	85,94	17,19	68,75
Fertiliser	709,25	709,25	141,85	567,40
Chemicals	161,01	144,91	28,98	115,93
Diverse	51,06	51,06	10,21	40,85
Machinery fixed costs:	465,73	465,73	46,57	419,16
Depreciation	288,57	288,57	28,86	259,71
Interest	177,16	177,16	17,72	159,44
Machinery variable costs:	362,90	289,16	82,68	206,48
Fuel	197,25	123,51	24,70	98,81
Repairs/ maintenance	165,65	165,65	57,98	107,67
Implements fixed costs:	88,02	88,02	8,80	79,22
Depreciation	54,54	54,54	5,45	49,09
Interest	34,38	34,38	3,35	30,13
Implements variable costs:	21,63	21,63	7,57	14,06
Contract hire service:	103,38	103,38	36,18	67,20
Other:	420,17	481,35		
Crop insurance	12,05	12,05	0,60	11,45
Labour	111,66	172,84		
Interest on operating capital	161,85	161,85		
Land hire	150,00	150,00		
General	4,61	4,61		
NET RETURN	513,59	-418,80		

Budget summary: Wheat production in the Koeberg-Malmesbury region, Swartland, 1998 best (R/ha)

	PRIVATE PRICES	ECONOMIC PRICES
Gross receipts	3176,55	2195,51
Allocated costs	2662,96	2614,30
Tradables:	2234,84	1729,59
Purchased inputs	1181,13	932,02
Machinery costs	828,63	625,64
Implement costs	109,65	93,28
Contract/hire service	103,38	67,20
Crop insurance	12,05	11,45
Domestic factors:	423,51	900,10
Cost of land	150,00	150,00
Labour costs	111,66	172,84
Cost of operating capital	161,85	161,85
Components of tradables	.	415,41
Net Return	513,59	-418,80

Policy Analysis Matrix for wheat production in the Koeberg-Malmesbury region, Swartland, 1998 best (R/ha)

	<u>Benefits</u>	<u>Costs</u>		Profits
	Gross Revenues	Tradable inputs	Domestic factors	
Private (market) prices	3176,55	2234,84	423,51	513,59
Social (shadow) prices	2195,51	1729,59	900,10	-418,80
Policy effect (divergences)	981,04	505,25	-476,59	932,39

DRC= 1,93 NPCO= 1,45 NPCI=1,29 EPC= 2,02 PC=-1,23 SRP= 0,42

Appendix B.9: Enterprise budget (R/ha) for wheat production in the Heidelberg region, South Coast. Wheat after wheat- less tillage; 1997/98.

	PRIVATE PRICES	ECONOMIC PRICES	COMPONENTS OF ECONOMIC PRICES	
			Non-tradable	Tradable
GROSS RECEIPTS	(2,35t * 880)	(2,35t *625,5)		
	2068,00	1469,93		1469,93
ALLOCATED COSTS	2317,44	2258,10		
Purchased inputs:	901,56	867,05	173,41	693,64
Wheat seed	184,80	184,80	36,96	147,84
Fertiliser	371,61	371,61	74,32	297,29
Crop Chemicals	345,15	310,64	62,13	248,51
Machinery fixed costs:	389,02	389,02	38,90	350,12
Depreciation	259,71	259,71	25,97	233,74
Interest	129,31	129,31	12,93	116,38
Machinery variable costs:	217,24	184,68	56,46	128,22
Fuel	87,11	54,55	10,91	43,64
Repairs/ maintenance	130,13	130,13	45,55	84,58
Implements fixed costs:	241,47	241,47	24,15	217,32
Depreciation	130,37	130,37	13,04	117,33
Interest	111,10	111,10	11,11	99,99
Implements variable costs:	48,29	48,29	16,90	31,39
Contract hire service:	187,50	187,50	65,63	121,87
Spraying	42,00	42,00		
Soil tests	58,00	58,00		
Transport	87,50	87,50		
Other:	332,36	340,09		
Crop insurance	30,00	30,00	1,50	28,50
Labour	25,77	33,50		
Interest on operating capital	91,59	91,59		
Land	140,00	140,00		
Diverse (admin)	45,00	45,00		
NET RETURN	-249,44	-788,18		

Budget summary: Wheat production in the Malgas-Heidelbergvlakte region, South Coast, 1997/98 (R/ha)

	PRIVATE PRICES	ECONOMIC PRICES
Gross receipts	2068,00	1469,93
Allocated costs	2317,44	2258,10
Tradables:	2015,08	1571,06
Purchased inputs	901,56	693,64
Machinery costs	606,26	478,34
Implement costs	289,76	248,71
Contract/hire service	187,50	121,87
Crop insurance	30,00	28,50
Domestic factors:	257,36	642,04
Cost of land	140,00	140,00
Labour costs	25,77	33,50
Cost of operating capital	91,59	91,59
Components of tradables		376,95
Net Return	-249,44	-788,18

Policy Analysis Matrix for wheat production in the Malgas-Heidelbergvlakte region, South Coast, 1997/98 (R/ha)

	<u>Benefits</u>	<u>Costs</u>		Profits
	Gross Revenues	Tradable inputs	Domestic factors	
Private (market) prices	2068,00	2015,08	257,36	-249,44
Social (shadow) prices	1469,93	1571,06	642,04	-788,18
Policy effect (divergences)	598,07	444,02	-384,68	538,74

DRC=-6,34 NPCO= 1,41 NPCI=1,28 EPC=-0,52 PC= 0,32 SRP= 0,37

Appendix B.10: Enterprise budget (R/ha) for wheat production in the Heidelberg region, South Coast. Wheat after medics- less tillage; 1997/98.

	PRIVATE PRICES	ECONOMIC PRICES	COMPONENTS OF ECONOMIC PRICES	
			Non-tradable	Tradable
GROSS RECEIPTS	(2,82t *880)	(2,82t*625,5)		
	2481,60	1763,91		1763,91
ALLOCATED COSTS	2128,51	2057,85		
Purchased inputs:	516,95	502,25	100,45	401,80
Wheat seed	178,80	178,80	35,76	143,04
Fertiliser	191,13	191,13	38,23	152,90
Crop Chemicals	147,02	132,32	26,46	105,86
Machinery fixed costs:	389,02	389,02	38,90	350,12
Depreciation	259,71	259,71	25,97	233,74
Interest	129,31	129,31	12,93	116,38
Machinery variable costs:	386,60	320,63	95,65	224,98
Fuel	176,47	110,50	22,10	88,40
Repairs/ maintenance	210,13	210,13	73,55	136,58
Implements fixed costs:	241,47	241,47	24,15	217,32
Depreciation	130,37	130,37	13,04	117,33
Interest	111,10	111,10	11,11	99,99
Implements variable costs:	48,29	48,29	16,90	31,39
Contract hire service:	205,00	205,00	71,75	133,25
Spraying	42,00	42,00		
Soil tests	58,00	58,00		
Transport	105,00	105,00		
Other:	341,18	351,19		
Crop insurance	30,00	30,00	1,5	28,50
Labour	33,35	43,36		
Interest on operating capital	92,83	92,83		
Land	140,00	140,00		
Diverse (admin)	45,00	45,00		
NET RETURN	353,09	-293,94		

Budget summary: Wheat production in the Malgas-Heidelbergvlakte region, South Coast, 1997/98 (R/ha)

	PRIVATE PRICES	ECONOMIC PRICES
Gross receipts	2481,60	1763,91
Allocated costs	2128,51	2057,85
Tradables:	1817,33	1387,36
Purchased inputs	516,95	401,80
Machinery costs	775,62	575,10
Implement costs	289,76	248,71
Contract/hire service	205,00	133,25
Crop insurance	30,00	28,50
Domestic factors:	311,18	670,49
Cost of land	140,00	140,00
Labour costs	33,355	43,36
Cost of operating capital	92,83	92,83
Components of tradables		349,30
Diverse (admin)	45,00	45,00
Net Return	353,09	-293,94

Policy Analysis Matrix for wheat production in the Malgas-Heidelbergvlakte region, South Coast, 1997/98 (R/ha)

	<u>Benefits</u>	<u>Costs</u>		Profits
	Gross Revenues	Tradable inputs	Domestic factors	
Private (market) prices	2481,60	1817,33	311,18	353,09
Social (shadow) prices	1763,91	1387,36	670,49	-293,94
Policy effect (divergences)	717,69	429,97	-359,31	647,03

DRC= 1,78 NPCO=1,41 NPCI=1,31 EPC=1,76 PC=-1,20 SRP= 0,37

Appendix B.11: Enterprise budget (R/ha) for wheat production in the Heidelberg region, South Coast. Wheat after lucerne- less tillage; 1997/98.

	PRIVATE PRICES	ECONOMIC PRICES	COMPONENTS OF ECONOMIC PRICES	
			Non-tradable	Tradable
GROSS RECEIPTS	(2,82t *880)	(2,82t *625,5)		
	2481,60	1763,91		1763,91
ALLOCATED COSTS	2570,88	2396,77		
Purchased inputs:	696,52	617,23	123,45	493,78
Wheat seed	178,80	178,80	35,76	143,04
Lime	84,00	84,00	16,80	67,20
Fertiliser	221,63	221,63	44,33	177,30
Crop Chemicals	212,09	132,80	26,56	106,24
Machinery fixed costs:	389,02	389,02	38,90	350,12
Depreciation	259,71	259,71	25,97	233,74
Interest	129,31	129,31	12,93	116,38
Machinery variable costs:	627,84	516,55	153,43	363,12
Fuel	297,70	186,41	37,88	148,53
Repairs/ maintenance	330,14	330,14	115,55	214,59
Implements fixed costs:	241,47	241,47	24,15	217,32
Depreciation	130,37	130,37	13,-4	117,33
Interest	111,10	111,10	11,11	99,99
Implements variable costs:	48,29	48,29	16,90	31,39
Contract hire service:	205,00	205,00	71,75	133,25
Spraying	42,00	42,00		
Soil tests	58,00	58,00		
Transport	105,00	105,00		
Other:	362,74	379,21		
Crop insurance	30,00	30,00	1,5	28,50
Labour	54,91	71,38		
Interest on operating capital	92,83	92,83		
Land	140,00	140,00		
Diverse (admin)	45,00	45,00		
NET RETURN	-89,28	-632,86		

Appendix B.12: Enterprise budget (R/ha) for wheat production in the Ruens region, South Coast. Wheat after medics- conventional tillage; 1997/98.

	PRIVATE PRICES	ECONOMIC PRICES	COMPONENTS OF ECONOMIC PRICES	
			Non-tradable	Tradable
GROSS RECEIPTS	(2,35t *885)	(2,35t *625,5)		
	2079,75	1469,93		1469,93
ALLOCATED COSTS	2124,66	2061,58		
Purchased inputs:	606,72	585,69	117,14	468,55
Wheat seed	178,80	178,80	35,76	143,04
Fertiliser	217,65	217,65	43,53	174,12
Crop Chemicals	210,27	189,24	37,85	151,39
Machinery fixed costs:	377,24	377,24	37,72	339,52
Depreciation	232,21	232,21	23,22	208,99
Interest	145,03	145,03	14,50	130,53
Machinery variable costs:	363,15	308,93	94,50	214,43
Fuel	145,04	90,82	18,16	72,66
Repairs/ maintenance	218,11	218,11	76,34	141,77
Implements fixed costs:	142,95	142,95	14,30	128,66
Depreciation	84,05	84,05	8,41	75,65
Interest	58,90	58,90	5,89	53,01
Implements variable costs:	28,59	28,59	10,01	18,58
Contract hire service:	262,50	262,50	91,88	170,62
Spraying	42,00	42,00		
Soil tests	58,00	58,00		
Transport	87,50	87,50		
Drying costs	75,00	75,00		
Other:	343,51	355,68		
Crop insurance	2,88	2,88	0,14	2,74
Labour	40,57	52,74		
Interest on operating capital	175,06	175,06		
Land	125,00	125,00		
NET RETURN	-44,91	-591,65		

Appendix B.13: Enterprise budget (R/ha) for a wheat production system in the Ruens region, South Coast. Wheat after wheat- minimum tillage; 1997/98.

	PRIVATE PRICES	ECONOMIC PRICES	COMPONENTS OF ECONOMIC PRICES	
			Non-tradable	Tradable
GROSS RECEIPTS	(2,49t *885) 2203,65	(2,49t *625,5) 1557,50		1557,50
ALLOCATED COSTS	1874,15	1842,44		
Purchased inputs:	612,54	598,98	119,80	479,18
Wheat seed	154,53	154,53	30,91	123,62
Lime	2,18	2,18	0,44	1,74
Fertiliser	320,22	320,22	64,04	256,18
Crop Chemicals	135,61	122,05	24,41	97,64
Machinery fixed costs:	377,24	377,24	37,72	339,52
Depreciation	232,21	232,21	23,22	208,99
Interest	145,03	145,03	14,50	130,53
Machinery variable costs:	182,73	152,41	45,73	106,68
Fuel	81,11	50,79	10,16	40,63
Repairs/ maintenance	101,62	101,62	35,57	66,05
Implements fixed costs:	142,95	142,95	14,30	128,66
Depreciation	84,05	84,05	8,41	75,65
Interest	58,90	58,90	5,89	53,01
Implements variable costs:	28,59	28,59	10,01	18,58
Contract hire service:	154,69	154,69	54,14	100,55
Spraying	11,90	11,90		
Marketing costs	106,49	106,49		
Transport	36,30	36,30		
Labour	0,70	0,70		
Other:	375,41	387,58		
Crop insurance	2,88	2,88	0,14	2,74
Labour	40,57	52,74		
Interest on operating capital	175,06	175,06		
Land	125,00	125,00		
Diverse	31,90	31,90		
NET RETURN	329,50	-284,95		

**Budget summary: Wheat production in the Ruens region, South Coast, 1997/98
(R/ha)**

	PRIVATE PRICES	ECONOMIC PRICES
Gross receipts	2203,65	1557,50
Allocated costs	1874,15	1842,44
Tradables:	1501,62	1175,91
Purchased inputs	612,54	479,18
Machinery costs	559,97	446,20
Implement costs	171,54	147,24
Contract/hire service	154,69	100,55
Crop insurance	2,88	2,74
Domestic factors:	372,53	666,54
Cost of land	125,00	125,00
Labour costs	40,57	52,74
Cost of operating capital	175,06	175,06
Components of tradables		281,84
Diverse	31,90	31,90
Net Return	329,50	-284,95

**Policy Analysis Matrix for wheat production in the Ruens region, South Coast,
1997/98 (R/ha)**

	<u>Benefits</u>	<u>Costs</u>		Profits
	Gross Revenues	Tradable inputs	Domestic factors	
Private (market) prices	2203,65	1501,62	372,53	329,50
Social (shadow) prices	1557,50	1175,91	666,54	-284,95
Policy effect (divergences)	646,15	325,71	-294,01	614,45

DRC= 1,75 NPCO= 1,41 NPCI=1,28 EPC= 1,84 PC= -1,16 SRP= 0,39

Appendix B.14: Enterprise budget (R/ha) for wheat production in the Riversdal region, South Coast. Wheat after lucerne- less tillage; 1997/98.

	PRIVATE PRICES	ECONOMIC PRICES	COMPONENTS OF ECONOMIC PRICES	
			Non-tradable	Tradable
GROSS RECEIPTS	(2t * 880)	(2t * 625,5)		
	1760,00	1251,00		1251,00
ALLOCATED COSTS	2064,02	2027,18		
Purchased inputs:	588,60	575,71	115,14	460,57
Wheat seed	186,25	186,25	37,25	149,00
Lime	84,00	84,00	16,80	67,20
Fertiliser	189,50	189,50	37,90	151,60
Crop Chemicals	128,85	115,96	23,19	92,77
Machinery fixed costs:	336,03	336,03	33,60	302,43
Depreciation	184,28	184,28	18,43	165,85
Interest	151,75	151,75	15,18	136,58
Machinery variable costs:	326,95	273,73	82,42	191,29
Fuel	142,36	89,14	17,82	71,31
Repairs/ maintenance	184,59	184,59	64,60	119,98
Implements fixed costs:	241,45	241,45	24,15	217,31
Depreciation	141,97	141,97	14,20	127,77
Interest	99,48	99,48	9,95	89,53
Implements variable costs:	48,29	48,29	16,90	31,39
Contract hire service:	230,00	230,00	80,50	149,50
Spraying	42,00	42,00		
Soil tests	58,00	58,00		
Drying cost	60,00	60,00		
Transport	70,00	70,00		
Other:	292,70	321,97		
Crop insurance	5,14	5,14	0,26	4,88
Labour	97,56	126,83		
Interest on operating capital	90,00	90,00		
Land	100,00	100,00		
NET RETURN	-304,02	-776,18		

Budget summary: Wheat production in the Riversdal region, South Coast, 1997/98 (R/ha)

	PRIVATE PRICES	ECONOMIC PRICES
Gross receipts	1760,00	1251,00
Allocated costs	2064,02	2027,18
Tradables:	1776,46	1357,37
Purchased inputs	588,60	460,57
Machinery costs	662,98	493,72
Implement costs	289,74	248,70
Contract/hire service	230,00	149,50
Crop insurance	5,14	4,88
Domestic factors:	287,56	669,81
Cost of land	100,00	100,00
Labour costs	97,56	126,84
Cost of operating capital	90,00	90,00
Components of tradables		352,97
Net Return	-304,02	-776,18

Policy Analysis Matrix for wheat production in the Riversdal region, South Coast, 1997/98 (R/ha)

	Benefits	Costs		Profits
	Gross Revenues	Tradable inputs	Domestic factors	
Private (market) prices	1760,00	1776,46	287,56	-304,02
Social (shadow) prices	1251,00	1357,37	669,81	-776,18
Policy effect (divergences)	509,00	419,09	-382,25	472,16

DRC=-6,30 NPCO= 1,41 NPCI=1,31 EPC= 0,15 PC= 0,39 SRP= 0,38

Appendix B.15: Enterprise budget (R/ha) for wheat production in the Slang River region, South Coast. Wheat after medics- less tillage; 1997/98.

	PRIVATE PRICES	ECONOMIC PRICES	COMPONENTS OF ECONOMIC PRICES	
			Non-tradable	Tradable
GROSS RECEIPTS	(2,35t *880) 2068,00	(2,35t*625,5) 1469,93		1469,93
ALLOCATED COSTS	2292,50	2219,36		
Purchased inputs:	692,01	675,63	135,13	540,50
Wheat seed	178,80	178,80	35,76	143,04
Fertiliser	349,44	349,44	69,89	279,55
Crop Chemicals	163,77	147,39	29,48	117,91
Machinery fixed costs:	465,73	465,73	46,57	419,16
Depreciation	288,57	288,57	28,86	259,71
Interest	177,16	177,16	17,72	159,44
Machinery variable costs:	427,16	354,83	106,02	248,81
Fuel	193,47	121,14	24,23	96,91
Repairs/ maintenance	233,69	233,69	81,79	151,90
Implements fixed costs:	241,47	241,47	24,15	217,32
Depreciation	130,37	130,37	13,04	117,33
Interest	111,10	111,10	11,11	99,99
Implements variable costs:	48,29	48,29	16,90	31,39
Contract hire service:	145,50	145,50	50,93	95,58
Soil tests	58,00	58,00		
Transport	87,50	87,50		
Other:	272,34	287,91		
Crop insurance	18,69	18,69	0,93	17,76
Labour	51,89	67,46		
Interest on operating capital	135,00	135,00		
Land	66,76	66,76		
NET RETURN	-224,50	-749,43		

Budget summary: Wheat production in the Slang River region, South Coast, 1997/98 (R/ha)

	PRIVATE PRICES	ECONOMIC PRICES
Gross receipts	2068,00	1469,93
Allocated costs	2292,50	2219,36
Tradables:	2038,85	1634,71
Purchased inputs	692,01	540,50
Machinery costs	892,89	667,97
Implement costs	289,76	312,90
Contract/hire service	145,50	95,58
Crop insurance	18,69	17,76
Domestic factors:	253,65	649,85
Cost of land	66,76	66,76
Labour costs	51,89	67,46
Cost of operating capital	135,00	135,00
Components of tradables		380,63
Net Return	-224,50	-749,43

Policy Analysis Matrix for wheat production in the Slang River region, South Coast, 1997/98 (R/ha)

	<u>Benefits</u>	<u>Costs</u>		<u>Profits</u>
	Gross Revenues	Tradable inputs	Domestic factors	
Private (market) prices	2068,00	2038,85	253,65	-224,50
Social (shadow) prices	1469,93	1634,71	649,85	-749,43
Policy effect (divergences)	598,07	404,14	-396,20	524,93

DRC=-3,94 NPCO= 1,41 NPCI=1,25 EPC=-0,18 PC= 0,30 SRP= 0,36

Appendix B.16: Enterprise budget (R/ha) for wheat production in the Slang River region, South Coast. Wheat after lucerne- less tillage; 1997/98.

	PRIVATE PRICES	ECONOMIC PRICES	COMPONENTS OF ECONOMIC PRICES	
			Non-tradable	Tradable
GROSS RECEIPTS	(2,64t *880) 2323,20	(2,64t *625,5) 1651,32		1651,32
ALLOCATED COSTS	2355,84	2247,78		
Purchased inputs:	825,86	805,48	161,10	644,38
Wheat seed	178,80	178,80	35,76	143,04
Lime	84,00	84,00	16,80	67,20
Fertiliser	359,28	359,28	71,86	287,42
Crop Chemicals	203,78	183,40	36,68	146,72
Machinery fixed costs:	226,77	226,77	22,68	204,09
Depreciation	141,73	141,73	14,17	127,56
Interest	85,04	85,04	8,50	76,54
Machinery variable costs:	585,11	481,86	142,71	339,15
Fuel	276,20	172,95	34,59	138,36
Repairs/ maintenance	308,91	308,91	108,12	200,79
Implements fixed costs:	241,47	241,47	24,15	217,32
Depreciation	130,37	130,37	13,04	117,33
Interest	111,10	111,10	11,11	99,99
Implements variable costs:	48,29	48,29	16,90	31,39
Contract hire service:	156,00	156,00	54,60	101,40
Soil tests	58,00	58,00		
Transport	98,00	98,00		
Other:	272,34	287,91		
Crop insurance	18,69	18,69	0,93	17,76
Labour	51,89	67,46		
Interest on operating capital	135,00	135,00		
Land	66,76	66,76		
NET RETURN	-32,64	-596,46		

Appendix B.17: Enterprise budget (R/ha) for wheat production in the Bredasdorp region, South Coast. Wheat after wheat- minimum tillage; 1997/98.

	PRIVATE PRICES	ECONOMIC PRICES	COMPONENTS OF ECONOMIC PRICES	
			Non-tradable	Tradable
GROSS RECEIPTS	(1,93t *880) 1698,40	(1,93t *625,5) 1207,22		1207,22
ALLOCATED COSTS	1938,71	1895,04		
Purchased inputs:	640,76	593,47	118,69	474,78
Wheat seed	187,20	187,20	37,44	149,76
Fertiliser	327,05	327,05	65,41	261,64
Crop Chemicals	126,51	79,22	15,84	63,38
Machinery fixed costs:	226,77	226,77	22,68	204,09
Depreciation	141,73	141,73	14,17	127,56
Interest	85,04	85,04	8,50	76,54
Machinery variable costs:	323,51	272,48	82,54	189,94
Fuel	136,50	85,47	17,09	68,38
Repairs/ maintenance	187,01	187,01	65,45	121,56
Implements fixed costs:	241,47	241,47	24,15	217,32
Depreciation	130,37	130,37	13,04	117,33
Interest	111,10	111,10	11,11	99,99
Implements variable costs:	48,29	48,29	16,90	31,39
Contract hire service:	46,21	46,21	16,17	30,04
Spraying	40,00	40,00		
Drying costs	6,21	6,21		
Other:	411,70	466,35		
Crop insurance	7,39	7,39	0,37	7,02
Labour	118,19	172,84		
Interest on operating capital	124,21	124,21		
Land	115,00	115,00		
Diverse	46,91	46,91		
NET RETURN	-240,31	-687,82		

Budget summary: Wheat production in the Bredasdorp region, South Coast, 1997/98 (R/ha)

	PRIVATE PRICES	ECONOMIC PRICES
Gross receipts	1698,40	1207,22
Allocated costs	1938,71	1895,04
Tradables:	1534,40	1155,93
Purchased inputs	640,76	474,78
Machinery costs	550,28	394,03
Implement costs	289,76	248,71
Contract/hire service	46,21	31,39
Crop insurance	7,39	7,02
Domestic factors:	404,31	740,46
Cost of land	115,00	115,00
Labour costs	118,19	172,84
Cost of operating capital	124,21	124,21
Components of tradables		281,50
Diverse	46,91	46,91
Net Return	-240,31	-687,82

Policy Analysis Matrix for wheat production in the Bredasdorp region, South Coast, 1997/98 (R/ha)

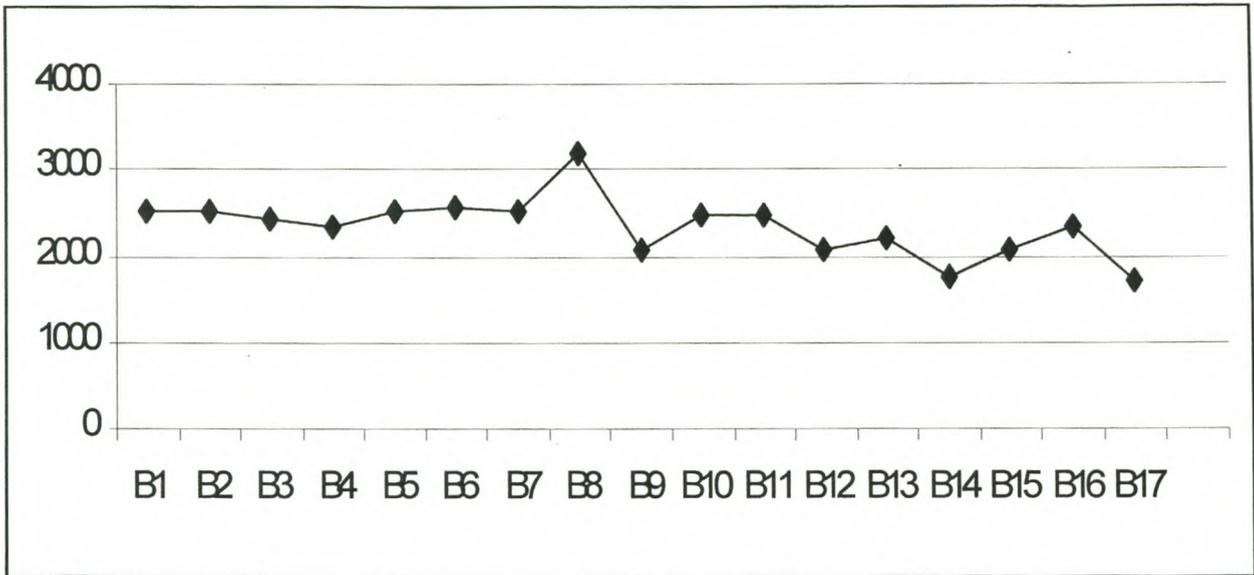
	Benefits	Costs		Profits
	Gross Revenues	Tradable inputs	Domestic factors	
Private (market) prices	1698,40	1534,40	404,31	-240,31
Social (shadow) prices	1207,22	1155,93	740,46	-687,82
Policy effect (divergences)	491,18	378,47	-336,15	447,51

DRC= 14,44 NPCO= 1,41 NPCI=1,33 EPC= 3,20 PC= 0,35 SRP= 0,37

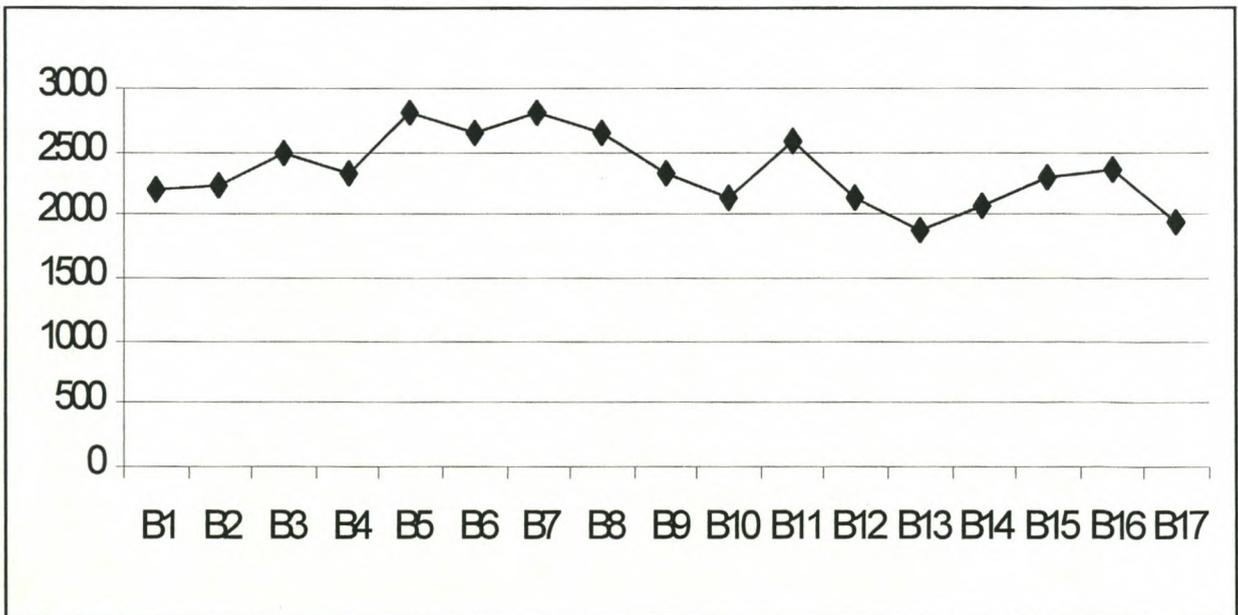
Appendix C.1: Tabulated private prices of all 17 budgets

Budget	Gross Receipts (R/ha)	Allocated Costs (R/ha)	Net Returns (R/ha)
B1-Moorreesburg	2538.00	2190.37	347.63
B2-Moorreesburg	2520.00	2243.68	276.32
B3-Moorreesburg	2439.00	2494.18	-55.18
B4-Piketberg	2327.00	2315.67	11.33
B5-Piketberg	2506.00	2801.17	-295.17
B6-Malmesbury	2543.05	2659.95	-116.90
B7-Malmesbury	2534.00	2822.92	-288.92
B8-Malmesbury	3176.55	2662.96	513.59
B9-Heidelberg	2068.00	2317.44	-249.44
B10-Heidelberg	2481.60	2128.51	353.09
B11-Heidelberg	2481.60	2570.88	-81.28
B12-Ruens	2079.75	2124.66	-44.91
B13-Ruens	2203.65	1874.15	329.50
B14-Riversdal	1760.00	2064.02	-304.02
B15-Slang River	2068.00	2292.50	-224.50
B16-Slang River	2323.20	2355.84	-32.64
B17-Bredasdorp	1698.40	1938.71	-240.31
Average	2338.11	2344.57	-5.99

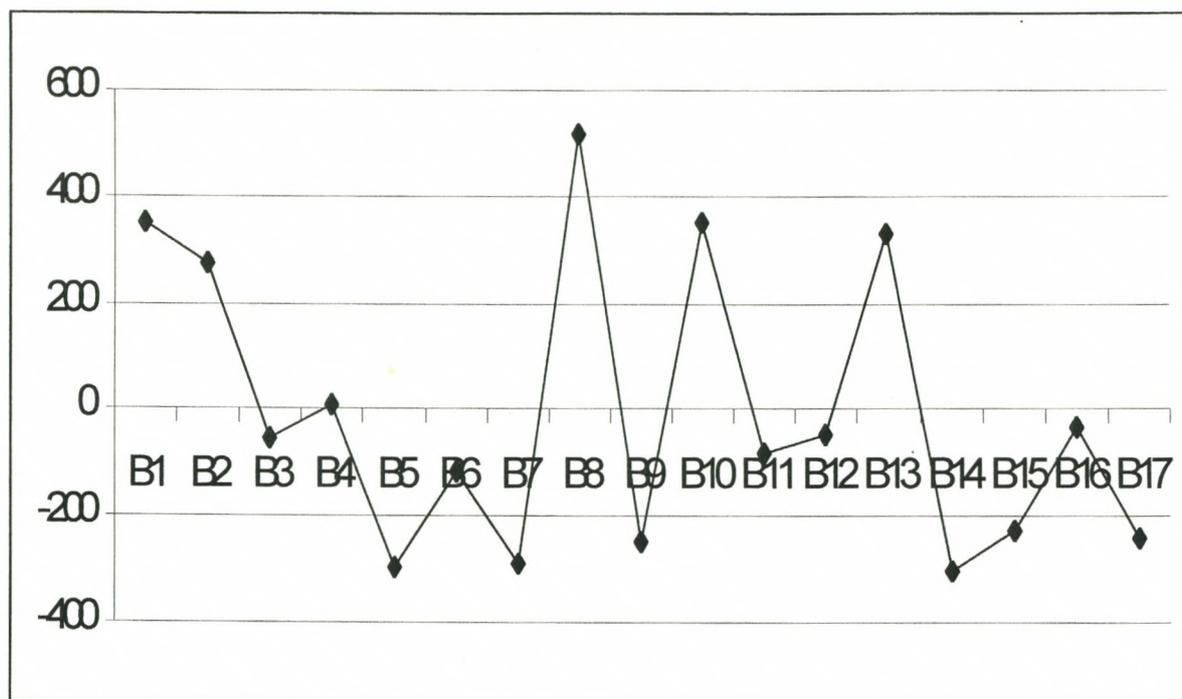
Appendix C.2: Graphic representation of Gross Receipts from the enterprise budgets



Appendix C.3: Graphic representation of Allocated Costs from the enterprise budgets



Appendix C.4: Graphic representation of Net Returns from the enterprise budgets

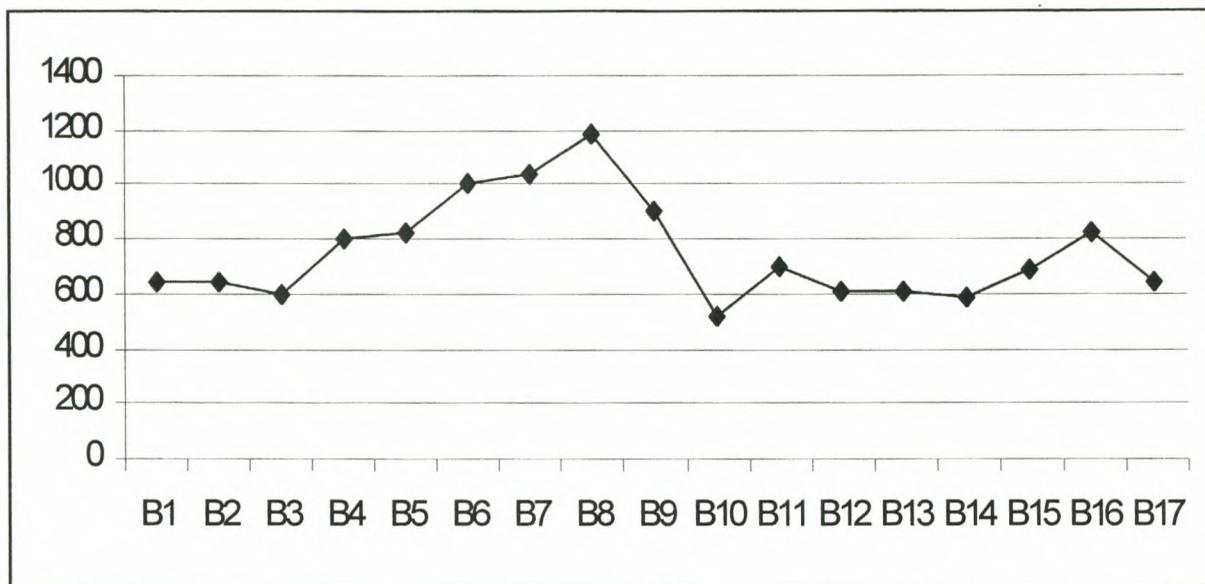


**Appendix C.5: Tabulated private prices for allocated costs of all 17 budgets
(R/ha)**

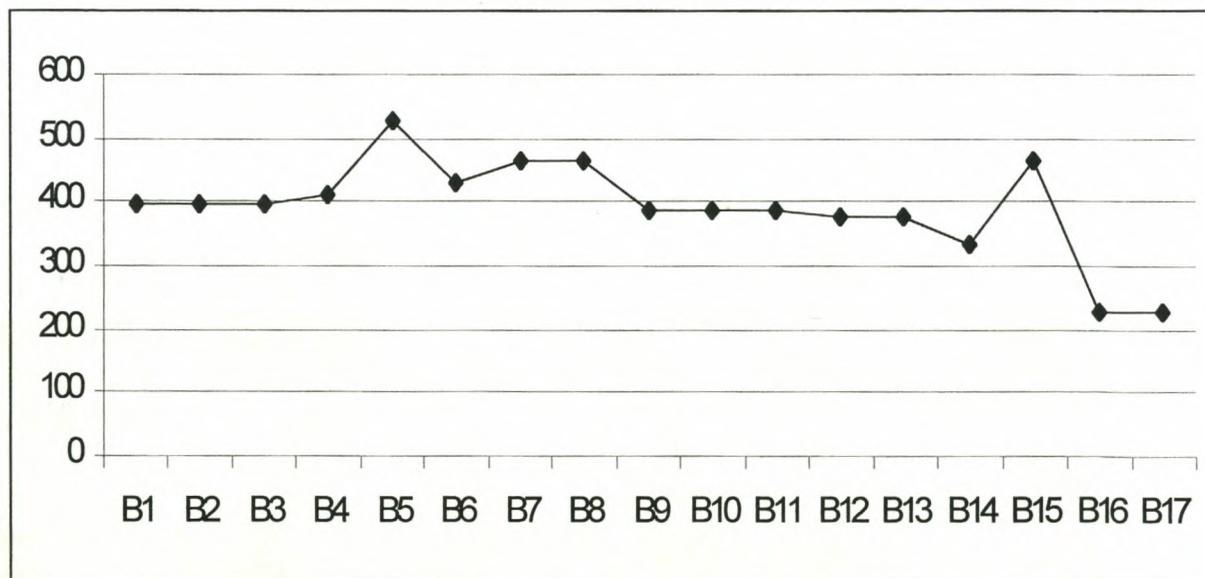
Budget	1	2	3	4	5	6	7
B1-Moorreesburg	640.47	397.09	142.52	394.91	85.57	57.00	472.71
B2-Moorreesburg	642.78	397.09	142.52	394.91	85.57	108.00	472.71
B3-Moorreesburg	595.00	397.09	238.28	394.91	85.57	291.83	491.40
B4-Piketberg	798.56	409.43	146.95	394.91	85.57	33.00	447.25
B5-Piketberg	827.37	527.64	485.43	394.91	85.57	33.00	447.25
B6-Malmesbury	1000.12	432.25	354.97	88.02	56.77	80.19	647.63
B7-Malmesbury	1036.98	465.73	556.00	88.02	91.64	71.26	513.29
B8-Malmesbury	1181.13	465.73	362.90	88.02	21.63	103.38	420.17
B9-Heidelberg	901.56	389.02	217.24	241.47	48.29	187.50	332.36
B10-Heidelberg	516.95	389.02	386.60	241.47	48.29	205.00	341.18
B11-Heidelberg	696.52	389.02	627.84	241.47	48.29	205.00	362.74
B12-Ruens	606.72	377.24	363.15	142.95	28.59	262.50	343.51
B13-Ruens	612.54	377.24	182.73	142.95	28.59	154.69	375.41
B14-Riversdal	588.60	336.03	326.95	241.45	48.29	230.00	292.70
B15-Slang River	692.01	465.73	427.16	241.47	48.29	145.50	272.34
B16-Slang River	825.86	226.77	585.11	241.47	48.29	156.00	272.34
B17-Bredasdorp	640.76	226.77	323.51	241.47	48.29	46.21	411.70
Average	753.17	392.29	345.29	247.93	58.42	139.42	406.86

- 1- Purchased inputs
- 2- Machinery fixed costs
- 3- Machinery variable costs
- 4- Implements fixed costs
- 5- Implements variable costs
- 6- Contract hire service
- 7- Other costs

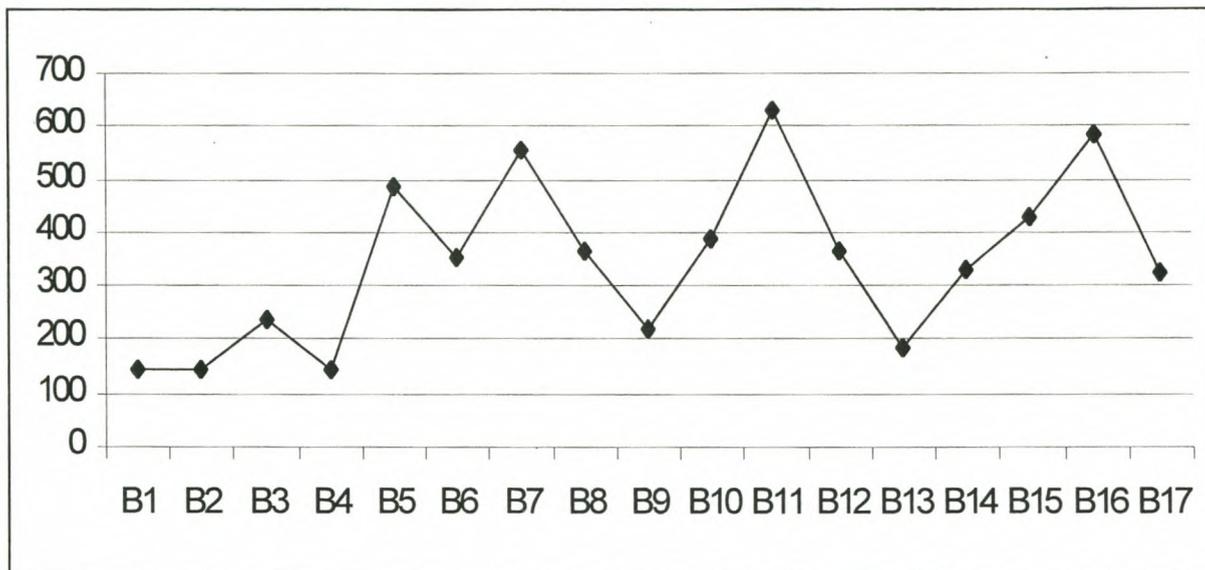
Appendix C.6: Graphic representation of Purchased inputs from the enterprise budgets



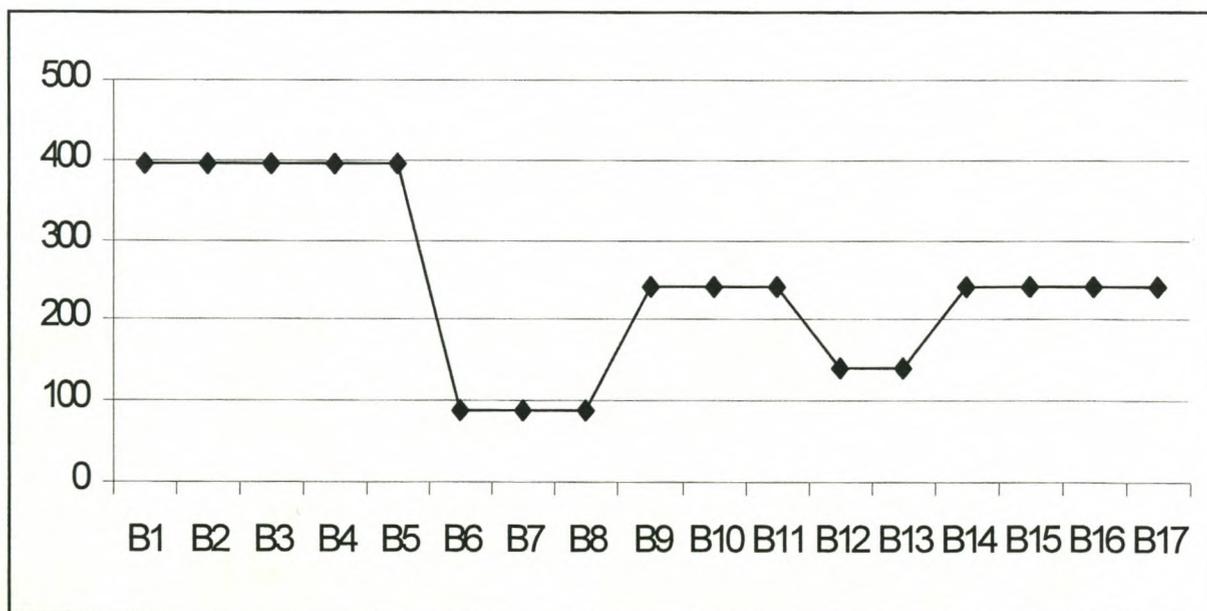
Appendix C.7: Graphic representation of Machinery fixed costs from the enterprise budgets



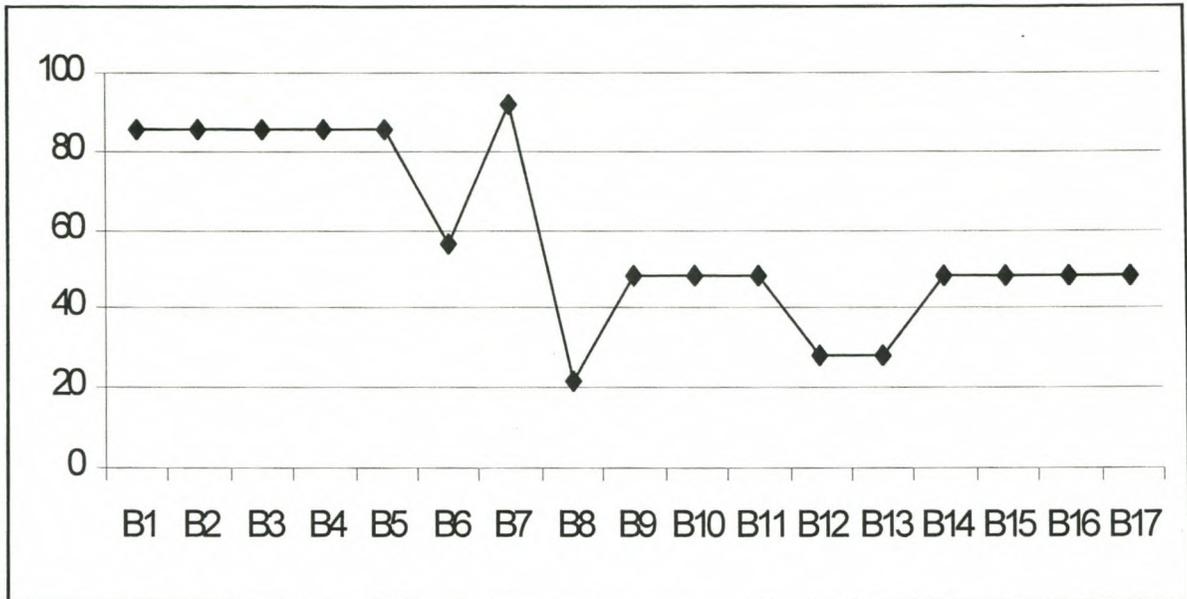
Appendix C.8: Graphic representation of Machinery variable costs from the enterprise budgets



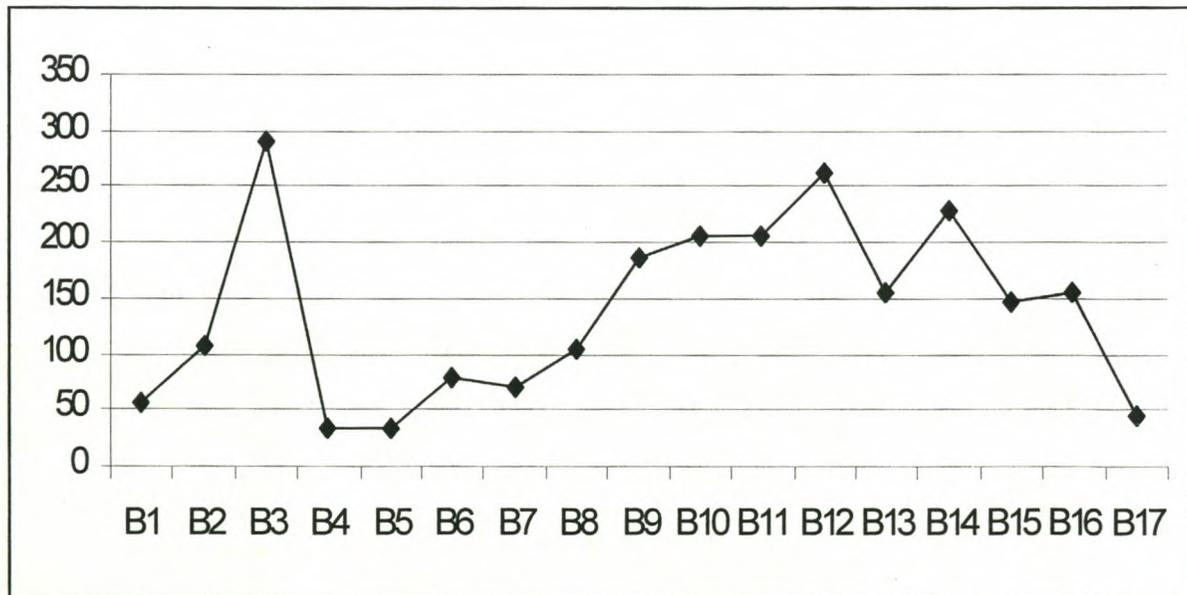
Appendix C.9: Graphic representation of Implements fixed costs from the enterprise budgets



Appendix C.10: Graphic representation of Implements variable costs from the enterprise budgets



Appendix C.11: Graphic representation of Contract hire costs from the enterprise budgets



Appendix C.12: Graphic representation of Other costs from the enterprise budgets



Appendix C.13: Tabulated social prices of all 17 budgets

Budget	Gross Receipts (R/ha)	Allocated Costs (R/ha)	Net Returns (R/ha)
B1-Moorreesburg	1763.91	2194.84	-430.93
B2-Moorreesburg	1751.40	2249.11	-497.71
B3-Moorreesburg	1695.11	2459.38	-764.27
B4-Piketberg	1626.30	2284.28	-657.98
B5-Piketberg	1751.40	2718.03	-966.93
B6-Malmesbury	1757.66	2560.95	-803.29
B7-Malmesbury	1751.40	2656.81	-905.41
B8-Malmesbury	2195.51	2614.30	-418.80
B9-Heidelberg	1469.93	2258.10	-788.18
B10-Heidelberg	1763.91	2057.85	-293.94
B11-Heidelberg	1763.91	2396.77	-632.86
B12-Ruens	1469.93	2061.58	-591.65
B13-Ruens	1557.50	1842.44	-284.95
B14-Riversdal	1251.00	2027.18	-776.18
B15-Slang River	1469.32	2219.36	-749.43
B16-Slang River	1651.32	2247.78	-596.46
B17-Bredasdorp	1207.22	1895.04	-687.82
Average	1640.98	2279.05	-638.05

Appendix D:

Transport Costing from silo to variable delivery points -October, 1999 (SAFEX)

Owner	Silo / Delivery Location	Location Differential
WPK	Ashton	-R48/t
MKK	Bergrivier	-R37/t
BNK	Bredasdorp	-R49/t
CRK	Caledon	-R35/t
WKK	Calvinia	-R110/t
PLK	Ceres	-R37/t
WPK	Darling	-R30/t
PLK	Eendekuil	-R43/t
PLK	Graafwater	-R53/t
PLK	Halfmanshof	-R34/t
SSK	Heidelberg	-R64/t
SSK	Karringmelkrivier	-R61/t
BNK	Klipdale	-R43/t
WPK	Klipheuwel	-R23/t
MKK	Koperfontein	-R33/t
MKK	Koringberg	-R36/t
CRK	Krige	-R38/t
MKK	Leliedam	-R33/t
MKK	Moorreesburg	-R33/t
MKK	Moravia	-R37/t
PLK	Piketberg	-R39/t
PLK	Pools	-R41/t
PLK	Porterville	-R36/t
SSK	Protem	-R44/t
WPK	Riebeeck-Wes	-R31/t
CRK	Rietpoel	-R40/t
WPK	Ruststasie	-R31/t
SSK	Swellendam	-R55/t

Appendix E:

The South African Agricultural Tariff Regime

“Tariff application in South Africa lacks the necessary policy guidance that is in line with the broad primary economic objectives, the general agricultural policy and the agricultural trade policy, on national as well as sectoral level” (Steenkamp, 1999).

This study tells of forms of non-tariff barriers that exist in the SADC, and SACU regions as well as internationally. Such barriers include quantitative control (import control), sanitary and phyto-sanitary measures, levies¹⁰ (taxes), and strict packaging regulations. These forms of barriers to trade directly impact on the effects of tariff liberalisation.

Various conclusions and recommendations were made in this study, including the need for tariff liberalisation. The wheat industry is practising the opposite of this and an increase in the import tariff for wheat has been implemented (SAGA, 1999). Tariff policy and liberalisation is an integral part of promoting exports and growth in the South African economy. South Africa needs a growth and export boost, which Steenkamp states could be brought about by liberalisation and the efforts of competitive parts of the economy. “Tariff protection costs jobs elsewhere in the economy and reduces the national income and growth prospects. South Africa needs growth...then we could afford the high price of mis-allocation of resources” (Steenkamp, 1999).

Appendix F:

Target Costing

¹⁰ Statutory levies are a dedicated tax per unit or ad valorem of an agricultural commodity at any point in the marketing chain between and including the producer and consumer (Bayley, 1998).

Target costing aims at profit enhancement by developing products with the right level of quality and functionality, as well as appropriate prices. Consumer preference must be identified and expressed as innovative design options. The target cost of the product is determined as the price partially predefined by competition minus the target profit, guided by competitor profit.

In the case of a commodity such as wheat, the cost reduction aim will dominate. Wheat farmers should treat their suppliers as partners both during the design process and when they are setting cost targets as producer study groups, possibly supported by the extension capacity of a co-operative or agricultural companies in a region. Target costing should further be seen as a continuous development approach to innovation management in the wheat industry (Street *et al.*, 1998).