STRUCTURAL ADJUSTMENTS IN THE WHEAT INDUSTRY OF THE WESTERN CAPE PROVINCE
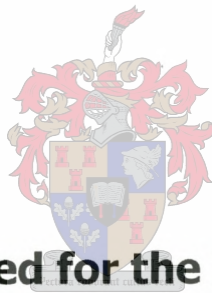
DIRK PIETER TROSKIE

Dissertation presented for the Degree of Doctor of Philosophy (Agriculture) at the University of Stellenbosch.

Promoter: Prof. N Vink

JANUARY 2001

DECLARATION

I, the undersigned, hereby declare that the work contained in this dissertation 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.

Signature: **Date:**

ACKNOWLEDGEMENTS

A research project of this nature is not possible without the active support of various individuals and organisations. To mention but a few:

➢ My employer, the Department of Economic Affairs, Agriculture and Tourism provided the research infrastructure and provided a bursary for two years of study. I especially want to thank my immediate supervisor, Mr Johan Blomerus, for his encouragement and the conductive environment that he created. However, the conclusions and recommendations are my own and should not necessarily be attributed to my employer.

➢ The financial assistance of the National Research Foundation towards this research is hereby acknowledged. Opinions expressed in this thesis and conclusions arrived at, are those of the author and are not necessarily to be attributed to the National Research Foundation.

➢ My parents taught me the virtues of an enquiring mind, hard work and confidence. Without these attributes a project of this nature would be impossible.

➢ The people of the Agricultural Economics Division at Elsenburg provided intellectual stimulation and acted as lightning conductor. Mishka was especially effective regarding the latter.

➢ Three examiners made very valuable comments.

➢ My promoter, Prof. Nick Vink, guided me on this journey. He succeeded in finding an excellent balance between providing the necessary impetus and sounding board but without being prescriptive.

➢ My family endured an absent and irritated husband and father without complaint. My wife, Sandra, also participated in the journey as a sounding board for our mutual interests.

➢ Finally, the Creator provided the talents that I could use.

SUMMARY

The objective of this dissertation was to investigate the structural imbalances of the wheat industry of the Western Cape Province and, with due recognition of a changing environment, to develop an effective strategy for the industry.

It was found that the origins of the structural imbalances could be detected in the interaction between policy, technological and demand factors and is not unique to the specific industry. The farm problem provides an explanation for the instability of and downward pressure on wheat prices as well as the sluggish adaptation to environmental change experienced in the wheat industry. Internationally similar problems led to a whole range of policy measures. Relatively unique to South African agriculture, but not only to the Western Cape wheat industry, is the circumstances that gave rise to the current dual structure of the domestic agricultural sector. The origins of these circumstances could be traced back to the Dutch settlement of the Cape in 1652 and the resulting measures was later upheld under British rule. After the commercialisation of the local agricultural sector following the discovery of diamonds in South Africa, certain measures were lobbied for at the end of the 19th Century to protect white farmers. These measures were expanded in the 20th Century and gave rise to the particular duality along ethnic lines of the South African agricultural sector.

If it is accepted that the structural problems of the wheat industry are the result of political, policy, technological and demand factors, the question of the potential future role of the sector, and more specifically the wheat industry, can be asked. It was established that agriculture is a natural catalyst for economic development through the provision of food, foreign exchange, manpower, and capital formation as well as a market for industrial produce. Whereas the potential exists, agriculture has not yet fulfilled this role in Southern Africa due to inconsistent domestic policy, adverse trade regimes, inappropriate technology and problems encountered in the management of development. This potential role of agriculture has been quantified for the Western Cape Province.

In the development of a strategy for an industry it is imperative to evaluate the future economic and social environment. It was verified that in the next phase of economic development, towards information societies, agriculture would still fulfil the functions previously mentioned. However, a new and more esoteric role relating to identity could be added to this list in an information society.

Given the important role of agriculture as described in the previous section, intuition would lead one to expect that government would play an important role in alleviating the structural problems of the Western Cape wheat industry. However, contrary to this intuitive expectation it was found that, in alleviating the problems of the Western Cape wheat industry, government intervention will be largely limited to creating a favourable enabling environment. In getting to this conclusion the theory of welfare economics, public choice and politician – voter interaction were explored. The traditional wisdom has it that in searching for a Pareto-optimal state, or at least a second-best solution, pressure group activities may play an important role. This is seen as important due to the difficulties, as indicated by Arrow's impossibility theorem, in transforming individual preferences into political preference functions. However, numerous examples have shown that pressure group activities may only play a marginal role in influencing the final outcome. The underlying structural characteristics of the national and provincial economies may be a more important determinant. This became more certain as the way politicians perceived agriculture before and after the 1994 political transition was analysed.

It follows that a strategy for the wheat industry of the Western Cape will take the global, social, policy, natural and consumer environment into account and both the strategy and the industry will have to be self-reliant. It was argued that a solution would be found in changing the slope (elasticity) of the demand and supply functions for agricultural produce. With the aid of a spatial model developed the impact of the different elements of the strategy on the profitability of wheat production in the Western Cape was evaluated. This model took into consideration the yield potential for wheat, the gross and net margin of wheat production, spatial dispersion, transport costs and also made provision for different intermediate markets. It was found that each of the components of the strategy would substantially contribute to a more profitable wheat industry for the Western Cape. The combined effect of the strategy would result in a 97 percent decrease in the area where wheat production is unprofitable. Profitable production of wheat would be possible on 99,3 percent of the total area that is suitable for rainfed wheat production. The production of wheat would be highly profitable at a margin of more than R200 per ton on more than 1,1 million hectares (77,1% of the total area).

It is concluded that, while taking the global, social, policy, natural and consumer environment into account and without relying on government, a strategy could be developed that will rectify the structural problems of the Western Cape wheat industry.

OPSOMMING

Die doel van hierdie proefskrif was om die strukturele wanbalanse van die koringbedryf in die Wes-Kaap Provinsie te ondersoek en, om met erkenning aan 'n veranderde omgewing, 'n effektiewe strategie vir die bedryf te ontwikkel.

Dit is bevind dat die oorsprong van die strukturele wanbalanse uit die interaksie tussen beleid-, tegnologiese- en vraagfaktore spruit en dat die wanbalanse nie uniek is tot die bedryf nie. 'n Verklaring vir die onstabiliteit van- en afwaartse druk op koringpryse, sowel as die trae aanpassings van die bedryf by omgewingsveranderings, word deur die plaasprobleem gebied. Soortgelyke probleme het globaal tot 'n verskeidenheid van beleidmaatreëls aanleiding gegee. Wat wel uniek is tot die Suid-Afrikaanse landbou, maar nie tot die plaaslike koringbedryf nie, is die omstandighede wat tot die huidige dualistiese struktuur van die landbou sektor aanleiding gegee het. Die oorsprong van die omstandighede kan teruggespoor word tot die Hollandse besetting van die Kaap in 1652 en die gepaardgaande maatreëls wat ook onder Britse bewind in stand gehou is. Na die kommersialisering van die plaaslike landbou sektor, wat op die ontdekking van diamante in Suid-Afrika gevolg het, is bepaalde maatreëls aan die einde van die 19de eeu deur drukgroepe beding ten einde blanke boere te beskerm. Hierdie maatreëls is in die 20ste eeu uitgebrei en het die unieke dualiteit op etniese gronde van die Suid-Afrikaanse landbou sektor tot gevolg gehad.

Met aanvaarding daarvan dat die strukturele wanbalanse van die koringbedryf die resultaat is van politieke, beleid, tegnologiese en vraag faktore, kan dit gevra word of die sektor, en meer spesifiek die koringbedryf, nog 'n rol te speel het. Dit is gevind dat landbou 'n natuurlike katalisator vir ontwikkeling kan wees deur die verskaffing van voedsel, buitelandse valuta, mannekrag, kapitaal vorming en 'n mark vir industriële goedere. Ten spyte van die bestaande potensiaal kon landbou nog nie hierdie rol in Suidelike Afrika vervul nie, hoofsaaklik as gevolg van inkonsekwente binnelandse beleid, onvriendelike handelsomgewings, nie-geskikte tegnologie en ontwikkelings-bestuur probleme. Die potensiële rol van landbou in die Wes-Kaap Provinsie is gekwantifiseer.

Dit is belangrik om tydens die ontwikkeling van 'n strategie vir 'n bedryf ook die toekomstige ekonomiese en sosiale omgewing in aanmerking te neem. Dit is bevestig dat in die volgende fase van ekonomiese ontwikkeling, dié van 'n inligtings gemeenskap, landbou steeds die voorgenoemde funksies sal vervul. 'n Nuwe en meer esoteriese funksie, gefokus op identiteit, kan egter in 'n inligtingsgemeenskap tot die lys toegevoeg word.

Gegewe hierdie belangrike rol van landbou kan intuïtief verwag word dat die owerheid bereid sal wees om 'n belangrike bydrae te maak tot die verligting van die strukturele probleme van die Wes-Kaapse koringbedryf. Teenstrydig met hierdie intuïtiewe verwagting is egter bevind dat owerheids betrokkenheid hoofsaaklik beperk sal wees tot die skepping van 'n gunstige en bemagtigende omgewing. Ten einde hierdie gevolgtrekking te bereik is welfaart ekonomie, publieke keuse en politici – kieser interaksie teorie bestudeer. Volgens tradisionele denke kan drukgroep aktiwiteite 'n belangrike rol speel in die soeke na 'n Pareto-optimale staat, of ten minste in die soeke na 'n tweede-beste oplossing. Weens probleme in die transformasie van individuele voorkeure na politieke voorkeur funksies, soos beskryf deur die onmoontlikheidsteorie van Arrow, word hierdie aktiwiteite as belangrik geag. Veelvuldige voorbeelde dui egter daarop dat drukgroep aktiwiteite slegs 'n marginale rol kan speel in die beïnvloeding van finale uitkomste. Dit blyk dat onderliggende eienskappe van die nasionale en provinsiale ekonomië meer bepalende faktore kan wees. Hierdie vermoede is bevestig namate die politieke persepsie van die landbou voor en na die 1994 politieke transformasie geanaliseer is.

Uit die voorafgaande is dit duidelik dat 'n strategie vir die koringbedryf van die Wes-Kaap die internasionale, sosiale, politieke, natuurlike en verbruikers omgewing in aanmerking sal moet neem. Dit is ook duidelik dat beide die strategie en die bedryf self onderhoudend sal moet wees. Dit word aangevoer dat 'n oplossing gevind kan word indien die helling (elastisiteit) van die vraag en aanbod funksies van landbouprodukte aangepas kan word. Met behulp van 'n ruimtelike model wat ontwikkel is, is die impak van die verskillende elemente van die strategie op die winsgewendheid van koringproduksie in die Wes-Kaap geëvalueer. Hierdie model het onder meer die opbrengs potensiaal van koring, die bruto en netto marge van koringproduksie, ruimtelike verspreiding, vervoerkoste en verskillende intermediêre markte in aanmerking geneem. Dit is bevind dat elk van die elemente van die strategie beduidend tot winsgewende koringproduksie in die Wes-Kaap kan bydra. Die strategie kan daartoe lei dat die oppervlakte met nie-winsgewende koringproduksie met 97 persent sal afneem. Koring kan winsgewend verbou word op 99,3 persent van die area geskik vir droëland produksie. Terselfdertyd sal koring, teen 'n marge van R200 per ton, hoogs winsgewend verbou kan word op nagenoeg 1,1 miljoen hektaar (77,1 persent van die totale area).

Ten slotte blyk dit dat, met inagneming van die internasionale, sosiale, politieke, natuurlike en verbruikers omgewing, en sonder dat op owerheids ondersteuning staatgemaak word, 'n strategie ontwikkel kon word wat die strukturele wanbalanse van die Wes-Kaapse koringbedryf kan oplos.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

CHAPTER 2

THE POLICY ENVIRONMENT IN THE CONTEXT OF THE FARM PROBLEM

CHAPTER 4

THE SOUTH AFRICAN POLICY ENVIRONMENT

CHAPTER 6

ANALYTICAL EVALUATION OF THE FRAMEWORK OF SOLUTIONS

CHAPTER 7

CONCLUSIONS

REFERENCES

ATTACHMENTS

LIST OF TABLES

	TITLE	**PAGE**

TITLE **PAGE**

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1. INTRODUCTION

Agriculture constitutes one of the most important segments of the primary sector in the Western Cape, producing a wide range of products from a good resource base supported by a well-established physical and institutional infrastructure and producing strong forward and backward linkages. The sector supports about 11 000 farmers (of whom approximately 1 500 are from previously disadvantaged communities) and 220 000 farm workers with an estimated 1,5 million dependants (CSS, 1993b). It also plays a major role in the economy of the Western Cape, producing an annual output of close to R9 billion and employing approximately 13 percent of workers in the formal and informal sectors. The real income of agriculture in the Western Cape grew at an average real rate of around five percent per annum compared to less than two percent nationally for the period 1980 to 1990. For employment the respective growth rates are about three percent for the Province against less than 1,5 percent for the country as a whole. The importance of agriculture for the economy of the Western Cape and South Africa as a whole can furthermore be stressed by the fact that although one of nine provinces, the Western Cape's agriculture sector is responsible for 22 percent of the total value of agricultural production in the country. As far as exports are concerned it can be mentioned that between 55 and 60 percent of all agricultural exports are produced in the Western Cape Province (DASMI, 1998).

Another issue that needs to be raised is the fact that the Western Cape is, relative to the rest of South Africa, poor in terms of natural and mineral resources. However, the Province is rich in terms of certain non-exhaustive and regenerative natural resources, related principally to the natural beauty of the area. Agriculture, together with the mountains, the sea and the amenities of the Cape Metropole forms the cornerstone of the tourism sector in the Western Cape Province. Without the basis of a vibrant and effective agricultural sector the tourism industry would not be the growth sector it currently is. Due to a lack of other natural resources, agriculture is also responsible for a significant portion of the raw materials for the

manufacturing sector of the Province, and, as was indicated, this source of raw materials is non-exhaustive. It would therefore be a strategic mistake to exclude agriculture from a growth strategy based on the tourism and manufacturing sectors. This fact has been recognised by Wesgro (the Economic Development Agency of the Western Cape Province), which includes agriculture as a priority sector for integrated cluster support[1] (Wesgro, 1998).

According to theory, growth in the agricultural sector will have a strong impact on the development of the rest of the economy. But what is the current situation with respect to the wheat industry in the Western Cape?

From the data in Table 1. 1 a number of deductions can be made on the role of the Western Cape wheat industry within national context. First, although South Africa is a net importer of wheat in six out of ten years, the Western Cape Province is a surplus producer of wheat. It is also clear that in the Western Cape, on average, less than 40 percent of the locally produced wheat is consumed within the Province. Third, the Western Cape is one of the most stable wheat production regions in South Africa.

The South African wheat industry is now, for the first time since the early 1930's, confronted with a totally deregulated marketing environment. According to the FAO (1999) global wheat production steadily increased from the 528 million ton in 1994 to a record harvest of 612 million ton in 1997 (almost twice the standard deviation from the long-term average). This resulted in the international price of wheat, as reflected by the FOB Trigo Pan price, declining from a record US$218 per ton in 1994/95 to a low of US$139 in 1996/97. This record harvest coincided with South Africa's first year of free marketing in the wheat industry and therefore resulted in downward pressures on local wheat prices. This resulted in a steady decline of wheat production in the Western Cape from 806 thousand ton in the 1995/96 season to 535 thousand ton in 1998/99 (Table 1. 1). For the 1999/00 season wheat plantings in the Western Cape are down to 280 thousand hectares from the 400 thousand in 1997 (SAGIS, 1999). From this trend it is clear that, although the local wheat industry currently still plays an important role in the provincial and national economy, the local production of

---

[1] *Integrated cluster support is a term used to describe an approach in which the whole value chain of a sector or industry, ranging from infrastructure requirements to final output, is appraised in conjunction with the linkages to other sectors and/or industries.*

wheat is declining. But what is the reasons for this decline and is there something to be learnt for the agricultural sector as a whole from the experience of the wheat industry?

Table 1. 1:   The relationship between the production and consumption of wheat in South Africa

Year	South-Africa			Western Cape				Rest of RSA			
	Prod 1000t 1	Cons 1000t 2	Surp 1000t 3	Prod 1000t 4	Cons 1000t 5	Surp 1000t 6	6/5 % 7	Prod 1000t 8	Cons 1000t 9	Surp 1000t 10	10/9 % 11
85/86	1 586	2 207	-621	706	313	393	125%	880	1 894	-1 014	-54%
86/87	2 249	2 143	106	664	306	358	117%	1 585	1 837	-252	-14%
87/88	3 037	2 386	651	821	313	508	162%	2 216	2 073	143	7%
88/89	3 490	2 351	1 139	692	324	368	114%	2 798	2 027	771	38%
89/90	1 962	2 304	-342	597	333	265	80%	1 365	1 971	-607	-31%
90/91	1 666	2 174	-508	456	325	130	40%	1 210	1 849	-638	-35%
91/92	2 085	2 143	-58	457	332	125	38%	1 628	1 811	-183	-10%
92/93	1 270	2 132	-862	582	345	237	69%	688	1 787	-1 099	-62%
93/94	1 913	2 259	-346	698	368	330	90%	1 215	1 891	-676	-36%
94/95	1 773	2 353	-580	696	358	338	95%	1 077	1 995	-918	-46%
95/96	1 899	2 496	-539	806	362	414	114%	1 123	2 076	-953	-46%
96/97	2 650	2 582	68	664	360	304	84%	1 986	2 222	-236	-11%
97/98	2 283	2 759	-476	550	360	190	53%	1 733	2 399	-666	-28%
98/99	2 202	2 659	-457	535	360	175	49%	1 667	2 299	-632	-27%
Ave	2 148	2 356	-208	637	340	298	88%	1 510	2 016	-505	-25%

Source: Sagis (1999)

DASMI (1998)

1.2. THE PROBLEM AND ITS SETTINGS

The wheat industry is important in especially the rural economy (according to DASMI (1994) and is responsible for 5,24 percent of farm income in the RSA, 9,09 percent in the Western Cape and as high as 75,15 percent in rural districts such as Hopefield) and with strong forward and backward linkages (see Eckert et al, 1997b). The wheat industry has not

succeeded in escaping the influence of global trends. A number of recent studies have emphasised some of the symptoms of the underlying problem. Street *et al* (1996) focussed on the relative price competitiveness of the local industry and *inter alia* found a net margin of R676,50 (Canada) and R603,18 (Australia) per ton amongst the local industry's main competitors compared to the local net margin of as low as R52,28 (Albertinia) and R65,56 (Porterville) per ton. Edwards and Leibbrandt (1998) moved the focus to the quality of the wheat being produced in the Western Cape and found low levels of baking quality, protein content and high levels of variability in the quality characteristics of locally produced wheat. Troskie *et al* (1998) introduced the resource base and spatial dimensions of the problem and moved the emphasis to geographically related symptoms. The additional pressure that is being brought on agriculture to rectify the imbalances imbedded in the duality[1] of South African agriculture (see Fényes *et al*, 1990) compounded these symptoms. In addition the policy changes away from food self sufficiency[2] towards food security and trade liberalisation, brought about by the new government after the political transition, exposed domestic agriculture to the full brunt of international competition.

It is clear that the wheat industry in the Western Cape Province is an important part of the rural, provincial and national economy. It is, however, also clear that the industry is suffering from serious problems with international competitiveness, quality characteristics and the ability to adapt to a new policy environment. It follows that the problem to be researched can be stated as follows:

"Within the framework of structural imbalances, the interaction between agriculture and the rest of the economy and the probability and nature of government intervention in the provincial agricultural sector, what is an effective strategy that will lead to a meaningful role for agriculture in the traditional wheat farming areas of the Western Cape Province?"

---

[1] *The South African agricultural sector consists out of two sections. The one highly developed with clear first-world characteristics. The other subsistence with characteristics comparable to those found in developing countries. It can be postulated that this duality is a crucial part of the problem and will thus be explored in much more detail in Sections 4.2 and 4.3.*

[2] *The policy objective of food self sufficiency and accompanying policy instruments such as price support and import restrictions effectively concealed the competitiveness or not of farm practices and agricultural industries in South Africa.*

From this problem the following sub-problems can be identified:

(a) What is the origin, nature, extent of and prospects for the structural imbalances in the Western Cape wheat industry?

(b) What is the origin, nature, extent of and prospects for the interaction between agriculture and the rest of the economy of the Western Cape Province?

(c) What is the probability, nature and extent of desired government intervention in alleviating the problems of the Western Cape wheat industry?

(d) What is the nature of a strategy that will ensure a relevant role for agriculture in the traditional wheat farming areas of the Western Cape Province?

1.3. PRELIMINARY SURVEY OF THE LITERATURE

It is often implicitly assumed that economic development follows a linear path from nomadic societies to agrarian societies, then industrial societies and finally post-industrial societies. It follows that during this linear route of development certain structural changes will take place and, more importantly, the role of agriculture *vis a vis* the rest of the economy will change. The roots of the investigation of the relationship between agriculture and the rest of the economy can be traced back to the seminal work of Adam Smith in 1776. The Great Depression of the first half of the 20th Century led to research that highlighted this changing relationship and especially the inability of the agricultural sector to react on changes in the output market.   Galbraith and Black (1938), later followed by Schultz (1945) who investigated the so-called "secular decline of agriculture", attempted to found a theoretical basis for this phenomenon. However, it was not until Johnson (1950) focussed on asset fixity and Cochrane (1958) developed the treadmill theory that a coherent theoretical base was developed. In various publications Johnston and Mellor annotated this base to which a whole body of authors (for instance Rausser, Anderson, Lipsey, Tweeten, Hagedorn) subsequently contributed. Bonnen and Schweikhardt (1998) provide a contemporary perspective.

Turning closer to home, a historical perspective on the structural development of the wheat industry in the Western Cape Province is provided by Leppan (1931), Du Plessis (1933), Louw (1948), Schreuder (1948) and Sim (1952). An important theme common to these works is the implicit and explicit government policies favouring the wheat industry. Townsend (1997) concisely describes the secular decline of South African agriculture. However, more important is the rise of duality in South African agriculture as explained by Bundy (1979),

Vink and Van Zyl (1998) and Terreblanche (1998). The implications of this duality will probably be an important determinant in the political economy of agricultural support in South Africa.

There are a number of theoretic approaches that can be taken in the evaluation of these implications. These theories are all based on analytical approaches to the problems of the agricultural sector during periods of transition. The first of these, the welfare maximisation approach, assumes that government is an active but philanthropic entity that tries to maximise the welfare of its constituency. The roots can be found in the 18th Century work of Bentham and the subsequent utilitarians (for instance Mill and Walras). At the turn of the 20th Century the neo-classical school, through Pigou, developed the theory of utility into the welfare approach. From this Pareto developed his concept of optimality and Hicks and Kaldor introduced the compensation principle. Schitovsky identified a potential paradox in the compensation principle. One of the main problems in this approach is the translation of real life, individual preferences into social welfare functions. The impossibility theorem, developed by Arrow, states that this is impossible through normal democratic processes.

The second approach, the pressure group approach, assumes that government is a reactive and passive entity that fulfils the role of a clearinghouse. All-important are the relative powers of different lobbying groups. The roots of this approach can be found in the work of Bently at the turn of the century, Schumpeter after the Second World War and Olson since the early sixties and relies heavily on the factors affecting group efficiency. Proponents of this approach use the latter, and the concept of logrolling, in explaining why agriculture in developed countries receives such relatively high levels of government support. However, a number of inconsistencies in this approach have recently being identified by *inter alia* De Gorter and Swinnen (1994), Krueger *et al* (1988), Gorn *et al* (1993) and Bullock (1992). In the South African literature both these approaches have received adequate attention (see for instance Spies, 1981; Van Rooyen *et al*, 1987 and Vink and Kassier, 1991).

The third and most recent approach, the politician – voter interaction approach, has not yet received any attention in South Africa. At the base of this approach is the assumption that both politicians and voters are rent-seeking entrepreneurs. The former in the form of political support (votes, popularity ratings) and the latter in the form of favourable policy interventions (see Swinnen (1994) and Swinnen and De Gorter (1993) for a detailed explanation of the

approach.) Suffice to say that the relative movement of *per capita* income, the ratio of land owners *viz a viz* labour owners and agriculture's share of consumer expenditure are some of the important determinants of government support. Although initially conceived at Cornell University, the most important subsequent work on this approach took place at K U Leuven, Belgium. Especially important for South Africa is the work done on the transitional economies of Central and Eastern European Countries (see for instance Hartell & Swinnen, 1998). As data is available through official sources, application of this approach to South Africa's nine provinces is possible. The results may not only hold significant implications for the nature and extent of policy instruments, but may also lead to new approach during trade negotiations.

Turning to the development of a strategy for the wheat industry of the Western Cape Province it is important to take note of the possible nature of prospective 21st Century economies. Schienstock *et al* (1999) provides a good overview of the different theoretical approaches upon which numerous schools of thought are based. Castells (1996; 1997; 1998) analyses the relevant landslides of importance. One of these is the change in technological artefacts as explained by Spies (1998). As agricultural products are predominantly consumed by human beings, with a firm but limited need for farm products, changes in demography will also be an important landslide. Various United Nations and World Bank publications provide valuable information on population growth, migration and urbanisation. Finally, Castells (1997) identifies the search for identity as another important landslide. It is argued by Dalecki and Coughenour (1992) that agrarian fundamentalism can fill this vacuum. Although Ofutt *et al* (1998) have a different opinion, Drury and Tweeten (1997) maintains that agrarian fundamentalism is relevant in modern society. Indeed, Bessière (1998) argues that culinary heritage, as part of agrarian fundamentalism, is a partial substitute for lost identity.

The development of a strategy for the wheat industry must be holistic by nature and be self-reliant. It will therefore have to take into account structural imbalances and future trends, the role of agriculture in economic development and the nature and extent of government intervention.

1.4. DELIMITATION OF CHAPTERS

From the brief survey of the literature in this chapter it is clear that the structural imbalances of the Western Cape wheat industry can be illuminated by theory. Moreover, it is also clear that questions should be raised concerning the international competitiveness of the industry. The focus in Chapter 2 will be placed on international experience regarding the reasons that lead to different farm policy programmes. With this objective in mind the farm problem and the secular decline of agriculture will be investigated in the first part of the chapter. In the same chapter the reasons for the levels of government support or taxation of agriculture as part of farm policy in different parts of the world will be scrutinised. In so doing the theoretical base for the evaluation of the problems regarding the uniqueness of the structural imbalances of the wheat industry and the expected levels of government support for the industry will be developed.

In the next chapter the role of agriculture *vis a vis* the rest of the economy will be investigated. In the first part of this chapter the focus will be placed on the traditional role of agriculture in economies developing from agrarian to industrial societies. However, is the industrial society a final goal of economic development to be achieved or is the apex of economic development an undeterminably moving target? This is the question to be answered in the second part of this chapter. Flowing from this answer the role of agriculture in such an economy will also be examined. As a result of the logic developed in this chapter the theoretical base for the problems focussing on the role of agriculture *vis a vis* the rest of the economy will unfold.

The focus of Chapter 4 will move from the global to the local scene. In investigating the current structure of wheat farming in the Western Cape it is necessary to take a historical perspective on the development of the local structure and, more specifically, to investigate the economic, political and social determinants that led to the current characteristics of the local wheat industry. Flowing from the insights thus collected, the local conditions regarding the interaction between government and the agricultural sector, as well as between the agricultural sector and the rest of the economy can be explored. This will be done with the theoretical groundwork of the previous two chapters in mind. The result will be that a local perspective on the first three problems can be cultivated.

In Chapter 5 the focus will shift to the development of the strategy envisaged in the final problem. However, this strategy cannot be developed in isolation, but should flow logically from the insights gained in the previous chapters.

The objective in Chapter 6 is to provide a quantitative evaluation of the strategy proposed in Chapter 5. As an often implicit and unstated modelling assumption can be found in the neglect of spatial differentiation, a spatial model will be developed for the quantitative evaluation of the strategy. In the second part of Chapter 6 a number of scenarios, based on the knowledge gained up to this point will be developed. Finally the results will be presented and evaluated.

The final Chapter will be devoted to a summary, followed by an evaluation of the problems and recommendations for further research.

CHAPTER 2

THE POLICY ENVIRONMENT IN THE CONTEXT OF THE FARM PROBLEM

2.1. INTRODUCTION

Knowledge of the strategic, tactical and operational environment is required for effective problem solving. It is true that a problem is seldom solved at the same level as where it originated. Effective problem solving is usually associated with moving to a different level[1] in order to understand the basic nature of the underlying factors (Spies, 1998c: 1-14 to 1-17). Thus, a sound understanding of the competitiveness of the Western Cape wheat industry requires a conceptual understanding of the wider policy environment within which it operates. The objective of this chapter is to evaluate the wider policy environment and to distil pointers for the wheat industry in the province.

Intervention in agriculture has been motivated on the basis of the perceived uniqueness of the sector, as encompassed by the theory of the farm problem and the resulting doctrine underlying intervention in the sector (farm policy). The farm problem, however, is usually a symptom that accompanies agricultural development and the nature of the problem differs at different levels of development. In order to understand the farm problem it is, therefore, necessary to understand the difference between developed and developing agricultural sectors. With this point of departure the farm problem can be investigated. With an understanding of the farm problem it will be possible to put the pressure on the wheat industry in the Western Cape into perspective.

The farm problem does not explain the reasons why the agricultural sector in certain countries, or then certain industries in the agricultural sector, receive relatively high levels of support. It is, therefore, necessary to explore the relevant political economy theories as these may play an important role in providing a theoretical foundation for the development of future strategies for the Western Cape wheat industry. For instance, if the local wheat industry were

---

[1] *Operational problems can be solved more effectively at a tactical level. Tactical problems, in turn, will be more effectively solved at a strategic level.*

to receive high levels of support somewhere in the near future, a different strategy would have to be developed by the various role players (the state, pressure groups) compared to the case of limited or negative support.

From these perspectives it will be possible to develop a better understanding of the place of agriculture in a transitional economy, and especially the role that agriculture may play in contributing to the development process. This aspect will be addressed in Chapter 3. With this in mind it is possible to identify the characteristics of a transitional agricultural sector, and more importantly, the expected characteristics of a future agricultural sector. The conceptual basis developed in Chapters 2 and 3 will allow a more focussed discussion and analysis of policy development in the South African agricultural sector in Chapter 4, and hence of policy options for the Western Cape wheat industry in the subsequent chapters.

2.2. AGRICULTURE IN TRANSITION

Since the Great Depression, when the "farm problem" was first identified, the face of global agriculture has changed considerably. Mechanisation, specialisation, the Green Revolution, steps in the direction of the freeing of international trade in agricultural products, the information revolution and bio-technology are all factors that have given rise to a sector with quite different characteristics than those that ruled in the earlier part of the 20th Century. However, a dichotomy between agriculture in developed and developing nations still exists. The characteristics of this dichotomy are described in Table 2. 1. These characteristics can be explained by drawing on the work of Bonnen and Scweikhardt (1998), Johnston and Mellor (1961), Mellor and Johnston (1984) and Mellor (1986).

As can be expected, the percentage of the population classified as rural in developing countries is relatively high. With the lack of an industrial base, it is also obvious that a significant part of the economically active population of developing countries will be involved in agricultural and related activities. Therefore, it follows, as indicated in Table 2. 1, that agriculture will form a major part of the economy of a developing country.

It is unfortunate that large quantities of the resources allocated to agriculture in developing economies are being used at relatively low levels of productivity. The significance of agriculture's dominance of the economy is that it also forms the largest part of the tax base

and is the major domestic source of capital for the development of the rest of the economy. These demands, of course, put a significant burden on agriculture. Due to the scarcity of capital, and therefore the relatively high opportunity cost thereof, the capital to land ratio and the capital to total labour force ratio is usually low.

Table 2. 1: Some characteristics of agrarian sectors in developing and developed economies.

Agrarian or Farm sector Economic Characteristics	Low Income "Developing" Economies	High Income "Developed" Economies
% of Population Rural	80 – 90 %	2 – 25%
% of Labour force in Farming	30 – 90 % (av. 69%)	1 – 13%
% Farm Sector Income is of GDP	20 – 50 % (av. 38%)	1 – 8%
% of Farm Inputs Purchased	0 – 20%	50 – 85%
Labour and Total Productivity of Farm Sector	Low	High
Capital/Total Land in Farms Ratio	Low	High ($1 020/Ac, US, '94)
Capital/Total Labour Force on Farms Ratio	Low	High ($333 177/person, '94)
Number of Farms	Many	Declines by ⅔ or more; only 20 – 30% commercial
Size of Farms	Very Small	Av. Size increase 10x or more
Income Elasticity of Demand[*]	0,8 – 0,9	0,1 – 0,2
Price Elasticity of Demand[*] (SR)	-0,4	-0,3
Price Elasticity of Demand[*] (LR)	-1,0	-1,0
Price Elasticity of Supply[*] (SR)	0,1 – 0,2	0,1
Price Elasticity of Supply[*] (LR)	0,4 – 1,2	0,8 – 1,0

Source: Adapted from Bonnen & Schweikhardt (1998: 4)

*   In this context there is specifically referred to the aggregate demand and supply of farm products.

The low levels of productivity, coupled with the high cost of capital, the usual incentive of land allocation to loyal subjects by chieftains and the relatively labour intensive production techniques used, lead to a situation where a family can only use a small unit of land effectively. It is therefore typical to find a large number of farms, each very small, in developing economies. Resource constraints usually lead to the fact that producers react more quickly over the short run to changes in the prices of products, but lack the resources to

capitalise on long term trends. The implications of resource constraints on farmers' reaction to changes in commodity prices will be briefly discussed later in this section. A more detailed discussion, with implications on the Western Cape wheat industry, will follow in Chapter 5.

In developed economies the reverse situation is often found. The agricultural sector is only a small part of the economy, as is indicated by the percentage of the population that can be classified as rural, the percentage of the population involved in farming, and agricultural income as a percentage of the gross domestic product (GDP). It therefore follows that the dominant tax base and capital formation institution is situated outside agriculture. The importance of these factors for agricultural support will be discussed in Section 2.3.4. Although usually a declining sector, the strong linkages of agriculture, as indicated by the high percentage of farming inputs purchased, indicates the sector's importance in the domestic, and especially the rural, economy. Due to the high opportunity cost of labour one would expect to find higher labour and total factor productivity in agriculture. The high opportunity cost of labour combined with more readily available capital also leads to more capital-intensive production techniques. The relatively higher capital to farmland and capital to agricultural labour[1] ratios illustrate this. These capital intensive production techniques are usually accompanied by considerable economies of scale[2] that lead to larger farming units and, therefore, a decline in the number of farms. This observation is supported by Drury and Tweeten (1997: 69) who found that the number of non-commercial (family) farms in the USA are declining by two percent per year. In contrast, the number of commercial farms has remained more or less constant and accounts for 20 percent of the total number of farms. It is, however, also true that not all farms are commercial enterprises, but that a significant percentage are used as so-called life-style farms.

---

[1] *It must be remembered that the traditional concept of a "family farm", where the majority of labour is supplied by the owner and his family, is not strictly applicable to the South African conditions. The local situation, with a number of wage earning labourers, show in this context closer ties to the notion of an "estate". The implications of this distinction will be developed in subsequent Chapters.*

[2] *Traditionally economies of scale in the agricultural sector were dependent on the ability of farmers to acquire, and negotiate volume discounts associated with expensive, lumpy and sometimes indivisible inputs into the production process such as machinery, management and capital. These were offset by the fact that agricultural production, by nature, usually requires large tracts of land which makes effective supervision difficult. Technological developments and the development of rental markets for physical and managerial inputs are changing the face of agricultural economies of scale. These arguments, and its implications for a post-industrialised agricultural sector, will be embroidered on in Chapter 3.*

Turning to the demand and supply part of the argument of Bonnen and Schweikhardt (1998) it is maintained that the aggregate income elasticity of demand for agricultural products in developing countries, although less than one, is relatively high. Any increase in the income of the general population, by whatever means, would therefore lead to a significant increase in the quantity of agricultural products demanded. The general population is quite price sensitive leading to a relative price elastic demand for individual products if a suitable substitute do exist. However, as very little suitable substitutes are available for food at the aggregate level, the aggregate demand of food in developing regions will be relatively price inelastic over the short run, albeit more elastic than is the case in the developed regions of the world. This again is due to the relatively low levels of household disposable income.

Consumers in a developed economy tend to spend a decreasing proportion of any additional income on agricultural goods, thus agriculture is faced with a relatively low aggregate income elasticity of demand. This line of reasoning is consistent with Engel's Law[1]. Due to higher household disposable income, these consumers also tend to be less price sensitive over the short run. It follows that the consumer demand in developed regions will be less price elastic than is the case in developing regions. However, their price elasticity of demand for agricultural products over the long run will strive towards unitary elasticity provided that suitable alternatives for individual farm products exist.

The argument in the previous two paragraphs is also consistent with the homogeneity condition. The homogeneity condition states that the sum of the own and cross-price elasticities and the income elasticity for a particular commodity is, taking account of the signs, zero. According to Tomek and Robinson (1987: 53) this condition can be written as:

$$E_{ii} + E_{i1} + E_{i2} + ... + E_{iy} = 0$$

Equation 2. 1

Where: E_{ii} = own price elasticity;

E_{i1} = cross price elasticity for product 1;

---

[1] *According to Ritson (1982: 51) Engel stated in 1857 that" the poorer a family is, the greater proportion of total expenditures which it must use to procure food". Similarly, Engel asserted "that the wealthier a people, the smaller proportion of food to total expenditure". The "law" has been used to describe a number of related features of relationships between income and food consumption.*

$$E_{i2} = \text{cross price elasticity for product 2};$$

.

.

.

$$E_{iy} = \text{income elasticity of demand}.$$

It follows from this equation that, depending on the number and nature of substitutes (and thus the magnitude of cross price elasticities), the absolute price elasticity of demand for an agricultural product will tend to be greater than the income elasticity of demand for the same product (Tomek & Robinson, 1987: 52 – 59). Turning to the aggregate level of demand for food it follows that in developing regions, with a high income elasticity of demand for food (Engel's Law) and very few suitable substitutes for food, the price elasticity of demand for food will be higher than is the case in developed regions. Especially as the income elasticity of demand for food in developed regions is lower than in developing regions (Engel's Law) and more suitable alternatives for food exist in developed regions. This is true for both between individual food commodities and between food and alternative uses for consumer income.

According to Liebenberg and Groenewald (1997: 10 – 12) five factors influence the price elasticity of supply most. These are:

(a) The length of period over which the changes are measured. Short term measurements are usually over one production cycle, while longer term measurements usually include three to five production cycles. It is obvious that within one production period factors such as climatic changes will have a larger impact on the quantity being produced than the price of the product, especially if farmers have access to sufficient resources to "weather" a "bad" year.

(b) The availability and suitability of other uses for the natural resources. It follows that where more alternatives for land use are available, farmers would change their production patterns and practices more readily.

(c) Closely related to the latter is the degree of specialisation. Under conditions of high specialisation it will be costly to change from the production of one product to another. Hence the problem of asset fixity and the associated transaction cost literature that will be discussed in Section 2.3.3.

(d) The objective of the farming activity. Usually a product that is produced for subsistence reasons, or as a sideline, will be less price elastic than one produced as a commercial activity.

(e) The relationship between the prices of agricultural products and those of agricultural inputs. Adam Smith identified the main factors of production (land, labour and capital) as early as 1776. The fact that land and labour[1] are residual claimants leads to a price inelastic supply of agricultural produce and has been identified as one of the underlying causes of the farm problem, as will be shown in Section 2.3.

It follows from these factors that over the short run the price elasticity of supply[2] would be relatively more elastic for farmers in developing economies than for those in developed economies. The reason being that farmers in developed economies usually have access to resources in order to manage the perceived short run fluctuation in prices. Compounding the situation is the fact that the latter often will increase production (although the margin per unit will be smaller, a larger volume will lead to an acceptable residual to labour).

However, over the longer term the situation is reversed. A wide variation in the price elasticity of supply is reported in the literature. In Australia it varies from 1,2 to 1,55 for wheat (Kingwell, 1994: 40) and in the United States from 0,32; 0,92 and 0,14 for respectively wheat, maize and soybeans (Haniotis *et al*, 1988: 49). Garcia and Randall (1994: 223) report long run price elasticities of supply of 0,62 for U.S. wheat, 0,91 for French wheat and 1,04 for UK wheat. Polson and Shumway (1992: 132 – 134), on a more geographically dispersed basis in the United States, reports long run price elasticity of supply that varies between 5,1 (Arkansas), 7,7 (Mississippi), 0,18 (Oklahoma) and 1,9 (Texas). In developing economies a long run price elasticity of supply of 0,78 is reported for wheat in the Punjab (McGuirk & Mundlak, 1992: 140) and 1,91 for soft wheat, 0,83 for hard wheat and 0,78 for barley in Morocco (Azzam & Britel, 1992: 66).

---

[1] *The deviation of the South African farm labour situation from the normal theoretical context must again be pointed out. In South Africa the majority of labour is supplied by wage earners, while only the farm owner receive the residual from the farming activities, often seen as an entrepreneurial remuneration.*

[2] *Remember that in developing economies a large portion, but difficult to quantify, of the produce never reaches the market place, but are consumed at a subsistance level. This portion is usually, due to practicle reasons, excluded from the calculation of elasticities, and also "immune" to price fluctuations. It is often the balance, not needed for own consumption, that reaches the market place.*

Closer to home the long run price elasticity of supply for wheat varies from 0,4 in the Ruêns to 3,82 in Natal and for sugar it is as high as 9,4. The only local studies on developing communities reports a long run price elasticity of supply of 1,41 for maize in the Middledrift area and –0,5[1] for wool in Lesotho (Liebenberg & Groenewald: 1997: 30).

It is evident that even within a country such as the USA a wide spectrum of reactions on price changes is found among farmers. Nevertheless, Bonnen and Schweikhardt (1998: 4) and hence the data in Table 2. 1 refer to aggregate demand and supply in agriculture, and not to the demand and supply of individual products. Their data, therefore, do not reflect the relationship between industries within the agricultural sector, but the relationship of the agricultural sector towards other sectors of the economy. In other words, not the possibility of reallocating resources within the agricultural sector, but from agriculture to other sectors of the economy. It can therefore be expected that, in the case of developing economies, the price elasticity of aggregate supply would be relatively inelastic in some countries where the movement of resources from and towards agriculture is constrained. In other developing economies, where the policy environment is of such a nature that new technologies and infrastructure enable the movement of resources and where productivity[2] is increasing, it can be expected that the long run price elasticity of aggregate supply would be relatively elastic. It can be assumed that in developed economies the availability and the freedom of movement of resources over the longer term would be more closely related to the relative earnings of entrepreneurs. The price elasticity of aggregate supply would therefore gravitate towards unity. This line of argumentation will be pursued further in Section 2.3 and in Chapter 3.

In their important work Johnston and Mellor (1961) indicate two models of economic transformation from a developing to a developed economy. The first of these deals with the secular decline of the agricultural sector and has also been called the general transformation model. According to this model the factors generally recognised as responsible for the structural transformation of an economy are:

---

[1] *Under normal conditions a negative sloping supply curve would be highly unlikely. According to Phororo (1996: 26 – 27) it is in this case due to the traditional investment and status value of sheep in Lesotho which implies that farmers would only sell their sheep at a relatively high price and that the number of sheep would therefore decline only during high value cycles. Liebenberg and Groenewald (1997: 31) are of the opinion that the discrepancy is due to the failure of eliminating seasonality and cross relationships with meat.*

[2] *As new technologies are accepted by farmers it can be expected that higher prices for agricultural commodities would lead to a larger than proportional change in the volume supplied, partly due to the "backlog" of productivity.*

(a) An income elasticity of demand for food that is less than one and declining, and

(b) The possibility of a substantial expansion of agricultural production with a constant or declining farm labour force.

A third factor, and one that, according to Johnston and Mellor (1961: 567), does not receive enough attention, is:

(c) The drastic reduction in costs in the manufacturing sector, power generation and transport due to modern technology.

It can be argued that a certain amount of cause and effect exists between these three factors. The technological advances and cost reductions in (c) may lead to higher levels of productivity in agriculture and therefore the expansion of agriculture and labour productivity of (b). These productivity and technological changes will not only result in a movement of the supply function of agricultural products to the right (see Section 2.3.2), but also to changes in the expenditure and consumption patterns of consumers. Cost reduction leads to produce (both agricultural and manufactured goods) becoming more affordable to the general public. The resulting effect is the declining income elasticity for food and, therefore, a secular decline in the agricultural sector.

The second model is "the two-sector classical growth model" and represents a special case of the first one for densely populated countries. In this model an agricultural (subsistence) and a non-agricultural (capitalist) sector exists. In densely populated countries an unlimited supply of labour in the agricultural sector is assumed and the only limitation on economic growth is supposed to be the capital constraints on expansion in the non-agricultural sector. Wages in the non-agricultural sector are dependent on the average product per person in the agricultural sector plus a margin for transfer frictions, social views and trade union pressures (Johnston & Mellor, 1961: 568 – 569). The implications of these models, and of agriculture as an instigator for economic transition, will be explored in Chapter 3. At this stage it is however important to first take a look at the problems associated with an agricultural sector in transition.

According to Bonnen and Schweikhardt (1998: 9) the transformation of agriculture leads to structural problems within agriculture[1] as the agrarian society breaks up into:

---

[1] *It is important to note that Bonnen & Schweikhardt focus on the problems within the agricultural sector while Johnston & Mellor are more concerned with agricultural transformation* vis à vis *the rest of the economy.*

(a) A commercial agricultural sector made up of an economically viable commercial farming component, a business component providing inputs and another business component that processes and markets agricultural products to the consumer.

(b) A part-time or life-style farm sector composed of large, relatively stable or slowly falling numbers of farms, generally small in size with most of their family income from non-farm sources.

(c) A large non-farm based rural society left behind by the development of agriculture.

The analysis of the structural changes accompanying an agricultural sector in transition has given rise to a rigorous debate on the characteristics of what came to be called the "farm problem". This in turn led the way to a wide range of remedial actions, collectively termed "farm policy".

Bonnen and Schweikhardt (1998: 2 – 4) proclaim that a growing consensus, that traditional farm programmes and their subsidies are no longer justified, is developing within the agricultural economics profession. It appears that the belief exists that latter day institutions enable farmers to manage their economic problems without government intervention. However, it can be argued that the underlying vectors that gave rise to the "farm problem" are still existing. It can also be argued that these vectors will influence the agricultural sector in developing economies in the same way as it influenced the agricultural sector of developed countries during their transition. It follows that it is not possible to develop a strategy for an agricultural industry, in either a developed or a developing country, without understanding the farm problem. For this reason the phenomenon of the farm problem will be discussed in the next section.

2.3. THE FARM PROBLEM

Agricultural output, in contrast to other sectors of the economy, did not adjust to the decline in demand after World War I and during the Great Depression. This created a puzzle for economists. The attempts to solve this phenomenon were reviewed in an article by Galbraith and Black (1938: 305 – 323) and according to Bonnen and Schweikhardt (1998: 11) the following six explanations were provided:

(a) High fixed costs in farming.

(b) Attempts by farmers to offset lower prices by increasing output.

(c) Effects of subsistence production in farming.

(d) Technological factors, including scrambled price signals due to random weather effects, inhibited farmers' response to price changes.

(e) Competitive structure of the farm level of the agricultural sector.

(f) Significant reduction of prices of farm-inputs during a resession.

Schultz (1945) added to these explanations the following:

(a) The relative inelasticity[1] of the demand and supply curve for agricultural products and the slow population growth.

(b) Technological change led to a rapid movement of the supply curve to the right.

(c) Mobility out of farming depend more on availability of non-farm employment than on low returns to labour.

The same literature and explanations explored by Galbraith and Black were evaluated by Johnson (1950). He, however, dismissed these with the only exception the influence of agricultural inputs on the supply function. He came to the conclusion that farms maintain production in periods of falling prices because of the nearly perfectly inelastic supply function of agricultural products. He reasoned that this is due to the fact that inputs such as agricultural machinery and farmland have few alternative uses and that farm labour is relatively immobile.

At the end of the previous section it was argued that it is not possible to develop a strategy for an agricultural industry, in either a developed or a developing country, without understanding the farm problem. For this reason the phenomenon of the farm problem will be discussed in this section with the aid of three questions proposed by Bonnen and Schweikhardt (1998: 9), namely:

(a) Why are farm sector product markets so unstable?

(b) Why is the farm sector plagued by low returns?

(c) If microeconomic theory is correct, why does the farm sector not rapidly adjust to low prices?

---

[1] *Although the term "elasticity" was not used by Shultz (1945), it remained the principle of the explanation.*

2.3.1. Instability

The nature of instability as part of the farm problem can be explained with the aid of the graphical representation in Figure 2. 1. At the basis of the farm problem is the relatively price inelastic aggregate supply and demand of farm products. Agriculture is through its very nature prone to unpredictable and indiscriminate changes in the quantity of products supplied. The combination of this natural fluctuation in quantity supplied and the inelastic demand and supply functions leads to larger than proportionate changes in the prices of agricultural products. Contributing to this instability is the declining income elasticity of demand as consumer income increases in a developed economy.
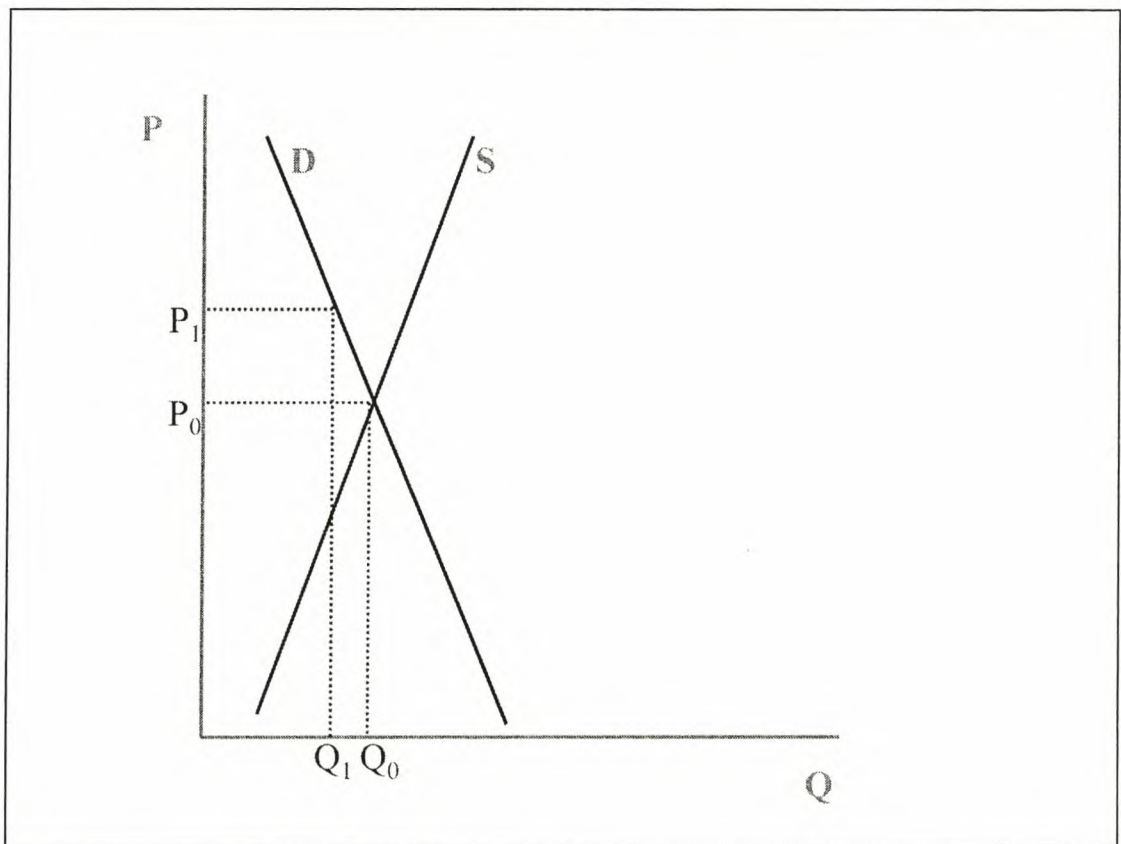
Figure 2. 1: The nature of instability.

Adding to the instability of agricultural prices is the tendency to adjust rapidly to monetary fluctuations (for instance exchange rate or interest rate variations) and therefore "overshooting" of the equilibrium. Other sectors of the economy, such as manufacturing, tend to "undershoot" the long-term equilibrium. Agriculture therefore

often carries the brunt of monetary fluctuations. (See Rausser *et al*, 1986: 399 – 412 and Andrews & Rausser, 1986: 416 for empirical evidence.)

This instability lead to the introduction of numerous policy instruments around the world with the objective of stabilising either the prices of agricultural products, the quantity of agricultural products supplied or the farm income. These stabilisation programmes can be either voluntarily or statutory through producer organisations or government programmes.

According to Lipsey (1979: 131 – 137) the main problems with these programmes rest in (a) choosing the proper price level and (b) the combination of increases in productivity and the relatively low income elasticity of demand for agricultural products that, over time, lead to the accumulation of stocks. Accumulated stocks necessitate programmes to remove production capacity. Unfortunately these uncoordinated policy instruments lead to the "export" of instability to the world market and therefore in turn to the need for even more rigorous stabilisation measures. (For a textbook explanation of exporting instability see McCalla & Josling, 1985: 47 – 50. An empirical analysis is provided by Anderson & Tyers, 1991: 42 – 48.) The exported instability was often to the detriment of developing countries and especially those that could not afford expensive stabilisation measures.

Although Bonnen and Schweikhardt (1998: 10) come to the conclusion that there is agreement on the fact that instability remains an inherent problem in many agricultural markets, they also state that there appears to be little consensus on appropriate policy action.

2.3.2. Low returns

In theory it can be expected that the prices of agricultural products, and especially commodities, will remain under downward pressure. As indicated in Table 2. 1 the price elasticity of aggregate demand for agricultural products is usually relatively inelastic and tends to strive to minus 1 over the longer term. In addition the relatively low income elasticity of demand and slow population growth in developed countries leads to a relatively slow movement of the supply function to the right.

The development of production technology (either cost saving or yield improving) tends to move the supply function to the right. Two events in the twentieth century, namely the mechanisation of agricultural production and the green revolution, represented a sharp shift to the right in farmers' supply reaction and the new developments in the fields of information- and biotechnology are expected to have the same effect. The net effect of these agricultural technology advances is that the supply curve is moving more rapidly to the right than the demand curve, and therefore downward pressure is exercised on the prices of agricultural commodities (see Graph a of Figure 2. 2).
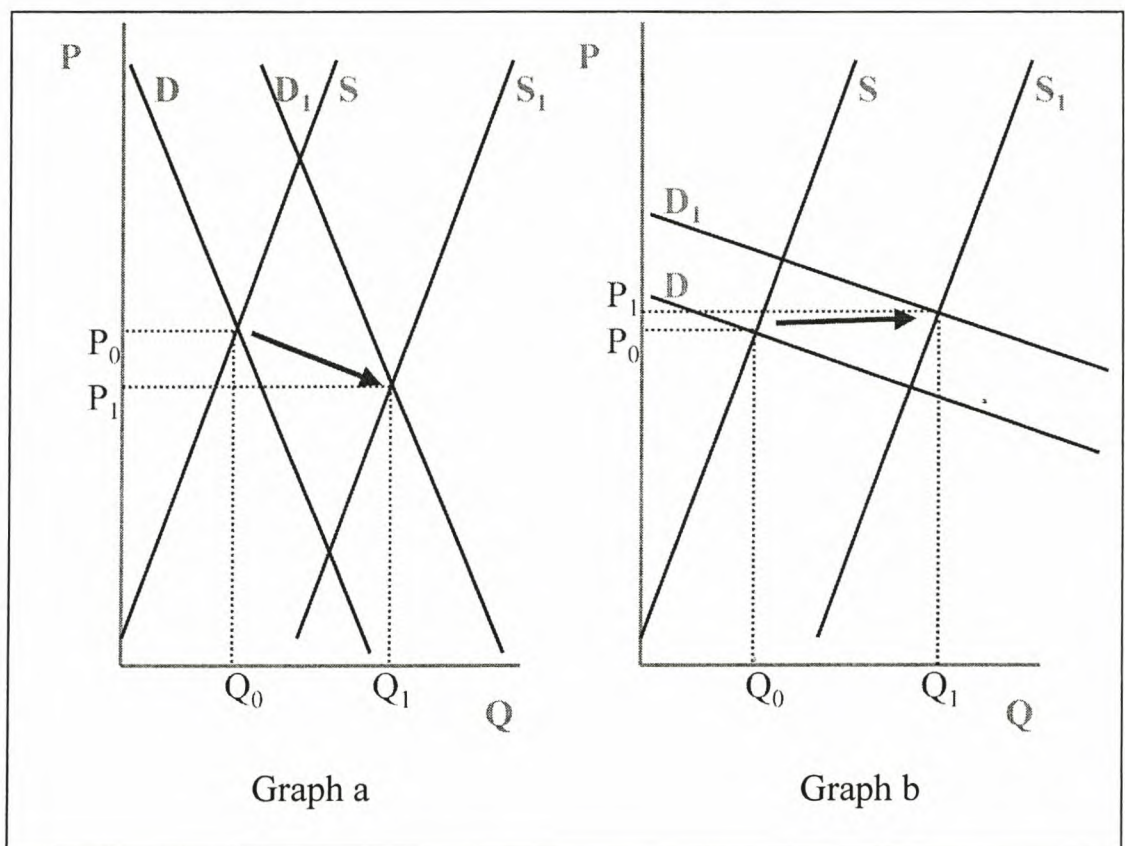
Figure 2. 2: The nature of the problem of low returns.

This relative movement of the supply and demand functions is aggravated by the relatively inelastic demand for agricultural commodities in developed regions. If the demand for agricultural products was more elastic the relative movement of the supply and demand functions would not have the same effect as is graphically illustrated by Graph b of Figure 2. 2.

In the economic boom of the 1950's that followed World War II the farm problem acquired a new dimension. Instead of the demand failure that characterised the time of the Great Depression (at the base of the analysis by Schultz, 1945), supply was growing at a faster rate than demand. Despite price- and income support and production control policies, the result was increasing government stockpiles of agricultural produce. Through this reasoning, and through emphasising technology change as the primary force in shifting the supply function to the right, Chochrane (1958) introduced the concept of the treadmill. Cochrane (1992: 427 – 436) argued that an individual farmer could only increase profits by adopting new unit cost-reducing technology. The first farmers to adopt the new technology usually reaped the benefits, but, as the new technology are accepted more widely, downward pressure was exhibited on commodity prices so that high-cost producers would be squeezed out by low-cost producers. However, eventually even low-cost producers would be forced into a situation were close to zero profits per unit were realised. Their remaining options were to either expand or adopt new cost reducing technology.

Cochrane continues his argument by indicating the complexity of the whole process and how the downward price trend is often concealed by short-term fluctuations in the prices of commodities due to the instability inherent in the production process (as indicated in Section 2.3.1) and farm programmes supporting the prices of agricultural commodities. The benefits of these programmes are however often capitalised in the price of agricultural land, and therefore contribute to higher production costs. In this way the treadmill is continued. Further the argument can also be used to show that farm programmes are relatively more to the advantage of land-owners than to renters. Land owners who are early adopters of new technology receive benefits from the new technology as well as capital gains while late adopters receive at least capital gains. Early adopting renters receive the gains from the new technology, but late adopting renters receive no gains, and are therefore the first to be pushed out of production.

The logic of the treadmill is, according to Bonnen and Schweikhardt (1998: 14), empirically well established (see also Table 2. 1) in that:
(a) The short term price elasticity of aggregate demand for agricultural products is relatively low (-0,30).

(b) Growth in aggregate domestic demand is slow due to the low income elasticity of demand (0,15) and slow increases in population.

(c) The short run price elasticity of aggregate supply of agricultural products is relatively low (0,10).

(d) Rapid technological change, especially since World War II, has shifted the supply function to the right.

(e) The highly competitive market structure combined with the movement in the supply curve to the right, creates very little price effect for early adopters of new technology, but leads to the elimination of laggards.

Although Bonnen and Schweikhardt (1998: 14) use current statistics in developed regions to illustrate the rationale of the treadmill, Cochrane initially based this logic on the situation during the Great Depression in developed regions of the world. The economic structure of developed countries at that stage closely resembles the current economic structure of a number of developing countries. It is true that the price elasticity of demand for aggregate food products in developing regions is relatively more elastic than is the case in developed regions, but it is also true that the aggregate price elasticity of demand for food in developing regions is still inelastic. Or, the absolute value is between zero and one. Although the inverse is generally true for the aggregate price elasticities of supply in developed and developing regions, supply are inelastic in both these regions. The result is that, especially as new technologies is adopted by farmers in developing regions, they will be faced with Cochrane's treadmill and, subsequently, downwards pressure on the prices of farm commodities. It must again be stressed that this argument is based on the aggregate demand and supply of food and not for individual products as such.

According to Bonnen and Schweikhardt (1998: 19 – 21) a different explanation was put forward for the problem of chronic low returns in agriculture by Tweeten. He is of the opinion that, due to the limited availability of agricultural land, expansion of individual agricultural firms is limited by the willingness of other farmers to leave farming. Therefore, if low-income earning farmers are not adequately equipped for a life outside farming, or if they prefer farming as a lifestyle or if there is high national unemployment they will not be able or willing to leave farming. Agriculture as a sector will therefore not be able to reach the optimum economies of scale.

Accordingly, Tweeten is of the opinion that low returns in an industrialised agriculture is not a problem anymore, but that excess capacity rather exists at the will of the government and is therefore a "political problem". The explanation of Tweeten has however largely been ignored by the mainstream literature on the farm problem. These authors see the treadmill theory combined with asset fixity as the explanation for the long term dynamics of the farm problem.

The question that still remains is why agricultural assets are relatively immobile. The answer to this question will be the focus of the next section.

2.3.3. Asset fixity

Bonnen and Schweikhardt (1998: 9) ask the question why does the farm sector not rapidly adjust to low prices if the microeconomic theory is correct? As implicitly stated this is a short term phenomenon with all inputs (including capital) variable and elastic over the longer term.

In order to answer this question it is necessary to turn to certain implicit assumptions often used. At the basis of the neo-classical agricultural economic theory are the assumptions of perfect knowledge, perfect rationality and the perfect mobility of production factors. Given this set of assumptions one would expect that excess capacity and returns relatively lower than in another sector of the economy would not be present for any extended periods of time. However, excess capacity, and therefore downward pressure on the prices of agricultural commodities, has persisted over long periods in the history of agriculture and ever since the industrial transformation in the previous century.

Investment in agriculture usually means an investment in a sector where the inputs in the production process are relatively unique to the sector. There is, for instance, very little demand for wheat harvesters outside agriculture, or even outside the wheat industry. The same applies to agricultural land, especially if the land is not geographically situated close to an urban centre. In the case of agricultural labour, individuals are more sensitive to the availability of job opportunities outside agriculture than to low returns in agriculture. This argument is supported by Hagedorn

et al (1950: 6) who state that it is rational for the individual farmer to continue with production as long as his (or her) revenue continues to exceed the alternative non-farm income minus transaction costs. This leads to the relative immobility of agricultural assets. This situation can be described with the aid of the graphical representation in Figure 2. 3.
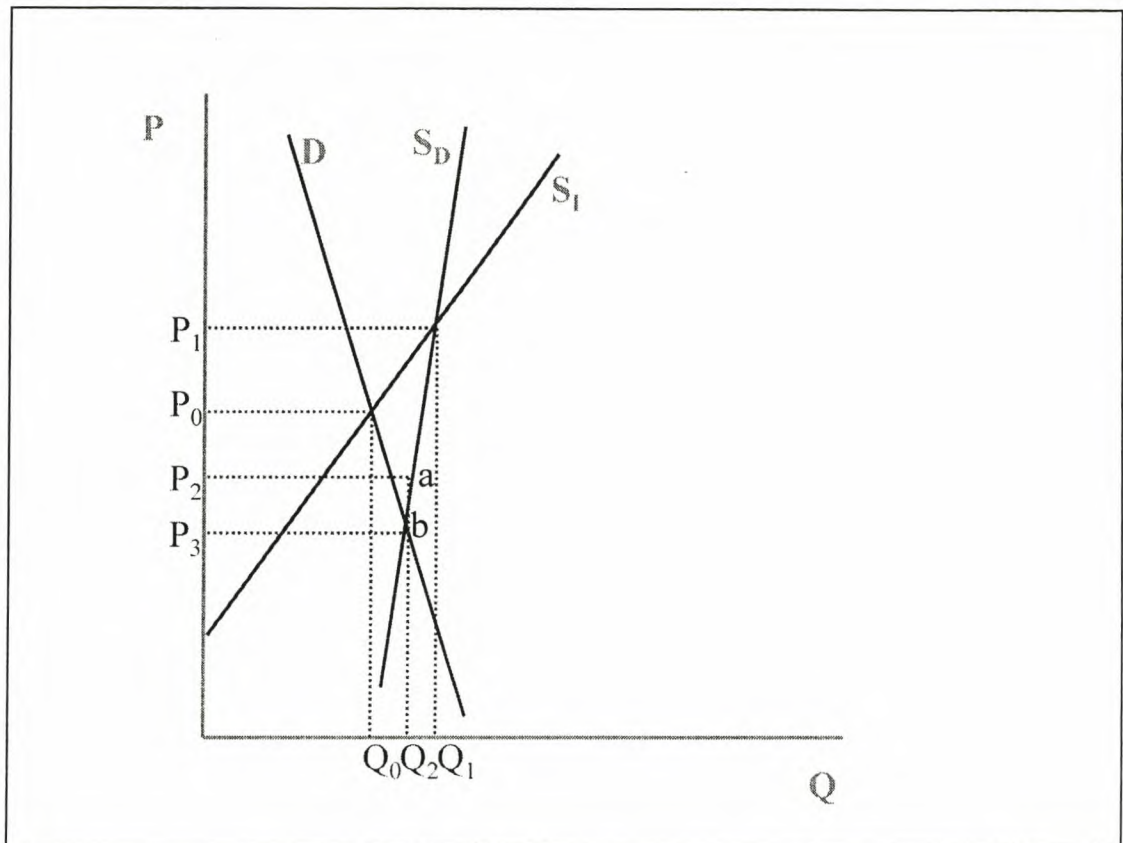
Figure 2. 3: Graphical representation of the problem of asset fixity

As indicated in the graphical representation the supply function of agricultural products can be represented by investment (S_I) and disinvestment (S_D) supply functions. Take the situation where, for some reason or other (for instance a subsidy or a natural disaster in another region that leads to short term increases in prices), the price of agricultural produce increases from P_0 to P_1. The natural response of farmers will be to increase production from Q_0 to Q_1 with the accompanying investment in agricultural inputs. If the reverse situation takes place (for instance the replacement of the subsidy with a tax or a bumper crop in another region) with a decline in the price to P_2 one would expect the quantity produced to decrease along the supply function S_I to correspond with price P_2. However, in reality farmers would be faced with the

problem of fixed investments in the production process and would therefore often be prepared to receive lower margins with the hope that the future will be better. According to Johnson (1997) it can be found that farmers will be prepared to receive a negative net margin over the short term as long as their gross margin is positive. In some instances farmers would even increase production over the short term in order to offset the smaller margins received. The result is therefore that the quantity produced would only decline from Q_1 to Q_2 to intersect line S_D at point a. But for this quantity consumers would only be prepared to pay price P_3 (where line aQ_2 intersect line D at point b), leading to an aggravated situation.

Although the discussion of Galbraith and Black (1938: 322) on the costs and the recovery of costs in agriculture showed an interesting similarity to the later asset fixity theory, they did not attempt to supply a coherent theoretical answer to the problem. The first structured dissertation on the asset fixity theory was supplied by Johnson (1958: 74 – 97). In a later work (Johnson, 1997) he argues that:

(a) Farmers are rational decision-makers who maximise profits and minimise losses.

(b) Farmers operate with imperfect knowledge in a dynamic environment with great uncertainty about change. These changes include technological, institutional (policy environment) human capacity and environmental change or risk.

(c) Because of (b) farmers make errors in their decisions.

(d) Due to the aforementioned and due to geographical and ownership transfer costs, there is a difference between the investment and disinvestment costs of any agricultural enterprise. As the majority of farm assets and investments are long-lived and very specialised, their salvage value tends to be low and substantially less than their original purchase cost. It follows that the asset must be depreciated down to salvage value before it pays to remove it from production.

(e) Farmers are therefore often forced into output sustaining, output expanding and loss minimisation adjustments in order to survive financially.

Thus, there is a tendency to overinvest and overproduce effective demand. The supply function at the level of the individual firm therefore becomes complex, asymmetrical and only partially reversible.

A theoretical explanation for this phenomenon can be found within the sphere of production economics. As the long-term supply function of a specific commodity is

the aggregate of the average total cost functions of individual farms producing that commodity, there is a clear cause and effect between the macro- (meso-) and micro-level relationships. At farm level the marginal cost function of the enterprise is per definition more inelastic than the average cost function and fixed costs are perfectly elastic over the short term. As one of the basic tenets of neo-classical economics is that farmers are rational decision-makers who maximise profits and minimise losses (see Johnson, 1997), farmers will maximise profits or minimise losses by ensuring that the last cent spent on the production of the commodity will be equal to the last cent earned from selling the product. Or in other words, it will be ensured that marginal costs are equal to marginal income. Therefore, theoretically the marginal cost function will form the short term supply function of the individual firm. That is, down to a level where the marginal cost and average variable cost functions intersect after which the rational decision-maker will cut his or her losses and cease the production of the specific product. As the short term supply function of the industry for a specific commodity is the aggregate of the marginal cost functions of the individual firms for that same commodity, it follows that the short term supply function will be less price-elastic than the long term supply function. The reason being that the long-term supply function is the aggregate of the total average cost functions of individual firms. An external price shock to the system will therefore lead to the apparent inelastic response of producers over the short term. This phenomenon may be at the root of the relative slow response by wheat producers in the Western Cape to unfavourable price signals.

Over the longer term the supply function of an industry is the function of the average total cost functions of the individual firms in the industry. It follows that over the long term the supply response will be more elastic. This hypothesis is supported by the research of Niebuhr and Van Zyl (1990) who found that the price elasticity of the area of supply for wheat in the Winter rainfall area of South Africa is 0,18 over the short term and 0,75 over the longer term. Or in the words of Keynes, "over the long term we will all be dead".

In the management literature the same principle is discussed as in investment-disinvestment theory (Besanko *et al*, 1996). Similar reasoning is also used in the

wider subject field of economics where, according to Williamson (1985) asset specificity, as part of the transaction cost theory[1], arises from:

(a) Nonstrategic or "innocent" uncertainty where decision error is possible.

(b) Behavioural uncertainty or opportunism.

(c) Asset specificity which assumes infrequent repetition of the same investment decisions and therefore little opportunity to learn from previous mistakes.

2.3.4. The relevance of the farm problem for the Western Cape wheat industry

It was argued in Section 1.2 that the symptoms of the underlying structural problem in the Western Cape wheat industry are manifested in *inter alia* international uncompetitiveness, perceived low baking quality and faulty spatial distribution. Developing an answer to the first sub-problem which focus on the origin, nature and extent of the structural imbalances in the Western Cape wheat industry, it was necessary to investigate the "farm problem" and the rationale behind this phenomenon.

Although the Western Cape (and especially the Swartland region of the Western Cape) is renowned to be the most stable wheat producing area in South Africa, this region do experience fluctuations in yield due to climatic conditions (see Table 1.1). Even more important, in a deregulated marketing environment the local wheat industry will face price fluctuations resulting from production instability in the rest of the country as well as globally. It follows that instability will form a tangible part of the future of the Western Cape wheat industry.

It will be shown in Section 4.2 that the margin between domestic and international producer prices for wheat increased steadily over the last number of decades. This was part of the implicit domestic farm policy to hide the effects of Cochrane's treadmill. It follows that the pressures leading to downward pressure on domestic and international wheat prices will also form an important part of the future of the local wheat industry.

---

[1] *According to Alston and Gillespie (1988) transaction costs can be divided into a structure of pre-production, production and post-production categories. In the pre-production category the elements are, amongst others, information constraints and asset fixity as being discussed here. More attention to the concept of transaction costs will be given in Section 3.2.3.*

Although the problem of asset fixity does not necessarily result in downward pressure on the prices of farm commodities, it contributes to understanding the complexity of decision making at farm level. It is clear that asset fixity is only a short-term phenomenon. However, it is exacerbated by the instability of the prices of farm commodities as is clearly indicated by the movement of wheat futures on the SAFEX commodity exchange (for instance, compare the wheat contract for delivery in December of June 1998 valued at R855 with the R1 210 of June 2000). In the rain-fed production areas of the Western Cape the problem is compounded by the lack of potential alternative uses for the natural resources. Of course, if water is available for irrigation the number of alternative uses increase dramatically. It follows that the problem of asset fixity is a very real phenomenon in the wheat producing areas of the Western Cape and must be kept in mind in the development of any strategy for structural adjustments.

2.4. THE POLITICAL ECONOMY OF THE FARM PROBLEM

Understanding the farm problem is a necessary exercise in understanding the objectives, limitations and constraints of farm policy. Such an understanding is also a useful background to making policy recommendations. It does, however, not explain why governments in certain countries support agriculture to the extent that they do while in other countries agriculture is effectively taxed. It obviously does not suffice to conclude that there is a positive correlation between the level of agricultural support and average per capita income (Bale & Lutz, 1981; Binswanger & Scandizzo, 1983; Anderson & Hayami, 1986 and Krueger *et al*, 1988). Some economists even go as far as to derive an income elasticity of support. The opinion has been expressed that the literature on the *consequences* of agricultural policy is more advanced than the literature on the *causes* of the same (Alston & Carter, 1991: 119).

Traditionally agricultural economists, implicitly or explicitly, have used two approaches or models in explaining the level of agricultural support (Alston & Carter, 1991; Bullock, 1992). These are:

(a) Social welfare maximisation by government (or the self-willed government).

(b) Collective action by pressure groups (or the clearinghouse government).

De Gorter and Swinnen (1994) add a third approach, namely:

(c) Politician – voter interaction.

2.4.1. The social welfare maximisation approach

The neo-classical view of the political economy relies heavily on this approach, which assumes an autonomous government, exogenous to the economic system, which tries to maximise social welfare by correcting market failures. According to Tweeten (1989: 39 – 42) the foundations of this approach can be found in the classical era of economic literature, at the time of the industrial revolution that took shape at the end of the 18th Century.

2.4.1.1. *Utility and the utilitarians*

Breaking from the strong agrarian basis of the mercantilist and the physiocratic schools, Bentham introduced the concept of utility (Gide & Rist, 1915). In the very first chapter of his first published writing[1] he states that *pleasure* and *pain* are the two masters that govern the actions of mankind (Bentham, 1789: 125). Bentham identified four sources of *pleasure* and *pain*. These are physical, political, moral and religious (Bentham, 1789: 147). Even more important are his attempts to develop a system through which these concepts can be measured (Scott, 1933: 127). It is possible to measure the *pleasure* and *pain* of individuals, according to Bentham, by its intensity, duration, certainty or uncertainty and by its propinquity or remoteness. Also to be considered is the fecundity and the purity of the *pleasure* and *pain*. When the measurement is extended to include a community, the extent of the emotion should be taken into account (Bentham, 1789: 151). Spies (1981: 25) adds to this by stating Bentham's belief that the welfare of a community is only the sum of the welfare of the individuals in that community. Classical economists such as Mill, Walras and other members of the so-called utilitarian school developed this approach into a comprehensive utility theory of value.

At the turn of the century Pigou developed the theory of utility into a new application. He *inter alia* made a distinction between "total welfare" and "economic welfare"; the latter being defined as that which could directly be linked to monetary criteria. In so doing he solved the problem of the cardinal measurability and

---

[1] *Introduction to the Principles of Morals and Legislation published in 1789.*

summation of utility through criteria such as the Gini-coefficient. In addition he developed the concepts of private and social benefits and costs, as well as the concepts of multipliers and externalities that subsequently were of considerable value in cost-benefit analysis. However, the attempts at cardinal measurability were also the main point of critique against his work. It was argued that through the emphasis on economic welfare a number of other important considerations were excluded from evaluation (Spies, 1981: 25 – 27).

With the arrival of the neo-classical school the concept of the cardinal measurability of utility was dropped. In its place it was proposed that utilities should be ordinally measurable (Spies, 1981: 27). This led to a more positive[1] approach, culminating in the concepts of welfare maximisation and Pareto optimality. Utility, in the context of welfare economics, is therefore the ordinal measurement of the pleasure or satisfaction that a person gains from the consumption of a good, service or the participation in an activity[2]. Of course, if that good, service or activity were withdrawn from the person his total utility would diminish. The sum of the utilities of the persons in a population forms the collective utility, or in other words, the collective welfare of the society.

However, one of the basic tenets of the science of economics is that the resources that can be used for the production of goods, services and other activities in a society are limited. These resources can be combined in an almost endless number of ways that is supposed to be to the advantage of individuals in particular and therefore the society in general. These combinations form the production possibility curve. When the production possibility curve forms a tangent with the highest possible collective welfare curve of society, an optimal equilibrium has been reached (Ritson, 227 – 241).

---

[1] *"Positive" in this context is used in relation to "what is", "what was", "what will be", "what is likely to be" or "what could be". Value judgements along the line of "what ought to be" are better left to theologians and politicians (see Tweeten, 1989: 40; Lipsey, 1979: 4 – 7 and Johnson 1969: 213 – 215).*

[2] *It is conceivable that utility may be negative as certain goods, services or activities may lead to pain or dissatisfaction. However, from a practical perspective, the borders between pleasure and pain may be somewhat vague. Certain activities, for instance running the Comrades Ultra Marathon, may seem to the casual spectator as extremely painful but it apparently has a positive utility-value to the participants.*

2.4.1.2. *Pareto optimality*

According to the Pareto criterion a policy is desirable when it makes one or more individuals better off without making anyone worse off. Therefore, if a specific policy measure would result in one or more individuals being worse off, that policy measure would be undesirable (Tweeten, 1989: 40 – 41). A distinction must be made between the strong and the weak Pareto criteria. In the weak criterion a policy change is desirable if everybody is made better of by the change. The strong criterion stipulates that at least some individuals must be better off, but no one is made worse off by the change (Johansson, 1991: 10).

The Pareto criterion is often confused with the concept of a Pareto optimal, or, as Sugden (1981:40) calls it, a Pareto efficient condition. Each decision taken that satisfies the Pareto criteria would lead to a Pareto improvement. The new state of affairs would therefore be Pareto superior to the original state of affairs. If an end state is reached where no additional Pareto improvements are possible, a Pareto optimal condition has been reached. It must be clear that, depending on the original distribution of resources and means within the community, as well as the sequencing of Pareto improvements used in reaching the Pareto optimal condition, an infinite number of Pareto optimal solutions are possible for any given community. In a society consisting of two individuals these optimal solutions can be plotted with the aid of an Edgeworth box. According to Cirillo (1979: 43 – 44) Pareto therefore deviated from the Benthamite definition that implies a unique social optimum.

In a multisource, multiproduct and multiperson economy the three conditions of general equilibrium:

(a) Production efficiency in that the marginal rate of substitution between any two inputs must be the same in the production of any two products.

(b) Exchange efficiency implies that the marginal rate of substitution between any two products must be the same for any two individuals.

(c) Output efficiency means that the marginal rate of transformation between any two products for the economy should be the same as the marginal rate of substitution between the products for all individuals.

will also imply a Pareto optimum condition. Competitive markets are therefore Pareto efficient (see Ritson, 1982: 240; Johansson, 1991: 11 – 21; Bohm, 1987: 162 – 163).

2.4.1.3. *Introducing the concept of compensation*

Sen (1970: 21 – 22) describes one of the dilemmas that led to the expansion of the Pareto criterion. This is namely the fact that Pareto (implicitly or explicitly) assumes a society where the individuals more or less share the same preferences. However, in a normal society, it is often found that individuals prefer opposites. A strict application of the Pareto criterion would therefore lead to inertia among decision-makers. According to Tweeten (1989: 42) this led to the introduction of the Kaldor, Hicks and Scitovsky criteria, which takes the principle of compensation into account. Kaldor (1939) and Hicks (1939) separately developed similar criteria that, at the same time, differ subtlety. Both work with the principle of *hypothetical* compensation and with a situation where a policy measure would result in gains for some and losses for others (and therefore not qualify to be a Pareto improvement). According to the Kaldor criterion a measure is desirable if it is hypothetically possible, as a result of the measure, to redistribute income in such a way that everyone is in a better final state than at the initial state. In other words, although actual compensation is not necessary, those that gain should potentially be able to compensate those that lose[1]. The Hicks criterion states that a policy measure is desirable if, in the initial state, income cannot potentially be distributed in such a way as to make every one as well off as in the final state. In other words, a policy measure is desirable if, hypothetically, the potential losers are not able to bribe the potential winners in not accepting the policy measure (Tweeten, 1989: 42; Johansson, 1991: 22 – 23). Due to the similarities of these two criteria, they are often seen as one and referred to as the compensation criterion, Hicks-Kaldor criterion or even the Kaldor-Hicks criterion.

Scitovsky (1941) identified a potential paradox in the Kaldor-Hicks criterion; subsequently labelled the Scitovsky paradox by Little. The Scitovsky paradox holds

---

[1] *It is also assumed that utility is independent from income or, in other words, that the utility functions are independent. If not the the losers may feel worse off even after receiving compensation (Johansson, 1991: 23).*

for the special situation where two collective utility curves of a society cross. Take two possible outcomes A and B, both to the right of the point where the two collective utility curves cross and each on a separate utility curve. In this unique situation it is possible to move from A to B and satisfy the Kaldor-Hicks criterion (i.e. the winners will be able to potentially compensate the losers). However, it would also be possible to move from B to A and still satisfy the Kaldor-Hicks criterion. In the light of this paradox Scitovsky recommended an additional criterion to be used in the evaluation of policy measures. This criterion, the Scitovsky criterion, dictates that if a move from an initial to a final state is desirable (i.e. the winners should be able to potentially compensate the losers), the inverse move should also be tested for desirability. If the inverse move is not desirable, then the policy measure is desirable. If not, then the policy measure is undesirable (Arrow, 1984: 37 – 38).

Given the redistributional objective of the majority of policy choices within the welfare maximisation approach and the number of criteria developed, Little (1950: 103) provided a guideline of recommended actions on each combination of criteria. This guideline is replicated here as Table 2. 2.

Table 2. 2: Evaluation of policy options using the compensation criteria.

ITEM	POLICY OPTION NO							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
CRITERIA								
Kaldor-Hicks criterion satisfied?	Yes	Yes	Yes	Yes	No	No	No	No
Scitovsky criterion satisfied?	Yes	Yes	No	No	No	No	Yes	Yes
Any redistribution good?	Yes	No	Yes	No	No	Yes	No	Yes
DEDUCTIONS								
Should the change be made?	Yes	?	No	No	No	No	No	Yes
Should redistribution without the change be made?	No	No	Yes	No	No	Yes	No	No

Source: Little (1950: 103)

2.4.1.4. Arrow's impossibility theorem

One of the basic problems of the welfare maximisation approach is in determining the social welfare function or, in other words, the translation of individual preferences into social preferences. Sen (1997: 8 – 9) is of the opinion that the set of "extremely mild looking" restrictions introduced by Arrow eliminates the possibility of a functional relation between individual preferences and the social ordering. He continues by stating that Arrow's impossibility theorem has "produced much awe, some belligerence, and an astounding amount of specialised energy devoted to finding an escape route from the dilemma".

In developing Arrow's impossibility theorem the underlying assumption is that a majority voting system is used in determining social preferences. This system may take a variety of forms, and may include the first-past-the-post system, the alternative vote system, the Borda count and the committee procedure. If, for instance, a simple system of two policy options is experienced, no problems are encountered. However, if the system is developed to include three or more possible options with three or more voters or groups of voters, the dilemma described by Arrow may be experienced (Sugden, 1981: 154).

In explaining the impossibility theorem of Arrow, it is necessary to state the following two axioms at the basis of the social welfare approach and the Bergson-Samuelson[1] social welfare function (Arrow[2], 1984: 8– 10):

(a) Any two alternatives are comparable. Implicit in this axiom is that a choice must be made between the alternatives.

(b) A consistent and logical order of preference must exist between alternatives.

Arrow (1984: 15 – 19) continued to establish five conditions that must be satisfied:

---

[1] *The social welfare function, as originally formulated by Bergson, was developed to include and order all variables important to individual welfare in a function. The problem was that no practical guidelines to the construction of such a function were provided. Samuelson, on the other hand, assumed that such a function would be provided by the decision-makers (Spies, 1981: 31 – 32). Therefore, although it was assumed that some form of ordinal ranking of priorities would be provided the problem of developing the ranking were not addressed.*

[2] *The reference cited here is a collection of papers by Arrow. Arrow first published his impossibility theorem in the Journal of Political Economy in 1950.*

(a) The social welfare function is defined for every admissible pair of individual orderings. (Restriction on the form of the social welfare function.)

(b) The social welfare function is such that the social ordering responds positively to alterations of individual values. (Positive association of social and individual values.)

(c) The choice made by society from a given set of alternatives depends only on the orderings of individuals among those alternatives. (Independence of irrelevant alternatives.)

(d) The social welfare function is not to be imposed. (Citizen's sovereignty.)

(e) The social welfare function is not to be dictatorial. (Nondictatorship.)

Now, take for instance a society consisting of three persons[1] (person 1, 2 and 3) who are faced with a choice between three options (option a, b or c). Assume that the three persons expresses the following preferences:

Person 1: a, b, c (prefers a over b, b over c and a over c);

Person 2: b, c, a (prefers b over c, c over a and b over a);

Person 3: c, a, b (prefers c over a, a over b and c over b).

It follows that the majority would prefer option a rather than option b. It is also clear that the majority would prefer option b rather than option c. Logic, and the two axioms stated, would dictate that a majority must also prefer option a rather than option c. From the example it is, however, clear that a majority prefers the opposite, that is, option c rather than option a. Arrow came to the conclusion that, with the exception of universal consensus, any social welfare function that is logical, consistent and satisfies conditions (a) to (c) must transgress conditions (d) and (e). Such a welfare function would therefore either be forced on society or be dictatorial (Spies, 1981: 35 – 36).

2.4.1.5. *Critique on the social welfare maximisation approach*

One of the main points of critique against this approach is how, in real life, individual preferences can be transformed into social welfare functions. Adding to this difficulty is the constitutional and institutional arrangements necessary to

---

[1] *In this context a person could also be defined as a group of persons. However, it is assumed that the groups possess equal weight and that no group or combination of groups show a clear majority.*

translate individual preferences into social preference orderings and therefore arriving at collective social choices for individual nations. Some economists believe that the democratic process and majority rule will lead to a social consensus on issues of equality and efficiency and therefore in effect lead to social welfare functions. The Arrow impossibility theorem, however, states that it is impossible to translate individual preferences to social preferences through a democratic process.

Compounding this problem is the fact that majority voting does not allow for differences in the intensity of individual preferences (Black & Dollery, 1992: 6 –7). One solution could of course be found in a monarchy, dictatorship or an oligarchy where the individuals involved could easily supply social preferences. Within the current global political context such a solution would probably not be acceptable.

One danger embedded in the social maximisation approach is the "piecemeal" nature of decision-making. Although it is natural that this strategy would be followed given the difficulties encountered in identifying and reaching a Pareto optimal condition, any strategist would be aware of the danger of partial optimisation. In solving this problem the so-called theory of second-best policies was developed (Ritson, 1982: 247 – 250; Johnson, 1986: 85 – 88). However, it can be argued that the second-best solution is not *the* best solution. It follows that there is very little difference between second-best and x-best solutions to problems.

One of the basic assumptions of the welfare maximisation approach is a private property society of free men (Lindblom: 1977: 78). It is also assumed that buyers and sellers are fully informed regarding the attributes of every unit of every good as well as the market clearance prices of various sellers. An implicit assumption is that homogenous commodities are traded at a point in space. However, in real life there are transaction costs involved in all trade. According to Brazel (1985) these costs include:

(a) Not all similar priced products are homogenous.

(b) Product information is not without cost.

(c) The validation of implicit or explicit contracts.

(d) Behavioural (moral) risk associated with different parties.

(e) The spatial dimension of transactions.

(f) Marketing institutions.

(g) Social institutions.

These transaction costs, often overlooked, will influence the Pareto optimal condition. The danger is that, due to transaction costs, people can behave differently than they are presumed to (Rutherford, 1996: 152 – 153).

In the real world of policy decisions the problem is usually a political problem with a few bothersome economic implications. The difference between the worlds of the policy analyst and the policy maker can be described as follows:

(a) The analyst is more likely to be concerned with efficiency while the policy maker is more likely to be concerned with distribution.

(b) The analyst is more likely to be concerned with programme outputs as benefits while the policy maker is more likely to be concerned with programme inputs as benefits.

(c) The analyst will consider the sunk costs of past policy decisions as irrelevant to future policy decisions while the policy maker will consider sunk costs as a justification for future policy decisions.

It follows that, in many policy decisions, something is optimised albeit seldom the economic dimension. With the usual multiple constraints and objectives of policy programmes, political compromise often plays a role. The result is that very few Pareto-supperior solutions are available or, for that matter, implemented (Bonnen & Schweikhardt, 1998b: 587).

Sen (1997: 23) brings another point of critique to the fore. He is of the opinion that the main schools of welfare economics, both old and new, provides very little basis for the study of inequality in a community. As the emphasis is placed on the welfare sum of a community, distributional judgements are avoided in the process.

In order to manipulate the approach to make sense in the real world, the concept of *hypothetical* compensation were introduced by Hicks, Kaldor and Scitovsky[1]. As long as the compensation remains hypothetical, the approach holds very little relevance for the real world (Cirillo, 1979: 50 – 51).

---

[1] *This argument has already been introduced in Section 2.4.1.3 but is briefly repeated here for the sake of completeness.*

Finally, in order to support the measurability of the different criteria and to aid cost-benefit analysis, the concept of utility is increasingly measured in monetary terms[1]. Therefore, the full circle to a Benthamite approach, and Pigou's concept of "economic welfare", were turned. As a consequence a number of Paretan non-monetary "utilities" were lost along the wayside.

The social welfare maximisation approach clearly does not supply a satisfactory answer as to *why* governments act as they do. It rather provides a framework of *how* governments can, in increments, govern in a responsible way. De Gorter and Swinnen (1994: 313) are of the opinion that this approach plays an important role in bridging the gap between the traditional literature and other political economy approaches.

2.4.2. The pressure group approach

Whereas proponents of the social welfare maximisation approach view government as an active or self-willed but philanthropic entity trying to maximise the welfare of its constituency, those supporting the pressure group approach see government as a reactive and passive entity fulfilling the role of a clearinghouse. In the words of Alston and Carter (1991: 109) "The government trades off political pressures among interest groups." Whereas the social maximisation approach views government as trying to achieve a tangent between the surplus transformation curve and the highest possible social welfare function, the pressure group assumes that there is no social welfare function. The latter approach assumes that the point on the surplus transformation curve where equilibrium will be reached is the result of the relative powers of the different lobbying groups. In the interpretation of results the essence of the difference between the two approaches is that in the case of the social welfare maximisation approach the trade-off slope between different policies will be the welfare weights. In the case of the pressure group approach the trade-off slope is the marginal influence of the different pressure groups (Alston & Carter: 110). Kleynhans (1991: 146) states that those individuals supporting the welfare maximisation approach see politicians as individuals without deficiencies or "saints". Those supporting the

---

[1] *This argument has been introduced in Section 2.4.1.1 but, again, is briefly repeated here for the sake of completeness.*

pressure group approach see government as *homo economicus* or, in other words, individuals with self-directed (economic) objectives.

2.4.2.1. *Origins of the pressure group approach*

Becker (1983) traces the origin of the pressure group approach back to the turn of the century to the work done by Bently in 1908 and Schumpeter in 1947. Hagedorn *et al* (1990: 5 – 11) provide a number of reasons why pressure groups are such a prominent part of the agricultural scene. These reasons include:

(a) The irreversible investment that has been made in the establishment of pressure groups.

(b) The atomistic[1] structure of agriculture precludes activity other than in the political sphere and the lack of efficient alternatives that can be used in securing economic rents.

(c) The more farmers experience the frustrations of economic profit seeking (see the discussion on the farm problem in Section 2.3), the more they will be inclined towards political rent seeking through influencing farm policy.

(d) Collective action amongst family farmers cannot take place on the level of factor allocation where the prices for labour[2], capital and land are determined. Instead, the process of collective action has to be shifted to the level of product pricing and income support.

The pressure group approach relies heavily on the ability of a group to organise for collective action. However, the efficiency of a group to organise relative to other (opposing) group(s) is more important than the absolute efficiency. This opinion is supported by Hagedorn *et al* (1990: 4) who continue by stating that the process of

---

[1] *The atomistic structure of agriculture refers to the large number of "small" enterprises. It is possible through co-operatives or cartel forming to extract economic rent from the market place. However, the same problem concerning free riders is usually experienced as it is often found that the larger the cartel the greater the incentive for opportunistic behavior by individuals. In those cases where large co-operatives or cartels are successful, some form of political rent is usually involved.*

[2] *The relationship between labour and the family farm in South Africa differs quite substantially from that found in most of the rest of the world. It is therefore not strange that collective action on the remuneration of farm labour in South Africa has become more frequent. This is especially true in the case of agricultural industries where farm owner and farm workers are estranged.*

competition and co-operation among pressure groups determines the "equilibrium structure[1]" of taxes, subsidies and other political burdens and favours.

Olson (1985) is of the opinion that the factors influencing the ability of a pressure group to effectively organise is uniformity of interest (similar problems), the availability of communicative and transport infrastructure, spatial distribution of the group and, of course the size of the group. Becker (1983) continues by stating that a larger group will result in potentially more substantial gain (in number of votes) for a politician in conceding to the proposals of the group. Following this reasoning a larger group will be more effective although it will probably lead to a relatively higher organisation cost and increase the free-rider problem. According to Brooks (1995: 399) there is no straightforward way of discerning the optimal size of a group. In theory there should be an optimal balance between a group large enough to be politically effective, and small enough to monitor and curtail free-rider activity. In practice optimal group size is influenced by such diverse factors as differential regional effects, differential benefits to group members and internal friction within the group. There is therefore a non-linear relationship between group numbers and group effectiveness. Becker (1983: 385) argues that the optimal size of a group is smaller than its most effective size, the reason being that an increase in the number of members reduces the net income per member. It also follows that the resistance from a large group of taxpayers to a relatively light tax will be less than if a few taxpayers are responsible for a relatively heavy tax. He concludes "Politically successful groups tend to be small relative to the size of the groups taxed to pay subsidies".

Olson (1965) however concedes that this model cannot explain the huge benefits received by farmers (who then represented 25 percent of the U.S. population) in the United States in the 1930's. In order to circumvent the inconsistencies presented by this occurrence, he introduced the concept of the social by-product. The basic tenet of the social by-product concept is that farmers would gather for social reasons (e.g. a nice barn dance to music supplied by a couple of fiddlers) and that political pressure activities for assistance would result as a by-product of these social

---

[1] *Hagedorn* et al *(1990:4) point out that the concepts of a "political market" and a "political equilibrium" were easily accepted by economists due to the close ties to the neo-classical school of economics.*

gatherings. On the social by-product concept De Gorter and Swinnen (1995: 405) show that Olson in his later work refrained from mentioning it. They continue by saying that "…trying to determine whether farmers go to the local town hall to organise as a pressure group with partying as a by-product or *vice-versa* is as unproductive as trying to determine whether academics go to conferences to socialise, with intellectual pursuits as a by-product or *vice-versa*."

One other important aspect of the pressure group approach is the concept of deadweight costs. Deadweight costs of taxes and subsidies arise from their effect on the allocation of time between work and leisure, investments in human and non-human capital, consumption of different goods and other behaviour. As deadweight cost will rise as taxes and subsidies increase, taxpayers have a relative advantage in the competition for political influence. As the deadweight costs to taxpayers fall as the tax per person decreases due to an increase in the number of taxpayers, this explains why farmers in developed countries are more successful in extracting favours from politicians. Another result of the concept of deadweight cost is that the political game often modelled with the aid of this approach is zero sum in terms of political influence, but a negative sum in terms of transfers (Becker, 1983).

In his formal statement of the pressure group approach, Becker (1983) models a political game of which the influence is a zero sum and the transfers (subsidies and taxes) is a negative sum due to deadweight costs. As discussed earlier the political pressure that a group can bring to bear can be stated as follows:

$$p = p(an, n)$$

Equation 2. 2

Where: p = the political pressure that a group can bring to bear;

a = the resources spent per member of the group on group activities (maintaining the lobby, attracting votes, issuing pamphlets, contributing to campaign expenditures, cultivating bureaucrats and politicians);

n = the number of members of the group (as indicated earlier this is dependent on uniformity of interest, infrastructure and spatial distribution).

The full income of each member of two groups (groups s and t) after expenditures for political activities and the control of free-riding has been included, can be stated as follows:

$$Z_s = Z_s^0 + R_s - a_s, \text{and } Z_t = Z_t^0 + R_t - a_t$$

Equation 2. 3

Where: Z = income of group members;

R = redistribution ($_s$ signifies a subsidy and $_t$ a tax);

^{0} = the original situation.

By manipulating the aforementioned equations, Becker continues by finding that the income per individual member of a politically active group is maximised when:

$$\frac{dR_s}{da_s} = 1, \text{and } \frac{dR_t}{da_t} = -1$$

Equation 2. 4

Or, in words, the income of a member is maximised when the last unit of money spent on pressure group activities by that member is equal to the last unit of subsidy received and tax paid by the respective parties. This concept shows similarities to production economics theory. Developing the equation to make provision for a political market equilibrium and assuming that each group acts as if the pressure exerted by the other group is not affecting the behaviour of the group, the following is reached:

$$\frac{dR_s}{da_s} = \frac{1}{n_s G'} \frac{\partial I^s}{\partial p_s} \frac{\partial p_s}{\partial m_s} \frac{\partial m_s}{\partial a_s} = \frac{I_s^s p_m^s}{G'} = 1, \text{and } \frac{dR_t}{da_t} = \frac{1}{n_t F'} \frac{\partial I^t}{\partial p_t} \frac{\partial p_t}{\partial m_t} \frac{\partial m_t}{\partial a_t} = \frac{I_t^s p_m^t}{F'} = -1$$

Equation 2. 5

Where: m = (an);

G = is the cost associated with providing R_s and include deadweight costs;

F = is the revenue from tax R_t and include deadweight costs;

I = the influence of the pressure group on subsidies $(_s)$ or taxes $(_t)$.

It is therefore clear that, according to Becker (1983) the equilibrium reached is dependent on the group size (and therefore organisational effectiveness and the free-riding problem), the contribution of group members, deadweight costs, and the effectiveness of collecting taxes and distributing subsidies. According to Bullock (1994: 94) Becker in his later work added the concepts of "altruism" and "envy" in generalising his model.

Becker (1983: 379 – 388) derived a number of propositions from the formal statement. These include:

(a) A group that becomes more efficient at producing political pressure would be able to reduce its taxes or raise its subsidy;

(b) An increase in deadweight cost reduces the equilibrium subsidy[1];

(c) Politically successful groups tend to be small relative to the size of the groups taxed to pay their subsidies; and

(d) Competition among pressure groups favours efficient methods of taxation.

Peltzman (1976), following a similar approach, proposed that inter-group transfers take place at the political equilibrium point where the income redistribution constraint (dependant on the efficiency of transfers between groups) forms a tangent to the highest possible iso-support curve (which is assumed to be independent from exogenous income shocks) in "welfare space". For a different political equilibrium point to be reached either a change in the iso-support curve or a change in the income redistribution constraint has to occur.

Bullock (1992; 1994), building on the work of Becker and Peltzman, uses an equation similar to Equation 2. 2 to denote the political pressure of a group. In

---

[1] *According to Becker (1983: 382) this proposition implies a "tyranny of the* status quo*".*

defining the size of subsidies (S) and taxes (T) he, however, introduced a factor x to derive:

$$S = I\left(p^s_{(+)}, p^t_{(-)}, x\right) = T$$

Equation 2. 6

Where: S = total subsidy including the costs of the subsidy process;

T = total taxation minus the costs of the taxation process;

x = a vector of exogenous "other influences".

By assuming that subsidies should be equal to taxes, and combining Equation 2. 2 and Equation 2. 6, he arrives at:

$$n^s G(R^s) = I\left[p^s\left(m^s = a^s n^s, n^s\right), p^t\left(m^t = a^t n^t, n^t\right), x\right] = n^t F(R^t)$$

Equation 2. 7

Equation 2. 7 states that transfers are a function of political pressures, which themselves are a function of group size and individual political expenditures. The choice variable of the individual is a^i, or, the expenditure of the individual on political activities. The amount that an individual will be willing to spend on political activities is dependent on

(a) The effects of those expenditures on the own income (Z^i) of the individual; and

(b) The effects of those expenditures on the transformation of own income (Z^i) into some other "good" (W^i). It is assumed that W^t is, by means of political expenditures, a function of per capita subsidies to group (s) and some exogenous shock (q) and (x), or:

$$W^t = \tilde{W}^t\left(a^s_{(+)}, a^t_{(-)}, q_{(-)}, x\right)$$

Equation 2. 8

It is assumed that individuals are not income maximisers, but utility maximisers and that, given the constraint of (a^t), utility is a function of own income (Z^i) and other goods (W^i). The optimal amount of political expenditure by group (t), given the amount of political expenditure of members of group (s), is that amount which causes group (t) to transform group income into the other good (W^t) at the same

marginal rate at which individual members of group (t) can substitute Z^t for W^t and still remain indifferent. Without the concept of the "other good" (W^i) the equilibrium reached by Bullock (1994) is the same as that of Becker (1983) as stated in Equation 2. 4 and Equation 2. 5.

In following the reasoning of Peltzman, Bullock (1994) derived the income redistribution constraint of government (g) to be:

$$R^3 = G^{-1}\left[\frac{n^t}{n^s} F(R^t) \right] \equiv g\left[R^t, \frac{n^t}{n^s} \right]$$

Equation 2. 9

It follows that government cannot increase subsidisation of group (s) without increasing taxes of group (t).

According to Bullock (1994) four causes may lead to a change in the equilibrium. These are:

(a) The influence that a group may bring to bear (Equation 2. 7). If a group experiences a change in size or the efficiency of the group changes, then one could expect a change in equilibrium transfers.

(b) The effectiveness by which a government transfers taxes into subsidies (the F, G and g functions in Equation 2. 9).

(c) Factors that change the marginal rate of substitution between W^i and Z^i.

(d) Factors that change the marginal rate of transformation between W^i and Z^i.

In empirical analysis using the pressure group approach, a Nash political preference function is often derived. According to Bullock (1996: 745) the conditions applied include:

(a) Individual rationality;

(b) Invariance to positive affined utility transformation;

(c) Symmetry;

(d) Independence of irrelevant alternatives;

(e) A Pareto optimal solution must be reached (although it is sometimes argued that conditions (a), (b) and (d) imply a Pareto optimal solution).

Finally, it seems as if the problem of asset fixity is not limited to organisations, but that it also plays a role in the activity of pressure groups. Hagedorn *et al* (1990: 5) argue that farmers often make a considerable (irreversible) investment (both monetary and human capital) in the establishment of groups. The object of this investment is the extraction of economic rents from the political system in order to achieve a specific economic status. Often the result is that this investment forms a barrier to entry to the group and, therefore, to the market. The problem arises when, under adverse economic conditions, the irreversible investments also form a barrier to exit. Thus, history teaches that it can be quite expensive to dismantle institutions and production facilities. At farm level production will continue as long as income exceeds the alternative non-farm income minus transaction costs. In the same way pressure group activities will continue as long as the *perceived* economic rents exceed the opportunity costs of the annual "investment". In other words, lobbying has it's own "asset fixity" problem.

2.4.2.2. *Party competition and the farm lobby*

The previous section placed the focus on why farmers show a propensity towards forming pressure groups. It does not explain why these pressure groups are effective in extracting political rents from the decision-makers. Those countries where farm pressure groups show the greatest apparent success are also the countries where the secular decline of agriculture is the most notable. In other words, farmers form a very small minority of the population.

Peltzman (1976: 222) captured the essence of the approach and describes it as a "majority generating function". But, as Hagedorn *et al* (1990: 12 – 15) put it, by means of his vote the farmer can only decide on a global party programme and not for particular agricultural policy measures. In addition to being a small minority, the farmer must also take into account his or her own political preferences[1]. The result is that "a farmers party" or a "farmers segment" in a political party only has a role to play in marginal election results. However, this may lead to an unstable policy environment for farmers as the farming minority could easily be replaced by another

---

[1] *Farmers are usually more religious and politically more conservative than the rest of the population. This is reflected in their party-political preferences (Drury & Tweeten, 1997: 68).*

minority or the "courting" of agriculture may lead to a greater than proportional loss of non-farm votes. It is therefore to the advantage of both farmers and political parties to keep agricultural issues out of the electioneering process[1] as deterministic (0-1) voting leads to unstable equilibria.

However, this leaves the option open to all parties to canvass the farm vote, and for agricultural pressure groups to court the favour (through external or internal processes) of political parties. It is argued that, through the process of logrolling[2], strong preferences of minority groups can be combined and played off against the weak objections of the rest of the electorate. For this reason farm issues are usually relatively high on the agenda of most political parties contesting elections in the majority of countries. It follows that the representation of agricultural interests has to be delegated to farm politicians in parliament, farmers associations, etc. Anderson (1995: 401) makes the important observation that it is not necessary for a government to be democratically elected, but only that the government must be contestable. In other words, even in the case of a dictatorship the dictator can be removed from office if he does not maximise his chances of staying in office by adopting the correct policy environment.

It could be argued that the time and money spent on lobbying activities could be more effectively used for productive activities and therefore reduces (a_s) and increases (Z_s) in Equation 2. 3. However, groups are faced with the prisoner's dilemma[3]. If, for instance, the farm lobby does not spent money on lobbying

---

[1] *In this regard the South African situation is a notable exception. The duality of the South African agriculture was a result of party political activities (see Fényes et al, 1990: 588) with the result that dismantling this structure is high on the agenda of the current political dispensation. This concept will be explored in more detail in Section 4.2.2.*

[2] *See for instance Spies (1981: 36 – 37) and Black and Dollery (1992: 20 – 22) for a more detailed description of the process.*

[3] *The scenario is that two prisoners (A and B) are known to be guilty of a very serious crime (with a penalty of 20 years), but there is not enough evidence to convict them. There is, however, enough evidence to convict them on a minor crime (with a penalty of 2 years). The prisoners are separated and each given the choice to confess. If A confesses and B does not, then A will go free and B will get the full penalty (and vice versa). If both confess then they will each receive a reduced penalty of ten years for their co-operation. If none confess they will be tried on the minor crime and each jailed for 2 years. The question that arises is what will be the optimal strategy for the prisoners? Prisoner A has two strategies (to confess or not). He reasons (rationally) that if he follows the confess strategy and B does not then A will go free while if B confess then A will only receive the reduced sentence of ten years. If prisoner A follows the strategy to not confess and B does not then A will receive the 2 year sentence while if B confess then A will serve the full term of 20 years. It is clear that*

activities, the members potentially face reduced net income. In the same way the non-farm lobby faces increased taxes if they do not allocate resources to lobbying activities. It is therefore in the rational interest of both groups to invest resources in lobbying activities (Scrimgeour & Pasour, 1996: 258 – 259).

This argument leads to the contemplation of the transaction costs involved in lobbying activities. According to Horn (1995: 13 – 14) the origins of these transaction costs can be found in:

(a) The time and effort it takes legislators to reach agreement on legislative refinements and any time and effort that affected private interests have to devote to participating in implementation or administration. Vague legislation will require more time of beneficiaries to participate and to defend their interests.

(b) The durability of the benefits of legislation is dependent on the ability of legislators to repeal or amend legislation, influence the way the legislation is administered and to reduce the funds available for the implementation of legislation.

(c) Administrators may not comply with the intentions of the enacting coalition. The expected benefits of legislation may not materialise because bureaucrats, regulators or judges lack the understanding, commitment or energy to administer the legislation in the way the enacting coalition envisaged.

(d) Constituents may be uncertain about the private benefits or costs associated with the legislation. Risk-averse constituents will provide less support, or more opposition, the greater the risk they face.

Hagedorn *et al* (1990: 15 – 23) continue their argument by stating that certain normative standards are agreed upon at the constitutional level. These normative standards must be perceived to be fair and in the interest of the individuals. Within the framework of these standards groups can legitimately and with a clear conscience campaign for their own interests. At the same time non-members of the group accept

---

the strategy to confess is the optimal strategy for prisoner A (he will receive either a pardon or a ten year sentence compared to the two or 20 year sentence if he does not confess). Prisoner B, following a similar line of (rational) reasoning, also decides to confess and therefore both receive the ten year sentence. If, however, neither had confessed then both would have been in prison for only two years each. It is therefore clear that the rational choice made by the prisoners resulted in each prisoner spending eight additional years in prison (Sen, 1982: 62 – 63).

the objectives of the group as legitimate. However, Scrimgeour and Pasour (1996) show that these standards may sometimes impede real structural reforms. It is often necessary that imminent economic blight be perceived by all, as was the case in New Zealand, before fundamental changes are made. The following principles have become established as foundations for group objectives:

(a) The principle of decreasing legitimacy of more distant objectives.

(b) Defending the *status quo ante*. (Groups wanting only to maintain their economic rent can expect much more consent than groups wanting to increase theirs. This process has also been called legitimisation by tradition.)

(c) Protection of the poorer and the weaker (distribution according to needs)[1].

(d) Ensuring just rewards for producers of important public goods (distribution according to merits).

Farm policy and social policy have a lot in common when the first two principles are taken into account. However, farmers shy away from the third principle (distribution according to needs) as such policies may drive a wedge between the more and the less affluent members of the farm community. It is therefore the last principle, that of distribution according to merits, that is used with extreme success by the farm lobby. Within the framework of the concept of agrarian fundamentalism[2] it is argued that support to the agricultural sector is nothing but a just reward for important public goods (security of food supply, reliable food quality, environmental protection, social stability, etc.) provided by the agricultural sector. Therefore, instead of a one-way transfer to the needy (social policy) farm policy is seen as a just exchange of public benefits. Is this concept of agrarian fundamentalism still relevant in the 21st century? This question will be addressed in Section 3.3.2.5.

One other factor to the advantage of farm lobbyists in developed countries is the fact that agriculture is usually a small segment of the economy. A small tax on the rest of the economy would therefore result in large advantages to the agricultural community.

---

[1] *The "commercial" segment of South African agriculture, which is perceived to be "rich" and exploiting poor farm labourers, got this argument turned against them.*

[2] *The "other good" (W') of Bullock (1994) defined in Equation 2. 8. The concept of agrarian fundamentalism will be explored in more detail in Section 3.3.2.5.*

It is important to take note of the fact that the cost associated with agrarian fundamentalism is being questioned in developed countries. Drury and Tweeten (1997: 69) observe that the traditional argument for the family farm was missing from the debate for the 1996 Farm Bill in the United States. In Europe, where the Common Agricultural Policy (CAP) cost taxpayers $45 billion a year (approximately half of the EU budget) the same question is being raised and fundamental changes are expected as part of the "Agenda 2000" budget reforms. Of course, the integration of certain Eastern European Countries into the EU may cost the EU another $15 billion if the CAP is retained in its present form. This augments the affordability debate (Economist 1998; Economist 1999a; Economist 1999b).

It follows, rather because of than in spite of, the fact that the farming community is a small segment of society in developed economies, the farm lobby is successful. In many countries agriculture has succeeded in removing itself from the electioneering process, while the utility (farm fundamentalism and food security) to society of a traditional countryside and the *per capita* cost of supporting agriculture is relatively low.

2.4.2.3. *Critique on the pressure group approach*

In their critique on the pressure group approach De Gorter and Swinnen (1994: 317 - 320) show a number of inconsistencies between the theoretical framework and the real life situation. They argue that the agricultural sector in Argentina and Canada can be compared, as both are highly urbanised countries with similar agro-climatic conditions. At the same time the communication and transport costs (as emphasised by Olson, 1985) of the two countries, as well as their geography, are similar. Both countries have well-developed telephone, road and railway systems which would imply that in both countries farm pressure groups would be able to organise with comparable levels of effectiveness. It is stated that, prior to the Second World War the average *per capita* income and the rural to urban population ratios in both countries were similar. In spite of these similarities Argentina consistently taxes agriculture severely while Canada subsidises agriculture.

A second example is the relative position of the United Kingdom and Germany on matters relating to support prices (especially regarding cereals) within the framework of the Common Agricultural Policy (CAP). Consider the relative structures of the agricultural sectors of the United Kingdom and Germany as illustrated in Table 2. 3. The total costs of the cereals regime of the CAP were higher for Germany because its taxpayer contributions were higher (in 1986 twice that of the UK) and the UK's consumer costs were lower as it is a net exporter of cereals. It is therefore clear that Germany argues for a net transfer from her consumers to producers elsewhere in the European Communion[1]. In addition the benefits to the UK were larger due to the fact that it is a larger producer of cereals.

An additional factor is that, not only were the total benefits larger, but also the *per capita* benefits. The United Kingdom has fewer farms of which the average farm size is larger and geographically more concentrated. At the same time the farm size distribution is more uniform in Germany and the specialisation of production more prominent in the United Kingdom.

Within the framework of the pressure group approach this set of variables would lead one to expect that the United Kingdom would be the country that argues for higher levels of support prices; especially in the case of the cereals programme. However, the opposite is true (see Table 2. 4) with Germany consistently arguing for higher levels of support and the United Kingdom for the opposite (see also De Gorter & Tsur, 1991: 1251).

This stance of the United Kingdom is confirmed in the most recent (1999) rounds of CAP reforms. What is new, however, is that Germany[2] is also arguing for a formula that will reduce its net contribution to the EU. Germany is now arguing for an idea called "co-financing" that will entail that the cost of the CAP is being shared between the national governments and the EU coffers. This will reduce the transfer

---

[1] *This trend is currently continuing. In 1996 Germany contributed DM 39,7 billion to the EU with France the closest rival at DM 23,7 billion and then the United Kingdom at DM 15,7 billion. At the same time Germany received only DM 18,8 billion from the EU. This is less than the DM 22,8 billion and 20,1 billion France and Spain received respectively. At the same time the United Kingdom received DM 11,4 billion (Financial Mail 1999).*

[2] *This change in stance is possibly due to the change in German government in 1998 (Economist, 1998).*

from German taxpayers to producers elsewhere in the EU; especially with the acceptance of certain Central and Eastern European countries into the EU during the next decade (Economist 1999a).

Table 2. 3: Pressure Group Variables: A comparison between the UK and the Federal Republic of Germany (1986).

ITEM	CATEGORY	U.K.	GERMANY
Number of farms	Total	242 500	703 900
	Cereal	20 900	44 100
	General cropping	24 500	75 100
Average size	Ha	69,3	16,8
	ESU	142,0	17,3
Farm size distribution	0 – 6 ESU	6,9%	32,6%
	6 – 16 ESU	12,3%	27,1%
	> 16 ESU	80,8%	40,3%
Benefits	Total 84/85[*]	242,5	372,9
	Total 85/86[*]	847,4	638,6
	ECU/farm	39 113	13 529
	ECU/AWU	16 398	9 020
Costs	Consumer[*]	3 700	9 000
	Taxpayer[*]	1 450	2 700

Source: De Gorter & Swinnen (1994: 318)

Note: ESU: Economic Size Unit.

AWU: Agricultural Worker Unit.

* Million ECU

Krueger *et al* (1988), in the first political economy study that encompasses 18 developing countries, provide substance for a third example (see Table 2. 5). As part of the World Bank's research project on the political economy of agricultural pricing policies, Krueger *et al* (1988) set out to investigate the direct and indirect effects on agricultural prices and incentives of the agricultural policies of developing countries (these policies will be discussed in more detail in Section 3.2). This was the first study that provided a systematic comparative analysis of the effects of differing degrees of discrimination against agriculture.

Table 2. 4:   Price Policy Preferences in European Agriculture: a comparison between the United Kingdom (UK) and the Federal Republic of Germany (FRG).

ITEM	Country to press for higher support prices	
	Pressure Group Prediction	**Actual Outcome**
Farm numbers: higher in FRG	UK	FRG
Farm size: larger in UK	UK	FRG
Farm size distribution: more uniform in UK	UK	FRG
Geographic dispersion of farms: more concentrated in UK	UK	FRG
Specialisation of Production: more specialised in UK	UK	FRG
Benefits to farmers: higher *per capita* in UK	UK	FRG
Costs to consumers: higher *per capita* in FRG	UK	FRG
Costs to taxpayers: higher *per capita* in FRG	UK	FRG

Source: De Gorter & Swinnen (1994: 319)

Currently relevant are the relative differences between the support of export and import products. It was found that, almost without exception, export products are taxed more or subsidised less than imported products[1]. For the eighteen countries average direct taxes on export products were 11 percent and average direct subsidies on imported products were 21 percent of the unit price of the product. If indirect taxes/subsidies is included, export products are on average taxed by 40 percent compared to the six percent tax on import products[2].

---

[1]   *The overt reason for this situation can probably be found in a combination of import substitution, infant industry, self-sufficiency, exchange rate and fiscal policies.*

[2]   *The fact that both import and export agricultural industries are taxed is logical as agriculture is usually one of the most important sectors of the economy in a developing country.*

Table 2. 5: Direct, Indirect and Total Protection Rates for main exported and imported products in 18 developing countries (1980 – 1984)

COUNTRY	INDIR	EXPORT PRODUCT			IMPORT PRODUCT		
		Product	Dir	Tot	Product	Dir	Tot
Argentina	-37	Wheat	-13	-50	-	-	-
Brazil	-14	Soybeans	-19	-33	Wheat	-7	-21
Chile	-7	Grapes	0	-7	Wheat	9	2
Colombia	-34	Coffee	-5	-39	Colombia	9	-25
Côte d'Ivoire	-26	Cocoa	-21	-47	Rice	16	-10
Dominican Rep.	-19	Coffee	-32	-51	Rice	26	7
Egypt	-14	Cotton	-22	-36	Wheat	-21	-35
Ghana	-89	Cocoa	34	-55	Rice	118	29
Korea	-12	-	-	-	Rice	86	74
Malaysia	-10	Rubber	-18	-28	Rice	68	58
Morocco	-8	-	-	-	Wheat	0	-8
Pakistan	-35	Cotton	-7	-42	Wheat	-21	-56
Philippines	-28	Copra	-26	-54	Maize	26	-2
Portugal	-13	Tomatoes	17	4	Wheat	26	13
Sri Lanka	-31	Rubber	-31	-62	Rice	11	-20
Thailand	-19	Rice	-15	-34	-	-	-
Turkey	-35	Tobacco	-28	-63	Wheat	-3	-38
Zambia	-57	Tobacco	7	-50	Maize	-9	-66
Average			-11	-40		21	-6

Source: Krueger *et al* (1988: 262 – 263)

Notes: Blanks denote circumstances where a country does not have a main export or import product.

Direct rate of protection is similar to the Nominal Rate of Protection criterion and the indirect rate includes macro-economic policy effects.

The same conclusion was arrived at in the substantial quantitative analysis of Gorn *et al* (1993). In a time-series analysis over the period 1969 to 1985 they found that the arithmetic mean of the direct net nominal rate of protection for wheat exporting countries is 13,3 percent compared to the 26,0 percent of wheat importing countries.

In the case of rice the comparative figures is –12,2 percent for rice exporting countries *versus* the 22,2 percent for rice importing countries. In addition it was found that net importing countries granted much more favourable producer prices for wheat than net exporting countries.

Anderson (1995) provided additional support for this conclusion. He simulated a social accounting matrix for a developing and developed economy respectively. The assumptions used reflected the structural differences as described in Table 2. 1. It was found that a ten percent reduction in agricultural prices due to a tax on agricultural exports would reduce the real income of farmers by less than four percent but would boost the real income of industrialists by forty percent. And, of course, the added advantage is that it is easier to tax exports at a few harbours compared to the numerous small farmers in developing countries. In the developed economy a ten percent increase in agricultural product prices (due to a tax on imports) would boost real farm incomes by 23 percent while lowering the real incomes of industrialists by only three percent. In the case of developed economies trade policy measures are preferred due to the lack of observability compared to the more efficient (but more observable) measure of direct payments. These underlying structural economic factors, rather than pressure group activities, explain why exports in developing countries are taxed.

De Gorter and Swinnen (1994: 317) are of the opinion that, within the framework of the pressure group approach, one would expect export industries in developing countries to be able to organise more effectively in pressure groups than the many small sized farms that typically comprise the import industries. This is due to the fact that farms in the export industries of developing countries are usually large, cost efficient and profitable. In addition they are usually few in numbers and would therefore be able to mobilise the necessary funds.

Bullock (1992), who investigated the countercyclicity[1] of transfers to agriculture, provides the fourth example. According to the pressure group approach inter-group transfers take place at the political equilibrium point where the income redistribution

---

[1] *By countercyclicity it is meant that when agriculture (or an industry) experiences adverse conditions the support it receive from government increases and* vice versa.

constraint (dependant on the efficiency of transfers between groups) forms a tangent to the highest possible iso-support curve (which is assumed to be independent from exogenous income shocks) in "welfare space". For a different political equilibrium point to be reached either a change in the iso-support curve or a change in the income redistribution constraint has to occur. But, given the assumptions, a drought or change in market price for a commodity or group of commodities would not change the iso-support curve[1]. The only alternative is that it will have an effect on the income redistribution constraint and, therefore, on the efficiency of the transfers between groups. This would entail an inverse correlation between farm income and transfer efficiency. The question can, however, be asked why would a government be more efficient in the transfer of income during adverse conditions than during prosperous times and *vice versa*?

In his investigation Bullock (1992) came to two important conclusions. The first is that transfers to U.S. agriculture are countercyclical and the second is that transfer volatility is not caused by year-to-year fluctuations in potential transfer efficiency. Although the countercyclicity of transfers may seem obvious to the man on the street, it cannot be explained by the pressure group approach.

In his subsequent work Bullock (1994) introduced the concepts of "altruism", "envy" and "public goods" in his model following similar changes that Becker (1985), as quoted by Bullock, made to his approach. He argue *inter alia* that altruistic non-farmers would respond to media reports of widespread family farm bankruptcy by holding "Farm Aid concerts" and even decreasing pressure on government for tax reductions. Similarly, altruistic farmers would feel sorry for taxpayers during years of record farm profits, feel guiltier about being on the government dole and decrease pressure for government transfers. With these changes he were able to explain the countercyclicity of government transfers to agriculture.

---

[1] *The iso-support curve, according to Becker (1983) is dependent on factors such as group size, group organizational ability, spatial distribution, etc. (see Section 2.4.2.1.). These variables may change over the longer term, but not dramatically enough to explain the short-term variability found at the base of countercylicity.*

A fifth example, more focussed on the empirical research done using game theory within the framework of this approach, is provided by Bullock (1996:750 – 751). He states that:

(a) The observed welfare outcomes are often not Pareto-optimal;

(b) The strategies of non-governmental interest groups are not observable;

(c) The political preference function weights[1] derived are often difficult to interpret;

(d) The statistical properties of political preference function weights are still unclear.

Finally, Alston and Carter (1991: 120) focus on the complexity of the models needed to represent reality. They argue that only two pressure groups, producers and consumers, are usually included in analysis. However, this is clearly an oversimplification of reality. Reality would demand multi-group (including foreign groups) and multi-instrument models which makes provision for the cross influence of groups and instruments. One of the basic assumptions of the pressure group approach, that "...additional pressure (of a group) does not affect political expenditures of other groups..." (Becker, 1983: 395), is therefore apparently questioned. Even Browne and Paik (1994), setting out as "...proponents of Olson..." (*op cit*: 126) conclude, "...legislators almost always choose to do farm favours because these anchor the entire policy domain and its many issues..." (*op cit*: 138).

An interesting observation from the literature is the fact that most examples in the pressure group approach have been developed within a United States and European context. Lobbying, contributions to campaign funds and "buying" of politicians plays an important part of the argumentation. Clearly these activities will be less successful in a country with other, more pressing, social objectives.

De Gorter and Swinnen (1994: 320 – 322) concede that lobbying activities play a "marginal" role in affecting political outcomes. They cite examples where there is a close relationship between government and the pressure group (i.e. the U.S. Farm Bureau) and where entrepreneurial politicians use existing structures in mobilising the rural vote (i.e. Belgium). Anderson (1995: 402) also states that "those

---

[1] *The "power" of the different interest groups.*

(underlying structural) differences are so large that it seems hardly necessary to consider relative costs of collective action by different groups as an explanator of policy choices". The balance of arguments is that there are too many paradoxes for the pressure group approach to present a reliable theoretical framework. In the words of Hagedorn *et al* (1990: 3) it is sometimes necessary that approaches "…be complemented, improved or sometimes even be replaced by other theories".

2.4.3. The politician – voter interaction approach

The origins of the third approach can be traced back to the model developed by Downs (1957) that does not focus on lobbying power or social by-products. At the base of this approach is the assumption that both politicians and voters are rent-seeking entrepreneurs in contrast with the previous approaches that see one or the other in a passive role. Politicians compete for political support, defined in terms of votes, popularity ratings and other activities that reflect the intensity of voter support for specific actions. Citizens supply support in exchange for favourable policy interventions. Policy decisions by government are therefore postulated to depend on political support and *vice versa*. The politician – voter interaction model does not rely on collective action and organisation costs and the free-rider problem therefore does not enter the calculus (De Gorter & Swinnen, 1994: 315).

2.4.3.1. The politician – voter interaction approach explained

Any policy action in effect implies income transfers from one section of the population to another. The support politicians receive from individuals in the economy therefore depends on how their policies (proposed or actual) will affect the economic welfare of the individuals in each affected section of the population. According to De Gorter and Swinnen (1994: 315) individual political support is assumed to be a strictly concave and increasing function of policy-induced change in utility. In the calculations of the politician, implicitly or explicitly, marginal support levels play the role of weights and therefore depend on the levels of income transfers.

This line of reasoning, combined with an increased exasperation with the pressure group approach, led De Gorter and Tsur (1991) to propose the politician – voter interaction approach. They assume that:

(a) Political opinions are formed depending on relative income and redistributive income.

(b) Politicians maximise the sum of individual support functions, stated as:

$$S(t) = n_u S^u(t) + n_r S^r(t)$$

Equation 2. 10

Where: S = Political support function

n = the size of the group

t = per capita transfer (negative in the case of a tax and positive in the case of a subsidy)

r = the rural population (land owners)

u = the urban population (labour owners)

In their analysis, based on the aforementioned assumptions, they arrived at a number of propositions. These include:

(a) If members are concerned only with relative income, then the optimal per capita transfer level will be equal to that which yields an equal income distribution.

(b) If the initial income gap is negative[1], then the optimal per capita transfer level decreases and optimal per capita rural subsidy increases with an increase in the urban to rural population ratio. The inverse is true in the case of a positive initial income gap in that the optimal per capita transfer level will increase and the per capita rural subsidy decrease with a decrease in the urban to rural population ratio. In the same vein is the proposition of Swinnen (1994: 5) that an increase in industrial employment and/or decrease in agricultural employment will increase agricultural protection.

(c) The optimal per capita tax decreases with the initial income gap.

---

[1]   *In other words, the* per capita *income of farmers is less than the* per capita *income of non-farmers.*

Swinnen (1994) built on the model developed by De Gorter and Tsur (1991) and derives the following equilibrium condition for the politically optimal income transfer:

$$\frac{S_v^A}{S_v^M} = \frac{U_y^M(1+C_R^M)}{U_y^A(1-C_R^A)}$$

Equation 2. 11

Where: S = the first order derivative of the political support function;

U = the first order derivative of the utility function of individual i;

C = the first order derivative of the cost associated with the transfer R;

A = the agricultural sector;

M = the manufacturing or non-agricultural sector;

v = a specific policy option;

y = individual disposable net income; and

R = income transfer.

By manipulating this model the following propositions are *inter alia* added by Swinnen (1994) to those derived by De Gorter and Tsur (1991):

(a) An increase in marginal deadweight costs reduces the equilibrium transfer.

(b) The political equilibrium subsidy will increase as the share of agriculture in total output declines.

(c) The demand elasticity does not affect the political equilibrium subsidy.

(d) Agricultural protection will be lower for products with higher supply elasticities.

(e) Results derived for a closed economy also hold in a small open economy.

(f) In a small open economy, the politically optimal tariff declines as the share of food expenditures increases due to an increase in the distortionary effects on taxes and consumption. From this it follows that poor people, experiencing low marginal income tax rates, few government benefits and a higher than average marginal propensity to consume food, will oppose import tariffs more vigorously than do rich people.

(g) Agricultural protection will decline with an increase in the degree of food self-sufficiency.

It follows that this approach would entail a liberal as well as a conservative facet. The liberal facet is reflected in the way that politicians compensate a section of the population that experiences a decline in income relative to other sections of the population. The conservative facet is situated in the avoidance of a decline in the relative income of a section of the population. This partly explains the inertia of policy measures once in place (De Gorter & Swinnen, 1994).

De Gorter and Tsur (1991: 1244 – 1245), in addition to the distinction between politicians and voters, categorise voters as landowners and labour owners[1]. They argue that in developed countries the majority of farms are family owned and operated and that leasing of farmland is therefore relatively limited. In developing countries, however, there is also an important segment of landless workers who are viewed to be labour owners free to sell their services in either rural or urban areas. Land on the other hand is immobile and any changes in the prices of agricultural products would therefore reflect in the value of agricultural land. They conclude by stating that landowners would be the main gainers or losers of agricultural policies. Following this reasoning they include labour owners in the urban population data sets in their analysis.

Within the framework of the politician – voter interaction approach it is clear that the relative movement of *per capita* income[2] between sections of the population will play a central role in determining the level of support received (De Gorter & Swinnen, 1995: 407). The relative difference between the agriculture to urban income ratio would explain the Argentina/Canada and United Kingdom/Germany examples cited in the previous section. It would also explain the differential between support to export and import industries. As the export of agricultural produce normally indicates a relatively more favourable competitive advantage, the *per capita* income received by those involved in export industries would be more favourable than those involved in non-competitive import industries (De Gorter &

---

[1] *From a South African perspective this distinction is very important. Normally the South African agricultural sector is defined to include the large labour component. Within the definition of De Gorter & Swinnen these individuals would be considered labour owners and would therefore be included in the urban data sets.*

[2] *Anderson (1995: 402) makes the interesting observation that, due to the relatively small number of years most governments have before the next election or coup attempt, most redistributional policies will have a short-term focus.*

Swinnen, 1994: 319 – 320). According to De Gorter and Tsur (1991) the politician – voter interaction approach explains why agricultural support will increase with a decrease in the number of farmers. The reason is that the increase in political support (in terms of *intensity* of support) due to the income redistribution effect more than offsets the decrease in political support due to a declining number of farmers.

Up to this stage the emphasis has been placed on income transfer policies, or according to Rausser (1992: 822) on "predatory" or political economic-seeking transfers (PEST's). He defines PEST's as policy measures focussed primarily on the redistribution of wealth between different sectors of the community. This is necessitated not so much by market failure, but rather by government failure. On the other hand there are so-called productive policy measures focussed on the enhancement of the efficiency of the system. These measures, the so-called political economic resource transaction (PERT's) measures, have the net effect of increasing the size of the proverbial pie[1]. Of course, these measures that enhances efficiency often contribute to Cochrane's treadmill (see Section 2.3.2). According to Olper (1998: 469) PERT and PEST policies are determined jointly. Or, in other words, governments set a productive policy and then a compensation scheme is set up using a redistributive PEST policy that makes the former politically sustainable. The hypothesis would therefore be that if a country reduces its PEST policies it would also reduce its PERT policies.

But what can be gleaned from the politician – voter interaction framework regarding productive or public good policies (i.e. public research and extension)? De Gorter and Tsur (1991: 1248) reason that changes in technology or input costs will result in changes in the urban to rural income gap. Investment in technology that raises the relative productivity and endowments of farmers would therefore result in a decrease in the transfer level that yields an egalitarian income distribution. In other words, relatively higher investment in agricultural technology would lead to lower levels of agricultural support, given the *ceteris paribus* condition.

---

[1] *This distinction is important in the South African context, as the powers of provinces are basically limited to PERT-like policy measures. At a national level the Constitution allows the implementation of both PERT and PEST-like policy measures. However, complicating this situation is the fact that substantial parts of the* implementation meganisms *for PEST-like policy measures are in the hands of the provinces.*

Swinnen and De Gorter (1998) expand on this observation by endogenising commodity policies in their analysis. They found that the main factors influencing the change in public support for agricultural research is the type of commodity policy involved, the objective function of the government and the relative distribution of the advantages of the research programme between producers and consumers. The latter is dependent on the relative price elasticity of supply and demand for the specific commodity. For instance they found that in the case of a government maximising a weighted utility function, or in the case of a government maximising political support and using a target price policy with deficiency payments, the result is dependant on the relative price elasticity of demand and supply. If technology development sponsored by the government leads to a relative gain to producers, then the income disparity will increase with the likelihood that income transfers will decrease (i.e. lower target price) and *vice versa*.

De Gorter and Swinnen (1994: 322 – 323) continue by arguing that in developing countries the demand for food is relatively more elastic and the supply relatively more inelastic than in developed countries (see Table 2. 1). Farmers in developing countries are expected to gain more from public good expenditures than consumers. In developed countries, with an inverse relationship between the elasticities of demand and supply, the opposite is true. In both cases expenditure on public goods will lead to a more unfavourable agriculture to urban income ratio from the perspective of agricultural support. This explains why there is a significant underinvestment in agricultural public goods in both developing and developed countries.

This then allows an explanation of *why* governments in industrialised countries subsidise farmers while those in developing countries tax farmers. In a developing country, were the relative *per capita* income distribution between agricultural and urban households is to the favour of agriculture, governments will be tempted to tax agriculture to the benefit of urban consumers. Ample evidence for this situation is provided by Krueger *et al* (1988), Gorn *et al* (1993) and Anderson (1995) as discussed in Section 2.4.2.3. As the economy develops and the relative changes in income elasticity of demand, price elasticity of demand, price elasticity of supply and agricultural technology development lead to downward pressure on the prices of

agricultural commodities (see Cochrane's treadmill as explained in Section 2.3.2), the *per capita* income distribution of farmers weakens relative to those of urban households. Within the framework of the politician – voter interaction approach governments respond by subsidising agricultural activities. It is especially evident from the work of Anderson (1995) that underlying economic factors, rather than the activities of pressure groups, are responsible for the fact that export industries in developing countries are taxed.

An example in case is the situation in the United States before and after the Great Depression. In 1925 the average farm employee earned $70,13 per month (cash and in-kind earnings) compared to the $99,36 per month of the average employee in the manufacturing sector; a ratio of 0,71 (see Table 2. 6). If the ratio of the farm to urban consumer price index (reflecting the cost of living differential between farm and city) is taken into account, the ratio changed to 0,88. Farm earnings, as well as the farm to manufacturing earnings ratio declined consistently to 1933, leading to the introduction of the Agricultural Adjustment Act of 1933. Although farm earnings started to increase as a result, the farm to manufacturing earnings ratio continued to decline, albeit at a lower rate. This was more a result of growth in the manufacturing sector than a decline in the agricultural sector. The result is that in 1941 the farm to manufacturing earnings ratio was almost half that of 1925. De Gorter and Swinnen (1994: 317) are of the opinion that this is one of the explanations of why the agricultural sector in the United States has received high levels of governmental support ever since.

Another concept to be discussed is that of "altruism". Both Becker (1985) and Bullock (1994) introduced the concepts of "altruism", "envy" and "public goods" in their (essentially pressure group) models. Swinnen and De Gorter (1993) show that this "altruism" of politicians is essentially "self-interest". Again underlying economic factors (the pre-policy income gap between groups in society) explains the perceived altruistic side of politicians.

Recent economic developments in those European countries that were formerly behind the Iron Curtain illuminate this approach[1]. The Central European Countries[1]

---

[1] *A detailed analysis of agricultural transition in Central and Eastern Europe is provided in Swinnen (1997).*

(CECs) followed a similar route in freeing their economies in the post-1990 period. Food-price liberalisation started in August 1989 and was completed by February 1991 (the only exception was Romania where it was only completed in May 1993).

Table 2. 6: **The relationship between monthly earnings in the agricultural and manufacturing sectors of the United States.**

Year	Agricultural earnings			Manufacturing earnings	Farm CPI / City CPI	Agricultural to Manufacturing Ratio			
						Nominal		CPI adjusted	
	Cash	In-kind	Total			Cash	Total	Cash	Total
1925	$43,51	$26,62	$70,13	$99,36	80%	0,44	0,71	0,55	0,88
1926	$44,36	$26,68	$71,04	$100,58	79%	0,44	0,71	0,56	0,89
1927	$44,36	$26,76	$71,12	$102,01	78%	0,43	0,70	0,56	0,89
1928	$44,28	$27,02	$71,30	$103,52	80%	0,43	0,69	0,53	0,86
1929	$44,52	$27,33	$71,85	$105,73	80%	0,42	0,68	0,53	0,85
1930	$41,25	$25,03	$66,28	$94,90	78%	0,43	0,70	0,56	0,90
1931	$32,11	$19,71	$51,82	$83,11	74%	0,39	0,62	0,52	0,84
1932	$23,66	$14,40	$38,06	$62,75	72%	0,38	0,61	0,52	0,84
1933	$21,10	$12,69	$33,79	$64,61	77%	0,33	0,52	0,42	0,68
1934	$23,61	$13,99	$37,60	$71,33	82%	0,33	0,53	0,40	0,64
1935	$25,53	$15,04	$40,57	$79,39	82%	0,32	0,51	0,39	0,62
1936	$27,51	$15,67	$43,18	$86,87	82%	0,32	0,50	0,39	0,61
1937	$31,25	$17,03	$48,28	$97,11	83%	0,32	0,50	0,39	0,60
1938	$30,91	$14,94	$45,85	$89,57	80%	0,35	0,51	0,43	0,64
1939	$30,56	$14,18	$44,74	$98,89	80%	0,31	0,45	0,39	0,57
1940	$31,28	$14,51	$45,79	$103,61	80%	0,30	0,44	0,38	0,55
1941	$38,14	$16,01	$54,15	$122,16	83%	0,31	0,44	0,38	0,53

Source: Alston & Hatton (1991: 86 – 90)

On the agricultural production side subsidies were reduced in a process that started in 1989 and was completed by 1991 (although Bulgaria completed only in 1992, while Romania has yet to complete the reforms (Hartell & Swinnen, 1998: 262 – 264)). In

---

[1] *Bulgaria, Czech Republic, Hungary, Poland, Romania and Slovak Republic.*

a country like Bulgaria the distribution was initially in the favour of final consumers but subsequently changed to the advantage of retailers. Throughout the period 1990 to 1993 farmers and consumers were losing heavily to the benefit of processors and retailers (Ivanova *et al*, 1995: 370). Swinnen (1998: 246 – 248) found that flour retailers received annual net transfers of approximately 27 percent while flour consumers have been consistently taxed at an annual level of 13 to 18 percent over the same period.

It is therefore not strange that the majority of the CECs almost immediately (1992) reintroduced a variety of support measures to agriculture. Although these measures were initially of a short-term stopgap nature, certain trends developed over time (Hartell & Swinnen, 1998: 264 – 272):

(a) Producer support was largely in the form of minimum or guaranteed prices for domestically important products (typically wheat, milk, beef);

(b) Import tariffs were introduced in specifically Poland and the Czech Republic.

(c) Export subsidies were used by especially Hungary and to a lesser extent the Czech Republic. This measure is used more sparingly by Poland and the Slovak Republic and not at all by Bulgaria and Romania due to monetary limitations.

(d) Supply controls (quotas) have only been applied in Poland (sugar), Slovak Republic (milk) and Hungary (milk).

(e) Credit subsidies have been instituted in all CECs, although at varying levels.

One explanation for the reintroduction of subsidies is that the CEC's are preparing their economies for possible integration into the European Union. What this does not explain, however, is why the CECs did not mirror the MacSharry reforms to the CAP and why there are important differences in both the level and type of policy measures between the different CECs. Another possible explanation is that underlying structural economic variables explain these changes (Hartell & Swinnen, 1998). For instance, before political transition in the CECs, wages did not reflect sectoral productivity. However, during the first year of transition agricultural wages declined by between ten to fifteen percent. Significant structural differences are also apparent amongst the CECs. For instance in Rumania agriculture contributes 22 percent to the GDP, 34 percent to employment and food is 60 percent of consumer expenditures. In the Czech Republic, with a much more EU-like economic structure, agriculture

contributes 3,1 percent to GDP, 6,3 percent to employment and food is 31,5 percent of consumer expenditure (Swinnen, 1996). It is evident that it is the latter, closely related to the principles of the politician – voter interaction approach, that is more appropriate in explaining the differences that do exist within the CECs (Hartell & Swinnen, 1998).

These results from the CECs may be of the utmost importance for South Africa. South Africa is, similar to the former communist countries, going through a process of agricultural transition that includes restructuring the ownership of agricultural land. At the same time certain powers have been delegated to South Africa's nine provinces. However, there is a wide difference between the underlying economic structures of these nine provinces. This train of thought will be further developed in Chapter 4.

2.4.3.2. Quantitative examples

There are still relatively few quantitative empirical analyses of the politician – voter interaction approach. Swinnen and De Gorter (1997) used data for eleven agricultural products over the period 1877 to 1985 in Belgium as case study. The second study, by Crommelynck *et al* (1998) focused on Finland for the period 1931 to 1990. Nine agricultural products were included in the analysis. Swinnen and De Gorter (1997) used the nominal rate of protection (NPC) and the producer subsidy equivalent (PSE) criteria as indication of protection. Their explanatory variables included:

(a) Producer income (the world market price of the commodity as indication of pre-subsidy income levels).

(b) The commodity-share of the Gross National Product (GNP).

(c) Aggregate capital intensity of agriculture.

(d) The commodity share of consumer expenditures.

(e) Agricultural employment as share of total employment.

(f) Self sufficiency ratio (the ratio of domestic production to consumption).

Certain dummy variables were also included:

(a) A variable to make provision for the inclusion of Belgium into the EU.

(b) Four dummy variables to make provision for institutional changes such as voting rights for women.

(c) Eleven product dummy variables to capture commodity specific changes.

The study by Crommelynck *et al* (1998) shows a similar structure with the following exceptions. Only the NPC criterion was used as dependant variable and the aggregate capital intensity was excluded as independent variable. Of course the dummy variables for inclusion in the EU were not used, as Finland is not a member of the European Union. As only nine products were analysed in this study, the number of product dummy variables included to capture commodity specific changes was limited to nine. The four dummy variables to make provision for institutional change were replaced to make provision for political party influence.

In both studies (Swinnen & De Gorter, 1997; Crommelynck *et al*, 1998) high levels of significance (R^2 – values of respectively 0,78 and 0,83) were obtained. It was shown that a decline in agricultural income relative to incomes in the rest of the economy leads to higher levels of agricultural protection. In addition it was found that protection is negatively correlated with agriculture's share of consumer expenditures, the self-sufficiency ratio and with the ratio of farmers to total employment. In the former analysis a positive correlation was found between agricultural protection and Belgium's inclusion in the EU as well as between agricultural protection and the expansion of the franchise. It follows that the qualitative analysis supports the theoretical framework as developed by De Gorter and Tsur (1991) and Swinnen (1994).

As this approach is currently in the initial phases of empirical research and conclusive theoretical body has not yet been developed, the authors suggest that certain other variables should be included in future quantitative analysis. These variables are:

(a) Supply elasticities.

(b) Degree of commercialisation.

(c) Perishability of the product.

(d) The degree to which a product is traded.

(e) The level of concentration of the processing industry.

In a more recent study Olper (1998) investigated the behaviour of the EU member countries over the period 1975 to 1989. It was found that the income gap variable is always negative and statistically significant. This supports the hypothesis that the larger the gap between farm and non-farm income the higher the level of agricultural support. It is worth noting that the significance of the income gap variable remains high even when variables measuring agricultural trade flow and comparative advantage are included in the model. Also negative is the number of farms[1], comparative advantage and food as a share of consumer expenditure. The latter two support the hypothesis that the level of agricultural protection rises as the resistance of consumer groups and the political cost of agricultural protection declines. An important deduction that can be made from this study is the fact that the underlying economic and political interests of the member states must be taken into account when dealing with the EU. This important implication for South Africa's future dealings with the EU will be dealt with in more detail in Chapter 4.

2.4.3.3. *Critique on the politician – voter interaction approach*

One point of critique that can be levelled at the politician – voter interaction approach is the assumption that monetary matters exclusively determine the support of politicians by voters. De Gorter and Tsur (1991: 1245) state that "Two motives are assumed to determine the formation of political opinion by members: the relative income motive and the redistributed income motive." Within a global context one must concede that in certain countries other matters, such as ideological, ethnic or religious considerations, will play an important role in determining voter preferences. It is, however, difficult to foresee the inclusion of these variables in a mathematical model.

The politician – voter interaction approach provides a valuable insight into the *why* of agricultural support. Although this approach is relatively new, it provides an explanation for situations that neither the social maximisation approach nor the pressure group approach could provide. It's further relevance lies in the fact that it

---

[1] *The specification of this variable may be questioned. The actual number of farms per country was included. However, the decision-making procedures of the EU (consensus) and the over-representation of small countries (see Economist 1999c) may result in a bias in favour of smaller countries.*

does not rely on a single, and sometimes problematically quantifiable, factor (the ability of a group to organise itself), but allows for a number of diverse variables.

2.5. CONCLUSION

Along the route of economic development agriculture will face a number of well-documented problems. These include price instability, the treadmill and asset fixity. Various solutions, in the form of farm policy, have been implemented in the past as a remedy for these problems. It is unfortunate that a number of these policy measures have contributed to the problem rather than to the solution. This is especially the case where the policy measures of developed countries harmed agriculture in developing countries. As one of the basic causes of these problems is the relative price elasticities of demand and supply, it follows that changing the slope of either the demand or the supply curve may lead to a solution that will not distort international trade. This may form part of the solution to be developed for the wheat industry in the Western Cape. Possible opportunities to this end will be investigated in Chapter 5.

The propensity of politicians to provide the necessary support lies in the domain of political economy theory. It has been argued in the literature that the politician – voter interaction approach is not new as such, but only a branch of the pressure group approach (see for instance Brooks, 1995 and Olper, 1998). This argument may be taken a step further to include the welfare maximisation approach. The concept of the relative movement of *per capita* income between land and labour owners as a determinant of support (De Gorter & Tsur, 1991; Swinnen, 1994) shows similarities with the Pigouian concept of economic welfare (Pigou, 1932: 10 – 18). In addition it can be argued that the relative movement of *per capita* income between land- and labour owners in developed economies would imply a Pareto deprovement, and thus that some form of compensation along the lines of the Hicks-Kaldor criterion[1] could be justified. With reference to the pressure group approach the concept of defending the *status quo ante* (see Hagedorn *et al*, 1990: 15 – 23) and the concept of the "tyranny of the *status quo*" (Becker, 1983: 382) show the same underlying principle.

It is interesting that the initial work using Becker-type models also shows a distinct similarity to the concept of economic welfare. However, in later work proponents of the pressure group

---

[1] *Although in this case an actual and not a hypothetical compensation.*

approach were forced to return to the so-called x-factor; non-economic "other goods" (see for instance Becker, 1985 and Bullock, 1994) that include vague concepts such as "altruism", "envy" and "guilt".

The real difference between the pressure group and politician – voter interaction approaches is not that similar variables are included in the analysis, but the exclusion of certain pressure group variables, such as deadweight costs, altruism and group efficiency. Thus, although some variables are similar, the basic point of departure is different. The politician – voter interaction approach departs from the assumption that both politicians and voters are fully informed rent-seeking entrepreneurs and that underlying structural economic variables determines policy outcomes and thus rent transfers. In contrast the pressure group approach see politicians in a passive or clearinghouse role with collective action from interest groups predominantly determining policy outcomes.

The implications for the wheat industry, as well as the agricultural sector, of the Western Cape Province are clear. The traditional wisdom has it that in searching for a Pareto-optimal state, or at least a second-best solution, pressure group activities may play an important role. This is seen as important due to the difficulties, as indicated by Arrow's impossibility theorem, in transforming individual preferences into political preference functions. However, numerous examples have shown that pressure group activities may only play a marginal role in influencing the final outcome. The underlying structural characteristics of the national and provincial economies may be a more important determinant. These structural characteristics will be investigated in Chapter 4 and may play an important role in determining the optimum strategy to be followed by the local wheat industry and agricultural sector.

CHAPTER 3

FARM POLICY AND ECONOMIC DEVELOPMENT

3.1. INTRODUCTION

The following quote probably rings a bell to many a South African ear: "*...the growing violence and crime in .... experiencing 25% unemployment and facing political disorder and radical solutions (is) likely to create even further disorder.*" It is however not an exerpt from a South African politician's speech, but Bonnen and Schweikhardt (1998: 23) describing conditions in the United States during the Great Depression.

In the discussion thus far it has been established that a dichotomy exists between developing and developed economies, and the origins of the problems of instability, low returns and asset fixity in agriculture have been identified. A theoretical framework to explain the reasons why different levels of support to agriculture are found between countries has been explored.

In this chapter the focus will be moved to agriculture as part of the economy of a country, and more specifically, to the role of agriculture in the transition from a developing to a developed economy. The theory underlying this process is well developed and can therefore be used as a sound base of departure. This theoretical base allows a scrutiny of the potential for agriculture to act as catalyst in the economic development of Southern Africa.

One can argue that the current characteristics of the agricultural sectors of developed economies are the final phase of economic transition. It would therefore only be necessary for developing economies to "play catch-up" before reaching the level of developed economies. The opposing argument is that economic transition is an on-going process and that a new stage of economic development, let it for the moment be called the information society, is dawning. Said stage would have a new set of characteristics with a distinct role for agriculture, not only in the structure of the economy, but also in the transitional phases. In developing the characteristics of an information society it is necessary to identify the key

trends that will influence the transitional phase and, in the end, the characteristics of the economic structure. This reasoning will form the second part of the chapter.

The agricultural sector in South Africa in general, and the Western Cape wheat industry in particular, shows certain characteristics associated with a developed economy. In spite of this certain parts of the national and provincial economy reveal distinct characteristics usually associated with developing economies. Thus, it can be assumed that the Western Cape wheat industry still has a traditional developmental role to play. The importance of identifying the salient characteristics of (a) a developing, (b) a transitional, (c) an industrial and (d) an information society is situated in the possibility of charting the most effective route to the future. However, the implications for the Western Cape wheat industry will only be developed in Chapter 4 and subsequent chapters.

3.2. THE ROLE OF AGRICULTURE IN A TRANSITIONAL ECONOMY

From the earliest times agriculture has played a role of the utmost importance in economic development. This trend is not only evident from developments in the Western Hemisphere (chiefly in the transition from feudal to industrialised economies), but more recently also in the East. As part of this transition the importance of agriculture (measured as a percentage of the economy) usually declines (the secular decline of agriculture) leading to the negation of the role of agriculture in some circles. It is therefore necessary to investigate the role that agriculture may play as part of this process before focusing on Southern Africa and then on the implementation of rural development.

3.2.1. Agriculture as a catalyst for economic development

At the start of the process of economic development agriculture is usually the dominant sector of the economy. The majority of resources, both natural and human, are usually deployed in this sector. It would therefore naturally follow that agriculture must play some role in the process of transition, even if it is only to release resources. The precise nature and extent of agriculture's role will be investigated in this section.

3.2.1.1. *Agriculture as a provider of food*

According to Johnston and Mellor (1961) agriculture contributes in a number of important ways to over-all economic development. The first of these is the provision of increased food supplies. The annual rate of increase in the demand for food in a country is a function of the rate of population growth and the product of changes in per capita income and income elasticity of demand for agricultural products. This growth in demand for food in developing countries is of importance due to the high rate of population growth usually associated with these countries. The high rate of population growth combined with a higher income elasticity of demand for agricultural products than in developed countries (see Table 2.1) can result in severe penalties if the domestic increase in production is not of the same magnitude as the increase in demand. Due to the usual limited foreign exchange available and therefore limited import possibilities and the opportunity cost of foreign exchange, food shortages may lead not only to political instability, but also to inflationary pressure. Mellor (1986: 77) argues that an imbalance between food supply and the demand for food will lead to the erosion of the real income of workers and thereby reduce the incentive to find employment. This in turn will lead to upward pressure on wage levels and reduced employment. However, according to Johnston and Mellor (1961) the opposite is also true. If the supply of food expands more rapidly than demand, this may lead to downward pressure on inflation, but, depending on the price elasticity of demand for agricultural products, lower returns on investment in agriculture.

In the role that agriculture historically played in the economic development of the industrial countries, increased farm production often went hand in hand with the expansion of the area under cultivation. This trend was most strikingly visible in the United States where the value of agricultural output increased fourfold over the period 1800 to 1850 (from $333 million to $1 442 million). However, over the same period the output per agricultural worker stayed more or less the same (Cochrane, 1963: 11). Increased production can therefore largely be ascribed to the westerly expansion of the fledgling United States and not, especially in the initial phases, to higher levels of productivity. Strikingly then that the literature on agriculture's role in economic development largely originated in the United States. In the current

developing world the same scope for lateral expansion does not, however, exist in most cases. Increased productivity in agriculture through mainly yield increasing and cost reducing technology is therefore of the utmost importance from the outset in the economic development process. A notable exception to this classification of developing countries can be found in Southern Africa (see Section 3.2.2 for a discussion of the possibilities).

The three main points of critique against this role of agriculture are identified and refuted by Mellor (1986: 78). One argument is that labour is already maintained and idle in rural areas. Empirical observation shows that increased wage payments to the rural unemployed results in money in the hands of people with a very high income elasticity of demand for food. Mellor (1986) also refutes the assumption that the aggregate price elasticity of supply of food is high (elastic). Again the empirical evidence is clear: it is low. Without technological development the supply of agricultural products is only slightly responsive to changes in prices. The third argument is that the supply of food from imports is highly elastic. This is only true if no widespread global economic development takes place. It also negates the pressure on foreign exchange that such a strategy will imply.

In their subsequent work, Mellor and Johnston (1984), show that in most developing countries, with specific emphasis on Sub-Sahara Africa, the opposite is unfortunately the case. The increase in the domestic production of food in these countries has fallen well below the population growth rate. Although in most developing countries, with the exception of Sub-Sahara Africa, the *per capita* consumption of food is increasing, this is mostly due to increased levels of imports and food aid. The warning by Mellor (1986: 77), that employment growth must go hand in hand with the growth in food production in order to prevent upward pressure on food prices, is therefore not heeded. Mellor and Johnston (1984) also stressed the relationship between the availability of food and productivity. It is true that in many developing countries the levels of nutrition are below the requirements for moderately active individuals, and even below subsistence levels. The nutritional levels of children is often of such a nature that their ability to function as economically active adults is impaired.

Finally, even in conditions where the total production of food is increasing rapidly, the sale of food in order to meet cash requirements may lead to situations of food insecurity at individual household level. Evidence from Uganda indicates that under conditions where food production is increased at individual household level over and above household needs, the food security situation may be improved where additional cash income can be created. However, if the production levels remain constant and the sale of food is increased at the same time, then household food security may deteriorate (Ejupu *et al*, 1999). As in any successful business consumption may not exceed production. Although this situation may influence the food security situation of some individual households, the importance of agriculture as a provider of food at macro-economic level still remains the same.

3.2.1.2. *Agriculture as earner of foreign exchange*

The second contribution of agriculture to economic development can be found in the possibility of increased agricultural exports. One of the most obvious advantages is an increase in foreign exchange earnings coupled with a decrease in foreign exchange outflows due to less imports. In certain regions, with specific reference to experience in the Western Cape Province, foreign direct investment in agricultural activities may also follow. Another advantage is increasing levels of domestic earnings.

The advantages of targeting an existing market, especially if the developing country is a small player within the market and therefore faced with an elastic demand for the product can, however, easily be offset if the same product is being produced by a number of developing countries (Johnston & Mellor, 1961: 575). An additional point of critique against World Bank / IMF structural adjustment programmes is that the underlying differences between countries are often not being considered during the development of such programmes – the so-called "fallacy of composition". For instance, it has been found by Evans and Edstrom (1993) that a 25 percent cut in export taxes on coffee and cocoa in developing countries will lead to a one percent decrease in the GDP of those countries. This is equal to ten percent of the value of all international development aid.

Mellor and Johnston (1984), however, indicate that the opposite is happening in a number of developing countries. Imports of food are increasing as the consumption, in total and *per capita,* increases more rapidly than domestic production. The balance, being made up by imports, is usually funded through either food aid or the revenues of primary products such as petroleum exports. Thus, there is an additional drain on scarce capital and foreign exchange reserves of the developing countries.

3.2.1.3. *Releasing manpower*

The transfer of manpower from agriculture to other sectors is the third contribution of agriculture to economic growth (Johnston & Mellor, 1961: 575 – 576). Mellor and Johnston (1984: 550 – 551) argue that in the course of development the occupational structure moves from being predominantly agriculturally based to a predominantly non-agricultural base. Eventually it is foreseen that the absolute size of the agricultural labour force will decline. Given the rapid increase of the labour force in developing countries, Mellor (1986: 70) argues emphatically that agriculture cannot be expected to absorb all surplus labour. At best agriculture can show a 0,6 percent direct employment growth with every one percent increase in agricultural production. It is therefore of the utmost importance that a development strategy results in indirect job opportunities in non-agricultural sectors of the economy.

However, implicit in this argument is the assumption of perfect mobility of labour between sectors of the economy. It is doubtful that this assumption will bear scrutiny in especially developed countries, leading to Swinnen (2000) arguing in favour of a policy objective of reducing labour mobility constraints as part of any development strategy.

The labour to land ratio, which is expected to decline as the economy develops, brings forward the question of optimal farm size or, in other words, economies of scale. The inverse relationship between farm size and land productivity can be neutralised by either high opportunity cost of labour or by a policy environment (i.e. credit provision, research, mechanisation centres) favouring larger farm sizes. The perception of the importance of economies of scale leads to co-operative or collective style farms in many development projects. The management problems

inherent in these large farms usually result in pressure for the introduction of labour saving and capital-intensive production techniques. Thus the development potential of labour intensive agriculture is often negated (Mellor & Johnston, 1984: 557 – 559).

However, different ratios (i.e. labour to land; labour to capital) are not constant, but are dependent on the factor price ratio, technology variables and policy variables. It follows that economies of scale will also not be constant, but dependent on these variables. Depending on the environment, price-induced change in the respective ratios is possible, the so-called "induced innovation hypothesis".

The South African experience since the Second World War provides an excellent case study for the illustration of this concept. In the first few years after the end of the war, the arable area was being extended largely after the introduction of tractors. This led to increased use of labour, especially to harvest the larger crop, as well as machinery. Then, for three decades the price of machinery fell relative to the price of labour, resulting in an increase in the machinery to labour ratio as combine harvesters were introduced. After 1981 the gold price declined drastically, the Rand was devaluated and the domestic situation resulted in higher spending on national security. The subsequent financial constraints put an end to favourable credit and tax policies for agriculture. The result was that the price of machinery increased relative to the price of labour, and labour was substituted for capital. A highly significant R^2 value of 0,94 between the factor ratio and the price ratio was found over the post-war period. It follows that not all changes in the factor ratio can be explained by technological trends in factor substitution, at least over the short term. However, over the longer term it was found that a one percent increase in R&D expenditure would lead to an increase in the machinery to labour ratio of 0,13 percent. Similarly, a one percent increase in farm size will eventually increase the machinery to labour ratio by 0,33 percent (Thirtle et al, 2000).

In conclusion, it is clear that, as part of the secular decline of agriculture and changes in economies of scale, agriculture will release manpower to the rest of the economy. However, through factor price relationships or by technological and policy variables

this process can be hastened or slowed down. Binswanger (1994: 169 – 170) has warned against the possibility of the "premature shedding of labour".

3.2.1.4. *The role of agriculture in capital formation*

In the typical developing country agriculture is an important, if not the most important sector of the economy. It therefore follows that agriculture will play an important role in private and public capital formation to fuel the economic growth of the rest of the economy – the fourth contribution of agriculture. Johnston and Mellor (1961: 576 – 579) are of the opinion that this is probably the most significant contribution of agriculture. Although the capital requirements (development of infrastructure, industrial development, etc.) of a developing nation may seem daunting, they are of the opinion that productivity growth in agriculture can be achieved with a minimum outlay of capital. Agriculture can, therefore, play the role of a net contributor to capital formation. However, they warn against a user pays system for agricultural development services, as the immediate benefits may seem smaller than the immediate costs for the individual producer. As this may hamper productivity growth in agriculture, they recommend an effective system of taxing agriculture, with Japan as an example. Over the period 1881 to 1920 labour productivity in Japanese agriculture doubled as a result of technological progress (i.e. higher yielding varieties, increased use of fertiliser) and rapid dissemination of these factors. As only small capital outlays were necessary and the consumption levels of the farm population increased less than the increase in productivity, a substantial fraction of the increment in agricultural product could be used for capital formation in the rest of the economy. In the last decade of the nineteenth century agriculture was responsible for 80 percent of the tax-base of the Japanese economy.

According to Mellor (1986: 84) a prerequisite is that government must use its resources to create the necessary infrastructure for rural development. Infrastructure includes transportation, power, communication, research, education and input supplies, although the latter should be privatised as soon as possible. It follows that, although agriculture will be the main contributor to the fiscus, it should also be the main beneficiary.

Mellor and Johnston (1984: 551) are of the opinion that the extremely low initial capital to labour ratios in agriculture lie at the heart of the development problem. They cite a study by Lewis (1955) that indicates the difference between the saving ratios as a percentage of GDP (as indication of the rate of private capital formation) of non-developing[1] (6%) and developing countries (12%). Once development is under way the marginal savings rate rises, and continues to rise, dramatically. They provide a number of case studies where the initial changes in agricultural technology used lead to high marginal savings rates. A South African case study that can be mentioned is that of Nieuwoudt (1989) who supports the very high propensity of the poor to save additional income. He found an income elasticity of demand for savings in KwaZulu as high as 2,61. In a more recent local survey, Morokolo *et al* (1999) are of the opinion that it is not so much that the rural poor are averse to saving (and thus contributing to capital formation) but rather the geographic inaccessibility of formal financial institutions. More significant however, is the fact that the envisaged purposes of savings in these communities are for emergencies and for educating children. If effective government safety nets are in place then a larger part of these savings would be available for productive investments.

An economy that successfully negotiates the transition from a developing to a developed economy usually ends up with an agricultural sector that is a relatively smaller part of the economy. This so-called law of the secular decline of agriculture led many economists to believe that the catalyst for economic development can be found in the industrial sector. It follows that the role of agriculture in the process of development could be negated (Cochrane, 1963: 7). Mellor and Johnston (1984: 551 – 553) and Mellor (1986: 72 – 74) however warn against a development strategy that relies on concentrating capital in large scale and capital intensive industries, or the so-called dualistic or two-pronged approach. This approach assumes that economic growth is a direct function of the growth of the capital stock. Resources are therefore channelled into the capital goods industries and away from consumption. The output from the capital goods industries is reinvested, resulting in a high marginal savings

---

[1] A *distinction between developing and developed countries is usually made in the literature. In this case the distinction is made between developing and non-developing countries. A developing country is defined as those countries with a marked economic growth. A non-developing country is defined as a country with stagnating or negative economic growth over a period of time.*

rate and therefore a rapidly rising average savings rate. As advantages to the workers are sure to follow in the distant future, agriculture and cottage industries are supposed to provide employment and consumer goods without drawing on the limited capital resources. That is the theory. In practice, however, they argue that due to limitations in human capital and poor infrastructure, the capital requirements of the capital-intensive sectors are usually higher than initially expected and usually increase over time. The result is slower economic growth, lower levels of capital formation, overvaluation of the exchange rate and slow employment growth. Due to the (unintentional) neglect of agriculture, upward pressure on food prices is often found with consequent social and foreign exchange problems. As in the case of an import replacement strategy, the resulting economic growth tends to be narrow, urban based, to the advantage of high income consumers, and capital intensive, and therefore contributes to the problems the strategy was initially supposed to solve.

3.2.1.5. *Agriculture as a market for industrial development*

The last role of agriculture is in providing a domestic market, through increased rural income, for the products of the developing industrial sector of the economy. Increased food production, due to modern technology, leads to higher rural income levels. As there usually is a strong demand for locally manufactured non-agricultural goods in the rural areas, this in turn leads to a demand for urban manufactured products. For instance in Asia peasant farmers spent 40 percent of incremental income on non-agricultural goods (Mellor & Johnston, 1984: 553 – 554). Other evidence supports this relationship between agricultural growth and the creation of markets. The growth multipliers of rural income in some African countries are 2,0 and higher. This compares favourable with estimates of between 1,5 and 2,4 for Asian countries (Spencer & Badiane, 1994: 62).

It may seem that there is conflict between the role of agriculture as contributor to capital formation and the need of the sector to be a catalyst for industrial development through increased purchasing power. The answer to this conflict can possibly be found in capital outlays that lead to import substitution, infrastructure development and industrial export enhancement. As these investments will probably lead to important increases in domestic demand by itself, the role of increased rural

demand will therefore not be all that important. This is especially true in the initial stages of economic development (Johnston & Mellor, 1961: 580 – 581). Mellor and Johnston (1984: 554) argue that the capital constraint is broken through cost reducing technological changes in agriculture. Therefore cost reducing and yield increasing technology allows agriculture to contribute to capital formation as well as to provide a market for urban produced goods. Mellor (1986: 81) concludes that, for agriculture to act as stimulus and market for the non-agricultural sectors, well developed rural communication infrastructure must be in place in addition to agricultural technology change.

From the analysis of Johnston and Mellor (1961) it is clear that agriculture is able to play an important role in economic development. Increased productivity, and therefore lower production cost of food, in the agricultural sector of a developing nation may lead to the ready availability of food and foreign exchange earnings. The resulting higher levels of rural income will lead to both public and private capital formation and will result in the development of a rural market for the industrial sector. The expansion of the industrial sector will lead to new job opportunities for which the agricultural sector is supposed to release labour. Due to the unique income elasticity of demand in developing countries, this in turn will again lead to increased demand for agricultural products, and therefore the start of a new cycle or, in other words, an upwards spiral of economic growth. It is therefore clear that productivity in the agricultural sector can play an important catalytic role.

This role as catalyst is true for the South African as well as the Western Cape agricultural sector. However, due to a number of unique circumstances, a number of additional roles for agriculture exist in the Province. Among these is the unique role of agriculture as basis for tourism and as provider of renewable resources for the manufacturing sector of the Province. These possibilities will be explored in Chapter 4.

3.2.2. Agriculture as catalyst in Southern Africa

A question that can be raised is: what of Africa? And then more specifically, Southern Africa? Can agriculture play the same role as catalyst in this region? It has been

argued in Section 3.2.1.1 that the potential for lateral expansion of agriculture in developing countries is limited. However, Table 3. 1 presents a picture of a region (with the exception of South Africa) with the potential for substantial lateral expansion. More than fifty percent of the land in the region is arable (almost 300 million hectares) and of this only twelve percent (35,9 million hectares) is currently cultivated.

Table 3. 1: **Agricultural potential in selected Southern African countries.**

Country	Potential of arable land (m ha)				Cultivated land		Non - arable	Total land	Arable % of Total
	High	Med.	Low	Total	Area (m ha)	% of Arable			
Angola	65,9	18,9	8,5	93,2	3,5	3,8	31,4	124,7	74,8
Botswana	0	0,2	4,9	5,0	1,3	26,4	53,5	58,5	8,6
Malawi	3,5	2,4	0,8	6,7	2,3	34,1	2,7	9,4	70,8
Mozambique	30,9	15,4	7,1	53,3	3,1	5,8	25,1	78,4	68,0
South Africa	0,1	6,8	7,7	14,6	13,2	90,4	107,7	122,3	11,9
Tanzania	29,6	17,6	12,4	59,7	5,0	8,4	28,9	88,6	67,3
Zambia	29,8	8,9	0,3	39,0	4,9	12,8	35,1	74,1	52,7
Zimbabwe	2,1	13,4	12,6	28,2	2,5	9,0	10,5	38,7	72,9
Total	161,9	83,5	54,3	299,7	35,9	12,0	295,0	594,7	50,4

Source: Kleynhans & Vink (1998: 389);

Rwelamira & Kleynhans (1996: 1-4).

In addition to lateral expansion, considerable scope for vertical expansion also exists. For instance, the average fertiliser use in 100 grams of plant nutrients per hectare of cultivated arable land in the world was 974 during 1992. The comparative figure for Low Income countries was 946, while in Sub Sahara Africa the figure was as low as 98 (Carruthers & Kydd, 1997: 229). In the case of some Southern African countries even lower rates of application can be found. Comparable statistics for Mozambique are 15, Tanzania 137 and in the case of Zambia 160 (Rwelamira & Kleynhans, 1996: 1-14).

"Feeding the poor in developing countries, and especially Sub Sahara Africa", is one of the main arguments of the pro-GMO lobby. In this regard see for instance the papers of Falcon (2000), Leisinger (2000), Smale (2000) and Rosegrant *et al* (2000) presented at the 24th Conference of the International Association of Agricultural Economists. The implicit assumption in this argument is that farming in developing countries is at the summit of technological and resource use efficiency. It is dubious that this assumption could bear scrutiny. The data in Table 3. 1 is corroborated by a recent report of the Food and Agricultural Organisation of the United Nations (FAO, 2000). It was found that the area in developing countries that could be planted with wheat could increase from the current (1997) 110 million hectares to 314 million hectares and that average yield could increase from 2,5 ton per hectare to 5,3 ton per hectare[1]. In the case of maize the area could increase from 99 million hectares to 1 382 million hectares and yield could increase from 2,6 ton per hectare to 8,0 ton per hectare. The area under soybean could increase from 37 million hectares to 1 277 hectares with a yield increase from 1,7 ton per hectare to 2,4 ton per hectare. In Sub Sahara Africa alone 800 million hectares can still be brought into production (FAO, 2000: 99 – 104). It is clear that considerable potential for both lateral and vertical expansion exist in Sub Saharan Africa.

In spite of this considerable agricultural potential, a significant percentage of the population of this region faces food insecurity. Of the countries for which data is available, 49 percent of the population of Mozambique, 48 percent in Zambia, 35 percent in Tanzania and 24 percent in Malawi do not have access to enough food for an active and healthy life (Van Rooyen, 1997: 183). This statement is corroborated by the data in Table 3. 2, where it is clear that in ten selected Southern African countries the production of food declined over the period 1988 to 1992. Over the same period the population growth rate for these countries ranged between 2,47 (Lesotho) and 3,50 (Zambia) per annum (Rwelamira & Kleynhans, 1996: 1-22). It is therefore not unexpected to find in Table 3. 2 that the consumption of food declined over this period in all selected countries. Almost more alarming is the fact that the average calorie supply is below the minimum requirement in all but Swaziland and Botswana.

---

[1] *Current "best practice" levels of technology is used in the calculation of these potential increases. .*

Table 3. 2: Agriculture as provider of food in some Southern African countries.

Country	Actual 1992 data (000ton)		Average annual growth rate (1988 – '92)		Average calorie supply as % of minimum requirement
	Production	Consumption	Production	Consumption	
Angola	3 833	4 323	-0,8	-0,7	80
Botswana	208	352	-9,1	-4,7	100
Lesotho	200	395	-11,7	-6,8	93
Malawi	4 208	4 571	-3,1	-0,9	90
Mozambique	4 672	5 910	-2,8	-0,5	77
Namibia	421	671	-10,4	-0,7	87
Swaziland	3 992	3 684	-2,7	-2,2	105
Tanzania	17 142	17 454	-0,9	-0,6	91
Zambia	3 130	3 750	-7,6	-4,0	89
Zimbabwe	1 858	3 528	-28,8	-15,3	94

Source: Rwelamira & Kleynhans (1996: 1-19 – 1-21);

From the perspective of the usage of natural resources, bad agricultural practices lead Van Rooyen (1997: 186) to declare that eighty percent of croplands currently being cultivated in Southern Africa are experiencing degradation. Added to this problem is the fact that physical infrastructure is not correlated with the dispersion of the high potential agricultural land. In a number of Southern African countries this fact limits the possibility of the agricultural sector to reach its true potential.

Van Rooyen (1997: 194) calculated that during 1993 Southern Africa (excluding South Africa) could have earned more than US$3 billion from additional agricultural exports. This could have considerably relieved the shortage of foreign exchange in the region. Nyandzunda and Mudimu (1999) identified government red tape, financing of new technology, trade restrictions and competition abroad as some of the most important problems experienced by export firms in Zimbabwe. Removing these obstacles could alleviate the foreign exchange earnings problems in Southern Africa.

It is clear from the data in Table 3. 3 that agriculture is fulfilling this role in a number of Southern African countries, and especially in the case of Malawi and Tanzania.

Table 3. 3:   Selected indicators of some Southern African countries.

Country	Rural population as % of total		Agriculture's labour share		Agriculture's share in GDP		Farm vs total exports
	1980	1994	% in 1993	% change 1970 – '93	% in 1993	% change 1976 – '93	% in 1991
Angola	-	-	69	-8,7	8,8	0,6	3,7
Botswana	85	70	61	-24,0	27,9	-22,0	8,4
Lesotho	87	78	78	-11,9	64,6	-53,6	67,6
Malawi	91	87	73	-17,2	34,8	-5,2	96,0
Mozambique	87	67	81	-5,4	57,2	2,2	52,6
Namibia	77	64	86	-35,1	10,3	-5,9	11,0
South Africa	52	50	10	-5,9	5,1	-3,0	6,1
Swaziland	-	-	65	-16,0	11,2	-9,4	57,6
Tanzania	85	76	80	-10,6	53,0	-3,8	84,0
Zambia	60	57	68	-8,6	14,0	2,3	1,0
Zimbabwe	78	69	67	-10,1	14,8	-2,2	51,0

Source: Van Rooyen (1997: 183)

Vink (1998: 3-37)

Some of the other indicators of development of a selected number of Southern African countries are presented in Table 3. 3. It is clear that in the majority of countries the largest part of the population is still rural. In the case of Malawi the rural population is still 87 percent of the total population. However, a steady trend of urbanisation is evident in those countries.

With the exception of South Africa, agriculture is the main provider of job opportunities in the selected countries. It is notable that more than 86 percent of the job opportunities in Namibia and 81 percent in Mozambique are related to agriculture. From the data available it is also clear that agriculture is steadily releasing labour to the rest of the economy. This probably forms part of the trend towards urbanisation.

Within the economic growth pattern of these countries it is debatable if this trend is part of the manpower releasing role of agriculture as envisaged by Johnston and Mellor (1961:575 – 576). It is rather more probable that this trend forms part of a premature release of labour as described by Binswanger (1994: 169 – 170) due to inappropriate policy measures and civil strife.

Although less prominent than in the case of agriculture's share of labour, agriculture still forms a dominant part of the economy of the majority of these countries. It follows that agriculture will be the dominant contributor to the formation of private and public capital in these countries. However, mobilising the formation of private capital may be a problem, as the financial infrastructure in Africa is still underdeveloped. In Africa the branch of a commercial bank services about 450 000 people compared to the one to 15 000 ratio in South Africa (Morokolo *et al*, 1999: 2). The population would therefore be dependent on government supported or informal institutions for their financial needs. It is unfortunate that South African experience indicates that parastatal development financial institutions are largely dependent on government subsidies and have a poor record in mobilising savings (Coetzee & Vink, 1996). With the exception of Zambia, Mozambique and Angola, agriculture's share of the economy is steadily decreasing. This is to be expected as part of the "secular decline of agriculture" growth model.

A factor that is often overlooked is the income multiplier effect of agriculture. The catalytic effect of agriculture in developing rural areas is often overlooked due to the large quantity of non-tradable goods and services that are consumed in such areas. Ngqangweni *et al* (1999) estimated that the multiplier effect in the rural areas of the Eastern Cape was 1,98. While this may seem high, he argues that it is consistent with findings from other parts of Sub Sahara Africa.

Recent developments indicate that Sub Sahara Africa may shed the image of the "world's lost region". During 1999 the economy of Mozambique was the fastest growing in the world, albeit as a result of price rises in oil, copper and aluminium (Bloomberg, 2000: 8). For a truly economy-wide and inclusive growth strategy to succeed, agriculture will have to play a role along the route of development. This possible role of agriculture as a catalyst is aptly summarised by Van Rooyen (1997:

198 – 199) (see Table 3. 4). It is shown that the agriculture in the majority of Southern African countries can create the engine of growth for economic development and provide food, foreign exchange, employment and income along the lines of the Johnston and Mellor model.

Table 3. 4:   The potential role of agriculture in Southern Africa.

Country	Growth engine	Provider of:			
		Food	**Foreign exchange**	**Employment**	**Income**
Angola	Yes	Important	Export crops	Important	Important
Botswana	No	Domestic	Beef	Limited	No
Lesotho	No	Household	No	No	No
Malawi	Yes	Important	High value crops	Important	Important
Mauritius	Compl	Domestic	hvc	Linkages	Linkages
Mozambique	Yes	Important	High value crops	Important	Important
Namibia	No	In north	Beef	Limited	Limited
South Africa	Compl	Important	Food, hvc	Linkages	Linkages
Swaziland	Compl	Important	Beef, hvc	Important	Important
Tanzania	Yes	Important	Grains, hvc	Important	Important
Zambia	Yes	Important	Grains, hvc	Important	Important
Zimbabwe	Yes	Important	Grains, Beef, hvc	Important	Important

Source: Van Rooyen (1997: 198 – 199)

Abbreviations: hvc = high value crops; compl = complementary.

From the discussion in this section it is clear that the economic potential of Southern Africa has not yet been fulfilled. It is further evident that the agricultural potential that does exist can create the ideal catalyst for the economic development of the region. In the face of this potential it can be asked why agriculture has not yet fulfilled this role. It is thus necessary to take a closer look at the preconditions for, and the phases of, agricultural development.

3.2.3. Implementing rural development

Johnston and Mellor (1961: 582) are of the opinion that an appropriate environment conductive to change is a precondition for the labour-intensive, capital saving approach to agricultural development that they recommend. The first phase of their approach is therefore the creation of this policy, social and institutional environment. It must be stressed that each component of this favourable environment is a necessary but not a sufficient condition. Adelman (1999) argues that it is often the case that the absence of one component is proclaimed as to be the reason why development is not taking place and identifies three fallacies:

(a)   Underdevelopment has but a single cause.

(b)   A single criterion suffices to evaluate development performance.

(c)   Development is a (log) linear process.

It is probably this trap of trying to find a single *panacea* that De Soto (2000) fails to avoid. De Soto argues that the absence of appropriate institutions to establish, verify and trade ownership of land is the main cause of non-development in the developing regions of the world. Conversely put, if the appropriate institutions can be instituted that will allow the establishment, verification and trade of land, the capital embedded in these assets can be released and used for development. Although it has been shown locally by Lynne (1991) and Lynne *et al* (1991) that the establishment of rental markets for land in the rural areas of KwaZulu-Natal can contribute to economic development, it is also acknowledged that it is not a sufficient condition for development.

According to Johnston and Mellor (1961: 582) the preconditions for a suitable environment are that the possibility of change must be recognised and accepted and that individual producers must be of the opinion that they will receive personal gain from technological improvement. It is therefore important that the system of land tenure must make provision for personal gain. An important precondition to change is rural attitudes towards the availability and attractiveness of consumer goods, awareness of the possibility of technical improvements and the availability of market outlets. In addition the institutional capacity to minimise transaction costs (i.e. manage risk and enforce contracts) must be available. It is seldom that all the

preconditions for agricultural development are met at the outset, and therefore community development programs focussing on adult literacy, self-help programs and similar activities forms an important part of the first phase. Mellor and Johnston (1984: 544 – 548) focus for instance on the importance of the nutritional balance as a precondition for agricultural and economic development.

At the outset of the second phase the characteristics of the economy are still those of a developing economy. The agricultural sector is therefore a large part of the economy, and, albeit within narrow limits, the demand for agricultural produce is increasing substantially. As capital is scarce, care must be taken to ensure that resources with a relatively low opportunity cost outside agriculture are used in the development process. Agents with an intimate knowledge of not only the unique conditions and circumstances of a specific region, but also of those factors that impede agricultural productivity are therefore of the utmost importance. Of the "non-conventional inputs" required in the process, research (adaptive and on-farm), extension-education (according to local customs and conditions), supply of strategic inputs (complementary and with institutional backing), creating the necessary infrastructure and education of all concerned (farmers and supporting infrastructure) are probably the most important (Johnston & Mellor, 1961: 583 – 590 and Mellor & Johnston, 1984: 556 - 566). From a more recent perspective, Anderson (1996: 205 – 206) provides a similar list of key factors.

Binswanger (1994: 170 – 171) warns that a development strategy along these lines may be ineffective due to the following failures:
(a) adverse policy environment;
(b) lack of government commitment;
(c) lack of appropriate technology;
(d) lack of beneficiary participation; and
(e) the complexity of co-ordination (especially in the case of top-down planning).
Some of these failures (government commitment and beneficiary participation) are logical and self-explanatory. The balance are in need of additional scrutiny.

Mellor (1986: 81 – 82) argues that a free trade regime is a prerequisite for effective agriculturally induced growth. The reason is that even labour-intensive inputs usually

require some capital-intensive intermediate components. It is therefore important that these components can be imported in order to conserve scarce capital. The inverse condition, that developed countries should keep their markets open for the labour-intensive produce of developing countries (Mellor, 1986: 85), speaks for itself. It is unfortunate that in some African countries inward industrialisation strategies are still followed. As over eighty percent of industrial protection in the 1970's in the Ivory Coast, Nigeria and Mauritius resulted in an effective tax[1] on agriculture, the result of such policies are clearly to the detriment of the sector (Spencer and Badiane, 1994: 70). To this well-established problem of (often-indirect) agricultural taxation[2], Binswanger (1994: 166 – 168) adds a list of misguided policies. One of these includes an urban bias regarding expenditure on productive infrastructure and social services. Another often-implemented and misguided policy is compensating inefficient food sectors in the name of national self-sufficiency. To this category the fallacy of "infant industries" could be added. A third category is compensating the rural elite in that rural compensatory measures often show a bias towards the larger and more capital intensive farming operations. Fourth, over-valuation of exchange rates may put the international competitiveness of industries under pressure. In addition, it usually leads to problems with foreign exchange balances that makes the acquisition of certain imported inputs (i.e. machinery and fertiliser) difficult. Fifth, rampant inflation usually leads to a high interest rate that makes capital investments in farming difficult. Finally, it can be shown that some land policies may limit agricultural development. This is especially true if such policies eliminate or inhibit rental or sales markets of farmland or show a bias against an effective tenant class in agriculture.

Although the individual developing nation may create a free-trade environment within and across its borders, that nation is still part of the wider international trade regime. Agricultural protectionism is rife in developed countries and especially in those that show low levels of comparative advantage in agriculture. The reasons for this trend has been adequately embroidered in Chapter 2 while the implications for the Western

---

[1] *This form of unproductive tax, with the objective of protecting inherently uncompetitive domestic industries, should not be equated with the role of agriculture in capital formation as discussed in Section 3.2.1.4. In the latter increases in agricultural productivity lead to economic rent of which part can be invested in productive infrastructure and competitive industries.*

[2] *The implicit or explicit rationale behind this indirect taxation is that it is easier to collect taxes or tariffs at borders than in hardly negotiable and often hostile rural areas.*

Cape will be investigated in Chapter 4. It suffices to state at this stage that protectionism leads to the depression of the prices of agricultural commodities. Table 3. 5 present the results of a series of investigations into the nature of price change that may occur in a liberated trade environment. Although the magnitude of specific results differs according to the basic assumptions and methodology used, consensus on the direction of price movement is apparent between these results. According to DeRosa (1996: 80) the UNCTAD/WIDER project expected an increase in world trade of agricultural products of 25 percent.

The current advantage of lower food prices for food-insecure and food-deficit[1] developing countries is more than offset by the loss of revenue from agricultural exports in those commodities that do have a competitive advantage. A number of studies have indicated that a free trade environment would have a negative influence on economic welfare in especially low-income Sub Saharan countries (see for instance DeRosa, 1996). However, these studies tend to overlook the possibilities of efficiency gains in and the natural resource potential of the agriculture of developing Sub Saharan countries[2]. In addition, low food prices are usually to the advantage of urban and the detriment of rural populations. Thus, protectionism in the developed world contributes to rural poverty[3].

---

[1] *As shown in Table 3. 1 that on average only 12% of potential arable land is cultivated, the food deficit in Southern Africa is not due to lack of natural resources, but rather as a result of circumstantial factors.*

[2] *It has been indicated in Table 2.1 that the long term price elasticity of supply in developing countries is relatively more inelastic in developing countries than in developed countries. In Sub-Saharan Africa, dominated by small farms, weak institutions, high transaction costs and poor infrastructure it is necessary for rural households to adopt cost-reducing technology. For this to happen it is important to create the (phase 1) institutional infrastructure as was argued at the beginning of this section. This is clearly a daunting task as large areas of Sub Saharan Africa represents an administrative and institutional "black hole" (see for instance Economist, 2000). If not and as most rural households are currently deficit producers these households will be harmed by trade liberalisation (and rising food prices) as predicted by De Rosa (1996).*

[3] *This statement is corroborated by World Bank data. In most African countries a much higher percentage of the rural population live below the poverty line than is the case amongst the urban population. In Ghana 94 percent of the rural population live below the poverty line compared to the 19 percent in the urban centres. In the Ivory Coast the comparable statistics are 77% and 23%, in Cameroon 71% and 25% and in Malawi 63% and 10% (Cleaver & Donovan, 1995: 1).*

Table 3. 5: **Simulated effects of agricultural trade liberalisation on world prices.**

COMMODITY	Resulting price change (%) from research project				
	UNCTAD / WIDER (1990)	Page *et al.* (1991)	FAPRI (1993)	Brandao & Martin (1993)	Goldin *et al* (1993)
Temperate zone products:					
Wheat	7.5	5.0	6.3	6.3	5.9
Coarse grains	3.4	1.8	2.4	4.4	3.6
Rice	18.3	1.2	4.4	4.2	-1.9
Meat	13.0	5.3	0.5	6.1	4.7
Sugar	10.6	5.0	-	10.2	10.2
Soybeans	0.0	-	4.52	-	
Soybean oil	0.1	-	3.8	-	4.1
Dairy products	-	9.3		10.1	7.2
Tropical products:					
Coffee	0.4	0.8	-	0.41	-6.1
Cocoa	0.0	1.0	-	0.14	-4.0
Tea	0.5	-	-	2.34	3.0
Tobacco	0.3	-	-	-	-
Cotton	0.9	-	-	2.23	3.7
Groundnuts	1.5	-	-	4.52	-
Groundnut oil	0.6	-	-	-	4.1
Plants and flowers	-	1.0	-	-	-
Spices	-	0.2	-	-	-

Source: DeRosa (1996: 80)

Added to the loss of revenue is, of course, the fact that agriculture is hampered in its role as developmental catalyst as shown in Section 3.2.1. Before a number of these developing countries can exploit opportunities and use their natural resource base, the problem of non-tariff barriers will need to be addressed.

On the topic of appropriate technology, Spencer and Badiane (1994: 63 – 64) are of the opinion that new varieties must easily be integrated into intercropping systems, should be nutrient efficient, pest resistant, stress tolerant and should meet post-harvest needs. The fact that these criteria are often not met leads to the very low level of adoption of "green revolution" technologies in most Sub-Sahara African countries. However, Binswanger (1994: 166) warns against assuming that smallholders will automatically be technologically backward. Anderson (1996: 206) highlights the

importance of agricultural technology as part of agricultural knowledge systems. Within this wider context, it is important that the beneficiaries are involved in the setting of priorities and, through participative research, in the actual generation and dissemination of knowledge. On the supply side of knowledge, it is important that the knowledge generation system should be sustainable (both in terms of finance and in attracting and retaining human capital).

The complexity of integrated rural development, especially when co-ordinated from a national level, is often the demise of rural development programmes (see for instance Ntangsi, 1992). Binswanger (1994: 170 – 172) is, therefore, of the opinion that the decentralisation of administrative and fiscal powers is one of the prerequisites for effective rural development. If rural authorities do have the necessary support (both in terms of the confidence of the population and the necessary skills), then a system of matching grants can result in funds being channelled to those activities that can make the greatest contribution to rural development. However, this does not imply that the first (national) level of government should divorce itself from all powers. It is still necessary that the different elements of government (fiscal, administrative and political) are consistent with each other and are focussed on the same priorities and objectives.

No section on agricultural development will be complete without a reference to transaction costs. Delgado (1999) is of the opinion that a number of structural constraints to smallholders are embodied in high transaction costs. These constraints include access to appropriate technology, information, assets and input supplies as well as fear of unenforceable contracts and lack of skills in dealing with foreign buyers. This opinion is supported by Lipsey *et al* (1987: 415 – 416) who argue that transaction costs are part of the necessary cost of doing business. It follows that, for a private firm to stay in business, it must be able to recover both production and transaction costs. If transaction costs are higher than they need to be because of imperfections in the private markets this may lead to market failure. Lipsey *et al* suggest that excessive transaction costs may necessitates government intervention, especially in the case of public goods. According to Rutherford (1996: 81 – 82) this attempt to reduce transaction costs through institutional development is why the common law represents an attempt to achieve economic efficiency.

Alston and Gillespie (1988) provide a framework of transaction costs in which the categories is divided in the pre-production, production and post-production phases of farming. In the pre-production category information constraints and asset fixity (see the discussion in Section 2.3.3) leads to high transaction costs and usually favours the larger business. In the second category the elements of high co-ordination costs and shirking (see the discussion on economies of scale) determine the level of transaction costs. In the post-production category elements such as measurement of the quantity and quality of production and the non-enforceability of contracts are contributing factors.

It is often argued that contracts (either horizontal or vertical) can be used in cases where high transaction costs are present. However, Cheung (1969) is of the opinion that the success of contracts to minimise transaction costs depends on the risk profiles of individuals concerned, the alternative contractual arrangements available, the specific legal institutions of a country and the level of law enforcement in the country. These transaction costs is one of the reasons why certain activities and resources are allocated within a firm rather than by market transactions. In other words, transaction costs is an independent variable to economies of scale. On the input markets Delgado (2000) provides a convincing argument why failure in factor markets adds to transaction costs. In a number of developing countries the title deeds of land ownership is not held in the form of some sort of official document, but rather through precedent and witnesses. As there is no official proof of ownership, potential financiers must interview witnesses to establish claims of ownership. It is obvious that such practices will add substantially to the transaction cost of and risk associated with any loan in which the land is used as capital. The potential advantages of developing a land rental market has been underlined by Lynne (1991) and Lynne *et al* (1991).

Delgado (1999: 179) provides a more specific framework for the evaluation of the influence of transaction costs on farming structures (see Table 3. 6). The basic argument is that certain firm structures will have a better chance of limiting transaction costs. For instance, a larger firm will have a better chance of enforcing contractual agreements than is the case of a smallholder. Using this framework Delgado (1999: 181) evaluated the influence of transaction costs on twenty-four commodity groups in Sub-Sahara Africa (see Table 3. 7). It follows from this

discussion that high transaction costs could be one of the factors on the list of reasons why agriculture in Southern Africa is not fulfilling the role of catalyst.

Table 3. 6: **Transaction costs factors in Sub-Saharan Africa and their probable influence on farming structures.**

FACTORS	INFLUENCE OF FACTOR ON STRUCTURE		
	Independent small farmers (ISF)	Contract institutions: ISF & downstream	Vertically integrated, specialised large farms
Production characteristics of commodity			
High labour intensive	+	+	-
Economies of scale in production	-	-	+
High returns to R&D	-	+	+
Complex and purchased inputs	-	+	+
High investment required	-	-	+
Processing/marketing characteristics of commodity			
Quality specificity	-	+	-
Perishability/co-ordination needs	-	+	+
High value to weight	-	+	+
Principle market is export	-	+	+
High marketing economies of scale	-	+	+
Economic and political environment			
Land scarcity	+	+	-
Agriculture large share of labour	+	+	-
Poorly integrated output markets	-	+	+
Missing input/factor markets	-	+	+
Absence of property rights	+	-	-
Participative governance absent	+	-	+

Note: A (+) indicates that the presence of the factor favours the specific farming structure while a (-) indicates the opposite.

Source: Delgado (1999: 179)

Table 3. 7:   Probable influence on farming structure of transaction cost factors.

ACTIVITY	TRANSACTION COSTS IN:		PREDOMINANT STRUCTURE IN SUB-SAHARA AFRICA
	Production/ Technology	Processing/ Marketing	
Coarse grains	0	0	IS
Small ruminants	0	1	IS
Root crops	1	0	IS
Swine (backyard)	1	1	IS
Poultry	3	1	IS
Oilseeds	2	3	IS
Sugar-cane	3	2	CF, LF
Cattle	4	1	CF,LF
Rice	4	1	IS,CF
Wheat	4	1	LF
Bananas (sweet)	4	2	LF,IS
Cotton	4	3	CF
Robusta coffee	3	4	LF
Pineapple	4	3	LF,CF
Cocoa	4	4	CF
Swine (industrial)	4	4	LF
Palm oil	4	4	LF
Aquaculture	4	4	CF
Tobacco	3	5	CF,LF
Export vegetables		5	CF
Arabica coffee	4	5	CF
Dairy	5	4	CF
Tea	5	5	CF
Cut flowers	5	5	CF

Note: Scored on a range from 0 to 5 with 5 being the highest.

"IS" denotes independent smallholders or operators; "CF" is small operators contracting with processors; "IF" is large, specialised farms, vertically linked to processors and marketers.

Source: Delgado (1999: 181)

The last phase of development usually occurs at a relatively late stage, where the use of capital intensive and labour saving technology becomes more important. This stage is characterised by the high opportunity cost of most agricultural inputs, and the need for credit facilities therefore becomes acute. As agriculture at this stage typically represents only a relatively small part of the economy due to structural changes, the limitations that characterise the second phase are absent (Johnston & Mellor, 1961: 583).

Where is South Africa situated on this route of development? This question will be addressed in Chapter 4. But before a move is made to the local arena, it is important to quantify the route of development and to investigate possible future routes in the transformation of agriculture.

3.3. AGRICULTURAL TRANSITION REVISITED

From the discussion in the previous sections it is clear that economic development in most developing nations relies heavily on the agricultural sector for at least the initial impetus. In this process the role of agriculture changes considerably, leading to certain structural problems. The current developed economies of the world are characterised by the dominance of the secondary and tertiary sectors of the economy, leading to the relative decline in *per capita* income generated from agriculture. This in turn led to the high levels of support and protection being experienced by agriculture in these countries.

In order to effectively put local conditions in international perspective, it is important to identify the characteristics of agriculture in the transitional[1] phase as well as that of an information society agricultural sector. As two groups of questions remain in transforming Table 2.1 into Table 3. 8, the answers to the first can readily be supplied from the discussions in the previous sections. The second, and rather more daunting group, is on the future characteristics of agriculture. Is the current phase of agricultural transition, as epitomised by agriculture in the developed countries, the final phase? Or will the face of agriculture change in future? Within a dynamic world the latter is probably correct. In gazing at the future transition of agriculture it is, however, necessary to evaluate those key factors

---

[1] *Note that transition in this context refers to the conditions when an economy changes on the route from developing to developed. It is not used to describe the situation where a regulated economy deregulates.*

that will shape the future. The challenge is situated in identifying those factors from the "white noise" of change that will have a real influence. This is then the objective of this section.

Table 3. 8:   Some characteristics of agrarian sectors in a continuum from developing to post industrialised economies.

Agrarian or Farm sector Economic Characteristics	Low Income "Developing" Economies	Economy in transition	High Income "Developed" Economies	Information societies
Income Elasticity of Demand	0,8 – 0,9	0,2 – 0,8	0,1 – 0,2	-0,1 to 0,3
Price Elasticity of Demand (SR)	-0,4	-0,3 – -0,4	-0,3	-0,2
Price Elasticity of Demand (LR)	-1,0	-1,0	-1,0	-1,0
Price Elasticity of Supply (SR)	0,1 – 0,2	0,2 – 0,3	0,1	0,3 – 0,4
Price Elasticity of Supply (LR)	0,4 – 1,2	0,8 – 1,0	0,8 – 1,0	1,0
% of Population Rural	80 – 90 %	>50 %	2 – 25%	10 – 25%
% of Labour force in Farming	30 – 90% (av. 69%)	30 – 60 %	1 – 13%	2 – 15%
% Farm Sector Income of GDP	20 – 50% (av. 38%)	10 – 30 %	1 – 8%	1 – 5%
% of Farm Inputs Purchased	0 – 20%	30 – 50 %	50 – 85%	70 – 90%
Labour and Total Productivity of Farm Sector	Low	Medium and rising	High	Higher
Capital/Total Land in Farms Ratio	Low	Low	High ($1 020/ Ac, US, '94)	Lower
Capital/Total Labour Force on Farms Ratio	Low	Low	High ($333 177/person, '94)	Higher
Number of Farms	Many	Many	Declines by ⅔ or >; 20 – 30% commercial	More
Size of Farms	Very Small	Small	Av. Size inc. 10x or >	More small, av. increase

Source: Developed from Table 2.1 and the discussion in 3.3.1 and 3.3.2.

3.3.1. Characteristics of agriculture in a transitional economy

In the economic development literature, as first developed by Johnston and Mellor (1961) and Cochrane (1963) and later embroidered on by those and various other authors, agriculture plays the crucial role of catalyst in the development process. It was shown that the farm problem is a major factor that should be reckoned with in the

later stages of economic development, and that at the base of the farm problem is the relative income elasticity of demand as well as the relative price elasticity of demand and supply.

It is typical in the development process for individuals with an entrepreneurial spirit to be the first to seize on opportunities. At the same time there will be persons stagnating in their original circumstances. It follows that the income elasticity of demand for agricultural products will be of a wide range ($\pm 0,2 - 0,8$), depending on the specific income group that is scrutinised. The short-run price elasticity of demand will show a similar tendency to vary according to the specific income group. In the affluent part of society one would expect a short-run price elasticity of demand of close to $-0,3$ and in the poorer sections of the population it will be closer to $-0,4$. Over the long run the tendency towards unitary elasticity ($-1,0$) will probably hold.

On the supply side the combination of advances in physical and institutional infrastructure, education and support services will probably lead to a long-run price elasticity of supply that tends towards unity ($0,8 - 1,0$). The short-run price elasticity of supply provides a very interesting case. Producers in developed countries make their production decisions in an environment where they know that:

(a) they are the owners of considerable fixed investment in production factors (the problem of asset fixity as discussed in Section 2.3.3.);

(b) when all else fails they most probably will have accumulated financial reserves or access to financial institutions to provide bridging capital until the next harvest;

(c) government will provide a safety net[1] (see Section 2.4).

The aggregate price elasticity of supply in their case, as the empirical evidence suggests, is inelastic.

Farming activities in developing countries, on the other hand, tend to be of subsistence nature and production of farm products is thus predominantly for own consumption. Surplus produce over household consumption can be used for bartering with other subsistence farmers or sold for cash. However, surplus production tends to be an intermittent and fortuitous occurrence rather than a planned event. It follows that the

---

[1] *For instance import tariffs or export subsidies under adverse international trading conditions, subsidised insurance or other farmer support programmes in the case of natural disasters etc.*

very survival of these farmers literally depends on the fruit of their own toil and not on the cash income of produce sold. The volume produced by these farmers will be more dependent on weather conditions than on the market price. Their price elasticity of supply would thus be relatively inelastic and of the same magnitude as is the case of farmers in developed countries.

Now, to discuss the special case of producers in transitional economies. These farmers, somewhere between the developing and developed world, make their decisions in an environment where:

(a) no government provided safety net is available;

(b) farming activities are labour intensive and not as capital intensive as in developed countries (asset fixity is not as important a problem);

(c) financial reserves or access to financial institutions are often not developed to the extent where bridging capital can be provided until the next harvest;

(d) specialisation takes place and the producer is dependent on cash sales of his produce in order to purchase those goods and services that are necessary for survival.

This set of circumstances, coupled with the enhanced institutional infrastructure, will probably lead to a situation where farmers in a transitional economy show a tendency to be more sensitive to price changes. Remember that the object of discussion is aggregate price elasticity of supply and not the price elasticity of supply of specific commodities. As these farmers could ill afford a bad financial year, they would tend to curtail production activities in the expectation of lower prices. Although still inelastic[1], the price elasticity of supply of producers in transitional economies would be relatively more elastic $(0,2 - 0,3)$ than is the case in both developing and developed economies. This assumption is sustained by the work of Lyne and Ortmann, as quoted by Vink and Kassier (1991: 219), where it was found that a ten percent reduction in the price of sugar would lead to a 39,4 percent decrease in the value of sugar produced in the former KwaZulu.

In the course of the development process agriculture is, although declining, still one of the most important sectors of the economy. This role of agriculture is realised in a

---

[1] *The short time price elasticity of supply would remain inelastic due to the lagged effect of response (captured in the longer term price elasticity of supply) and conditions of imperfect information.*

sector contribution to the GDP of between ten and thirty percent. Inherent in the development process is the role of agriculture in providing a market for the fledgling industrial sector. Although not to the same extent as in a developed economy, one would therefore expect an increase in the proportion of agricultural inputs that are purchased from outside the sector. An estimate of between 30 – 50 percent of agricultural inputs being purchased therefore seems accurate.

In a successful development process it is expected that the secondary and tertiary sectors of the economy will show, relative to agriculture, increased dominance as a percentage of the GDP. Most developing economies are, however, characterised by relatively high population growth rates. Although agriculture is expected to provide labour to the rest of the economy, one would find that the total number of labourers in agriculture would more or less remain the same. A relatively large part of the population would therefore still be rural in the middle stages of development (more than 50%). This would also imply that a dominant part (30 – 60 %) of the labour force would still be active in the agricultural sector. It is, however, important for the total economic development process that the production of food will increase to prevent either inflationary pressure on the economy or foreign exchange problems. The possibility for lateral expansion of agricultural production is however limited in most developing countries. Any higher levels of food production would therefore largely result from increased productivity of the farm sector.

In the initial phases of economic development agriculture plays a dominant role in both private and public capital formation. As the rest of the economy takes up the impetus, their role in capital formation during the latter stages of development will probably increase in importance. However, as agriculture is still one of the most important sectors of the economy in the middle stages of development, and as labour will be abundant at this stage, one would expect labour intensive and capital saving production technology in agriculture. The capital to agricultural land and the capital to agricultural labour rates would, therefore, remain low. The management problems inherent in labour intensive agricultural production technology favour farms of a smaller size. Although the average farm size will probably not be as small as in the

initial stages of development due to expansion by the more productive farmers[1], farm size will still be small relative to that in a developed economy. Following this line of reasoning and given the fact that agricultural land is limited, it can be deduced that there will still be many farms.

In the later stages of the transition from a developing to a developed economy the labour problem would probably not fall in the paradigm[2] of Johnston and Mellor (1961) and Cochrane (1963). The labour problem would rather be one of acquiring the necessary skills to effectively function in secondary and tertiary industries.

3.3.2. Characteristics of an information society

It is beyond the scope of this thesis to fully investigate all factors that will influence the future of global agriculture. Rather more appropriate for the purpose to be served is to determine whether agriculture in developed countries is at the apex of transition or not. If not, and within the context of a non-exhaustive list of factors, what is likely to be the characteristics of agriculture in information societies in the foreseeable future?

Before this Section can be continued it is important to define what is meant by an information society. Various terms are used for the structure of the society that is developing in the first part of the 21st century. Various forms of nomenclature, such as post-industrial, post-fordist, knowledge society and information economy, have been used since the 1980's to describe this new setting.

3.3.2.1. Defining the concept of an information society

In the fragmented scientific environment of the late 20th century, scholars from various disciplines have tried to make sense out of the changing environment and, of course, tried to determine the optimum future direction of the discipline. Thus a number of approaches have been developed; each with a distinct character and a

---

[1] *The implicit assumption here is that the institutional infrastructure to allow transfer of land and land rentals is in place. This will also allow the adoption of appropriate (land saving) technology.*

[2] *Agriculture is to release labour for labour-intensive industrial production.*

group of prophets. However, as the driving force for change revolves around technological change and information, a number of similarities exist between these approaches. An attempt is made in Table 3. 9 to put these approaches into context.

The concept of an information economy originated from the work of the biologist and anthropologist Todao Umesao in 1963. He postulated that the "electronic" industries (information, communication, education) would be just as important for the structural adjustment of the industrial society as the intermediate industries (transport, heavy industries) were for the agrarian society. This approach stands in the tradition of linear modernisation where social progress is seen as a linear evolution from "lower" (agrarian) to "higher" (information economy) societies (Ito, 1989). An information economy is defined as a society where more than half of the work force is employed in information-orientated occupations and where the net product of these activities is more than half of the Gross National Product (GNP). One of the main points of critique against this approach is the very wide definition of what knowledge workers is. It is conceivable that nursery school teachers, game wardens and restaurateurs will fit the definition. A second area of critique is that the limited technical and economic indicator characteristics of the information economy approach lead its proponents to reductionist arguments. However, in differentiated societies social change never follows technological or economic determined rationalities alone (Schienstock *et al* 1999: 3 – 5).

In contrast to the deterministic information economy approach, social change is seen as a multi-dimensional process in the post-industrial society approach. At the roots of this approach is the sociologist Daniel Bell who argued that the axes of production of goods, primarily by machines and private capital in an industrial society, is moving towards the production of goods based on information and knowledge in the post-industrial society. It follows that the impetus for transition is found in technical innovations and the exponential expansion and differentiation of knowledge. The result is that the importance of the science system in society is seen to be on the increase (Lyon, 1988). The main area of critique against this approach is that the co-existence of the agrarian, industrial and information sections of a society is negated. More important, the interaction and increasing interdependence between these sections are ignored (Schienstock *et al* 1999: 5 – 6).

Table 3. 9: Different approaches to the concept of an information society.

INFORMATION ECONOMY	POST-INDUSTRIAL SOCIETY	POST-FORDISM	INFORMATISED INDUSTRIAL SOCIETY	KNOWLEDGE SOCIETY	LEARNING SOCIETY
BASIC TENET					
Economic deterministic	Social change as multi-dimensional process.	Socio-economic & political; capitalistic.	Change in base technology is central cause of social change.	Change in the basis of society's knowledge.	Application of knowledge to knowledge generation.
DEVELOPMENT/GROWTH					
Linear modernisation (development)	Shifting of "axes" of organisation in society. Technical innovations, knowledge and market forces forms impetus for change.	From Keynesian exploitation of economies of scale to privatisation & deregulation.	Automation of manual labour is now followed by the automation of brainwork.	Coupling of science and techniques through information and communication technologies.	Cumulative feedback loop between innovation and the use of innovation.
CHARACTERISTICS					
Electronic industries >50% of work force in information oriented occupations. >50% of GNP from information industries.	Production dependent on information. Production less dependent on raw materials. Changed fundamental	High variety of products, short production runs, market diversification, flat & organismic organisations,	Growing dissemination of information & communication technologies in all areas of social life. Informatised industrial	Growth of knowledge, computer important as knowledge-based machine & confluence of above in cognitive-technical complexes.	Learning by doing & learning by interacting at level of individual, organisation & system. Innovation normal part of work.

INFORMATION ECONOMY	POST-INDUSTRIAL SOCIETY	POST-FORDISM	INFORMATISED INDUSTRIAL SOCIETY	KNOWLEDGE SOCIETY	LEARNING SOCIETY
High household expenditure on information goods & services.	social orientation.	fragmented political markets, consumer choice in welfare, regional diversification.	control technologies. Technology push, cross-sector application & heartland technology.	Informatisation of society, artificial intelligence technology soar, organisations change in knowledge-based entities, science responsible for new knowledge.	Three levels of dialogue must have same operating principles: intra organisation (1st), inter organisation (2nd) & inter system (3rd).
CRITIQUE					
What is information oriented enterprises: what of supportive services (i.e. schools, roads, etc.). Difficult to develop indicator grid.	Industrial goods & non-informational services will still form important part of society.	Influenced by technological determinism. Concepts of crisis and historical shift unclear. Focus is unclear.	Information rather than information technology is key source of change.	Knowledge is only one form of organised information. Science can no longer control specialised expert opinion & is being bypassed.	Hard to ascribe to different levels same cognitive process & that each individual will learn the same aspect.

Source: Developed with Schienstock *et al* (1999) as base.

Fordism is a growth model based on the exploitation of economies of scale in the manufacturing of standardised goods and has mass production and mass consumption as basic requirements. The concept of Post-Fordism, developed by the "French Regulation School", has a broad economic and political perspective and grew from the realisation that the nature of demand is changing and that mass produced goods have saturated markets. The new production regime is characterised by privatisation, deregulation, accelerated innovation, market diversification, organismic organisations and the disintegration of the welfare state (Jessop, 1991). According to Schienstock *et al* (1999: 7) more recent work in this school has contributed to it being influenced by technological determinism. As the object of research is quite often limited to the labour process and business organisation the focus of the approach is limited and unclear.

It is claimed, within the traditional concept of the industrial society, that change in the means of production (base technology) is the central cause of social change. It follows that the introduction of information and communication technologies in the production process would mark the informatisation of society; also called the "Second Industrial Revolution". Just as the automation of manual labour marked the industrial revolution, the automation of brainwork marks the informatised industrial society. Technology is seen as the driving force and all other aspects of social life have to adjust to this induced change. The "technology push" is most visible in the information and communication sphere with applications in control and feedback. Due to the fact that information and communication technologies find application across many production processes, it can be classified as "heartland" technology. It is typical of heartland technology that its diffusion offers considerable economic benefits in cost reduction, time saving and improvement in quality which lead to new products, new modes of production, new organisational forms and new skills (Miles & Robins, 1994). Recently there is a clear move away from technology and towards information and knowledge as the key source of change. It follows that knowledge, and not as much technology, is being considered the most important asset in an economy (Schienstock *et al*, 1999: 7 – 8).

In the case of the knowledge society changes in the basis of a society's knowledge is considered to be the main driving force behind social change. In this regard three key vectors of change need to be emphasised.

(a) The enormous growth of knowledge.

(b) The development of the computer as knowledge based machine.

(c) The confluence of both these into the cognitive-technical complexes of knowledge-based techniques and types of mechanised knowledge.

The knowledge society is characterised by the fact that *all* of its functional systems are bound to a knowledge base in their basic manner of operation. Thus, compared to agrarian and industrial societies the members of a knowledge society enjoy higher levels of education, products with built-in intelligence and organisations that are knowledge-based entities. The result is a division of labour where science is responsible for the production, evaluation, canonisation and revision of knowledge and where other functional systems (i.e. politics, law, education, health, etc.) incorporate knowledge through intermediary processes. However, it is becoming apparent that this division of labour is weakening as a result of the proliferation of multiple centres of expert opinion. It follows that "science" is no longer able to control the production and use of specialised expert opinion. It is interesting to note that new concepts in management are no longer limited to economists or theorists in organisational management, but quite often as a result of reflected practice (Schienstock, 1999: 8 – 10).

Castells (1997) argues that the current revolution is not so much characterised by technological development *per se* or knowledge and information on its own, but rather the application of knowledge and information to technological devices to create a cumulative feedback loop between innovation and the use of innovation. In the learning society the spiral of learning by doing leads to the generation of new knowledge which, in turn, is directly applied in the production process and results in an acceleration of the production process. Thus, innovation becomes a normal part of work. It follows that transfer models in education, which isolate knowledge from practice, need to be re-evaluated. Rather put knowledge back into the context where it belongs. As learning is not only limited to transfers between individuals, but also take place at the level of intra and inter organisation and intra and inter industry, a learning economy is created. This learning is not an one way transfer, but multi-

dimensional interaction between a numbers of nodes of innovation. Critique against this approach centres around the unlikelyness of a collection of firms, organisations and institutions having a single, clear and cognitive process involving both decision making and a memory function (Schienstock, 1999: 10)

What these six approaches have in common is that the new environment will result in change at the core of society. Information and knowledge, as key variables, will replace land, labour and capital as the major source of the creation of wealth.

The economies of the industrial countries changed from agrarian to industrial during the industrial revolution. That change was not only a change in the mode of production, but was accompanied by a complete change in the fabric of society. And yet this did not imply that the production of agricultural goods was terminated in industrialised economies. To the contrary, as was shown in Section 2.4, the agrarian sector of the economy in industrialised economies has increased in political importance. It follows that one can expect that the information revolution would not eliminate the need for agricultural and industrial production and that these sectors of the economy would still play an important developmental role as is argued in Section 3.2. However, the true wealth would most probably be found in the information societies of the world. What then is the extent of the change taking place?

3.3.2.2. *Globalisation*

Perhaps the most striking factor influencing the future of agriculture, especially for South Africans emerging from the dark years of isolation, is the trend towards globalisation. The ascendancy of the global village, fading of international boundaries, confined powers of the nation state and the regional and international integration of economies are all symptoms of the move towards globalisation. Two of the technological changes that made this possible are advances in the terrain of communication and transport. These will be embroidered on in Section 3.3.2.3. In this section the equally important concept of the relatively unhindered flow of capital (monetary and human), ideas and material across international borders will be addressed.

Although at first glance, it may seem that the availability of international capital may negate the role of agriculture in the formation of capital in the initial stages of economic development, the right environment is needed for international investors. Capital, after all, is known to be very cautious. This environment includes political and social stability as well as rural and urban physical and institutional infrastructure. In addition international capital is notorious for the ease with which it takes fright and international investors usually require at least an equity share from local sources (Diaz-Bonilla & Robinson, 1998). Therefore, globalisation will have very little effect on the capital formation role of agriculture in the initial stages of economic development. Labour, being less mobile than capital, may be a totally different matter.

It can be expected that, with the borders of the nation-state becoming more porous, shifts would take place in the production base of economies. Indeed, whole sectors of industrial economies, such as the labour intensive textile and footwear sectors, are increasingly coming under pressure due to expanding competition from low-wage producers and the parallel relocation of jobs by multinational companies. This relocation of jobs often entails investments and acquisitions by multinational companies in developing countries in order to take advantage of specific competitive advantages. The resulting changes in the employment and wage structures are one of the reasons for high levels of unemployment in some developed countries. For instance, in the decade of the 80's the real wages of American men with at least college education rose by 11%, while the wages of those with only secondary education declined by 20 percent (World Bank, 1995). It follows that the two groups of people most affected by this trend towards globalised trade are unskilled workers in developed countries and entire countries (especially in Sub Saharan Africa) that lack the dynamics of competing on a global level. Protecting labour intensive industrial[1] industries in developed countries by trade barriers may be self-defeating as this will lead to the contraction of those economies. In addition, the shrinking of the labour force in those countries is a very real problem that will be discussed in Section 3.3.2.4 (World Bank, 1995).

---

[1] *It is interesting to note that consensus exist on almost a global scale regarding the advantages of labour intensive manufacturing industries to developed countries. It is a pity that the same level of consensus does not exist concerning agriculture.*

The ease with which the best-qualified and most capable individuals from a developing country can be lured to the higher living standards of developed countries is a well-established fact. Sarvate (2000: 2) claims that even if every child in the USA would forthwith study science, the demand by industry for highly skilled labour in the USA is of such a magnitude that the supply would be less than the demand. As a result preferential immigration rules meet the needs of USA industry, and not that of the developing world.

The World Bank (1995) argues that both the sender and the receiver countries benefit from the migration of labour. The remittances sent home by migrant labourers *could* contribute considerably to the GNP of a country, for instance the effect of earnings from South African gold mines sent home by Lesotho nationals. An additional advantage is the exploitation of migrant labour opportunities as risk management strategy at household level. The so-called brain drain is no problem in a country with a well-developed educational system. This loss of highly qualified individuals does not preclude the flow of ideas back to the developing countries. Well-developed communication infrastructure in developing countries and the development of personal ties with expatriates may well lead to easier access to new ideas and therefore technologies, markets and business opportunities. However, as it is often quite expensive to migrate, it is usually not the poorest section of society that forms the migrant labour contingent. Thus income inequality in the sender country can be enhanced through migrant labour. Receiving countries receive benefits through advantages accruing to capital holders and skilled locals. Unskilled migrants are usually willing to fill jobs that the local population shies away from. In this way populist fears that migrant labour "steal jobs from the local population" is often unfounded.

The population of the developing world does, however, not only qualify for the low skilled section of the job market. Uys (1999: 2) show that technological development in the communication sphere (to be discussed in Section 3.3.2.3) makes it possible for highly skilled technical jobs to be performed in developing countries at a fraction of the cost compared to the same task being done in a developed country. This leads multi-national companies to shift some of their functions to less expensive destinations or, in other words, to developing nations. It follows that it is not only

people that migrate across international boundaries from developing to developed countries but, if the right conditions exist, also job opportunities (both labour intensive manufacturing and high skilled) from developed to developing nations. As a result of the specific spending patterns in developing countries the income multipliers (see Section 3.2.2) of the migration of these job opportunities can significantly contribute to economic development.

Reducing the barriers to the flow of material goods across international borders has been the objective of various multilateral and bilateral international and regional trade agreements. With the process that culminated in the establishment of the World Trade Organisation (WTO) the field was opened to further advances on this terrain, albeit not all plain sailing as the Seattle-round of negotiations has proven. It is however important to note that tariffs, quotas, import taxes and export subsidies are not the only source of distortion in international trade. To this list should be added non commodity specific measures such as those that were pertinently excluded from the Marrakech-Agreement through a series of green, blue and amber "boxes". These measures are often to the detriment of the developing countries that (a) cannot afford[1] the same levels of support and (b) need a free flow of commodities for their own development (see for instance Mellor, 1986: 81 – 82). The question that remains is what are the possibilities to eliminate, somewhere in the future, all measures that distort (agricultural) trade? The answer to this question is closely related to changes in the concept of agrarian fundamentalism, which will be discussed in Section 3.3.2.5.

A number of implications can be drawn from this trend towards globalisation. It can be accepted that trade liberalisation does not necessarily implies a total elimination of agricultural support. Although the current WTO-logic is to minimise trade distortionary policy measures, green box measures still allows for *inter alia* investment in research, extension, training and regional support programmes. In other words, measures that will entail a movement of the aggregate agricultural

---

[1] *Some of the allowable Green Box measures that cannot be afforded by a number of developing countries are direct payments to producers, decoupled income support, structural adjustment assistance programmes through producer retirement programmes, payments under environmental programmes and payments under regional assistance programmes. In the case of Blue box measures resource retirement (set aside) programmes will be difficult to finance and, given the problems discussed in Section 3.2, ill advised.*

supply function to the right. If it is assumed that the WTO will succeed in minimising trade barriers and thus the policy options available to individual governments, it follows that the global economy will tend to resemble the characteristics of traditional closed economy models. This fading of national boundaries and erosion of national prerogative is one of the main implications of globalisation. As the relative competitiveness of agricultural production is therefore of the utmost importance, the second implication follows. Only those farmers that can either differentiate their products on a global scale or be the first to effectively implement new technology will survive financially. The third implication is that multi-national agricultural organisations that can make use of global production, marketing and ecological niches in conjunction with technological advances will probably be the only winners in the foreseeable future.

3.3.2.3. *Technology*

It is barely possible to picture a world with the current number of people and economic activity but without the technological artefacts available. According to Spies (1998: 4-8 to 4-10) three categories of long-term trends in the development of technological artefacts can be identified. The first category is the change in the technology that enables the technological artefact to operate. He states that technology evolved from tools used for moving matter, to energy-utilising machines and ultimately to artefacts with the ability to combine knowledge and information with the other components. Thus machines becomes automates. The second category is changes in structural trends. The size range of technological artefacts is increasing. This means that machines that benefit from an increase in size become larger and those that benefit from a decrease in size usually become smaller. Closely related and according to Spies (1998) the most significant trend is the tendency for technological artefacts to become more complex. The third category can be labelled performance trends. The increase in performance of technological artefacts can be measured in terms of efficiency (ratio of output produced per unit of input), capacity (intensity of output), density (increased efficiency and capacity in relation to space occupied) or accuracy (precision).

It is common cause that one of the most important technological trends that will influence the future lies in improvements in information technology. As the performance of information processors (computers) increases on a logarithmic scale, new possibilities for simulation, design, modelling, research and weather forecasting arise. Closely related are trends in communication where the power of the internet for the exchange of information (i.e. research and extension) and as a conduit for business is only starting to be appreciated. Other important technological trends include space technology (remote observation and global positioning systems), megatronics (robotics), neural networks (self-taught expert systems based on the workings of the human brain) and nanotechnology. Biotechnology research is currently largely focussed on medical science, but with important agricultural applications. Through the manipulation of single genes the agronomic and post-harvest characteristics of crops can be changed. Similar manipulations for animals are envisaged in the near future. Cloning, although accompanied by considerable ethical questions, can increase the turn-around time and lower the cost of research dramatically. There is also the added advantage of yield-increasing crops and animals that may flow from this technique (Spies, 1998: 4-20 to 4-41).

One of the dangers of developments in the technological environment is that organisations try to entrench old ways of doing things (organisational structures, financial and accruement systems) by applying new technologies. In taking advantage of new technologies, however, totally new ways of doing things are often necessary. Take for instance manufacturing. At the cutting edge of business the organisation involves the customer in the process of manufacturing. Through customer inputs (information and preferences) the ideal final product – from the perspective of the customer – can be created. If the middleman (sales agent) cannot add value to this process, he will be eliminated from the process (Uys, 1999). Currently the on-line sales of Dell, an IT company, are more than US$30 million per day. This has been achieved with a totally automated process without any intervention of people in the process (Uys, 2000). In other words, the "technology push" of the information economy (see Table 3. 9) requires a shift in emphasis away from command and control structures to the creation of an environment wherein the knowledge worker is able to fulfil his, and hopefully also the organisation's, objectives.

It is appropriate at this stage to evaluate the relationship between technological change and economies of scale in farming. Traditional wisdom has it that advantages gained by technical efficiency are eroded by management problems on larger tracts of land[1]. Thus, the family farm can achieve optimum farm-level economies of scale. In other words, that combination of technology that allows the farmer and his family to supply the majority of labour engaged in farming operations[2] can be more efficient than large farms. This relationship leads Binswanger (1994: 166) to argue that genuine economies of scale in agriculture only exist in the so-called plantation crops (i.e. sugarcane, bananas, tea and oilpalm). However, this is the result of economies of scale in processing rather than in farming itself. He continues by arguing that the same levels of economies of scale can be reached by contracting of raw material in plantation crops.

As agricultural technology develops new heights in efficiency, capacity, density and accuracy are reached, the labour requirement for producing a unit of output declines. The result is that an individual person can "control" a larger tract of land. At the same time the introduction of precision agriculture[3], which Robert (1999: 2) describes as "not just the injection of new technologies, but rather an information revolution made possible by new technologies" requires high outlays of capital. Although new technologies, such as precision agriculture, lower the per unit cost of production, the indivisibility of the capital requirements associated with the technological artefacts favours the larger business. The effect of this variable, even before the impact of technologies such as precision farming is emerging, is clear from the North American example. In Canada, for instance, average farm size increased from the 578 acres in 1976 to 751 acres in 1991. In effect the number of farms larger than 2 000 acres increased from 5 000 to 7 865 over this period. Over

---

[1] *The high supervision costs of labour on larger wine-producing farms in the Western Cape is clearly illustrated by the inverse relationship between labour productivity and number of employees found by Townsend (1997: 180 – 190).*

[2] *Of course, these relationships can be changed through factor price relationships, technological change and policy measures – the so-called induced innovation hypothesis as discussed in Section 3.2.1.3.*

[3] *Precision agriculture is a new technique that incorporates soil characteristics, micro-climate and yield potential in a interactive and in-time GIS database. As a result the particular management of sub-units rather than fields are possible through, for instance, varying the blend and application of fertiliser. Although still in its infancy, it is considered world-wide for most common cropping systems and some speciality crops (Robert, 1999: 1 – 2).*

the same period the number of farms smaller than 1 000 acres declined. A similar trend is visible in the USA (Hoffman *et al*, 1995: 151).

Combine the changes in the control variable with precision farming, neuron networks, artificial intelligence, information technology and the possibilities of biotechnology, then, for the first time in the history of mankind, farm products can acquire the true characteristics of a fordist or industrial product. According to Boehlje and Doering (1999) industrialised agriculture is characterised by:

(a) Adoption of manufacturing processes in production as well as processing;

(b) A systems or food supply chain approach to production and distribution;

(c) Negotiated coordination replacing market coordination of the system;

(d) A more important role for information, knowledge and other soft assets;

(e) Increasing consolidation at all levels raising issues of market power and control.

However, while this type of production is now possible, information as an input in the production process creates the cognitive-technical complex that is a true characteristic of the knowledge society (see Table 3. 9). It follows that agriculture will probably develop through the "industrial" phase in the shortest possible time; shorter than, for instance, the manufacturing sector.

Returning the argument to the concept of economies of scale. The combination of various factors, such as the skill requirements of new technologies, the removal of government risk management strategies, the requirements of a market driven agriculture and consumer dominance means that a wide range of expertise is necessary for effective farming. This range of skills required is sometimes of such a variety and magnitude that the typical family farmer is at a clear disadvantage compared to the "company" farmer. In spite of this pressure there are a number of possible strategies through which the family farmer can compete in the global market place[1]. More attention will be given to these strategies in Chapter 5.

In agriculture the trends in the development of new technological artefacts are already clear, and include the development of expert systems, precision farming,

---

[1]   *Napier (1998) is of the opinion that sharing capital and capital items, cooperation amongst farmers, flexibility to relocate (divorcing the farm business from the farm land), human resource management and professionalism are but some of the prerequisites of a successful strategy.*

harvesters for fruit, computerised shearing, weed killer resistant crops, etc. It is clear that this has a number of implications for the future shape of the sector. The first is that highly skilled farmers have a competitive edge due to the complexity and efficiency of most of the artefacts and processes being developed. Thus, these changes are primarily to the advantage of highly educated farmers and therefore those individuals in developed economies. The second implication is that most of these technologies result in labour saving techniques, again to the disadvantage of developing economies whose competitive advantage is often embedded in cheap labour. Thirdly, the technology and processes employed are not unique to agriculture and are therefore to the advantage of multi-sectoral enterprises. As these enterprises are often also multi-national, with head offices situated in developed countries, the family farmer is usually at a disadvantage. For instance Hedly (1998: 369 – 371) provides a description of the implications of biotechnology[1]. It may, however, in certain instances reduce the problem of asset fixity. The fourth implication is that a whole new range of products and markets for agriculture may develop. Although it can be expected that the better-connected farmers may be the first to benefit from these developments, a certain market for "traditionally produced" products may develop simultaneously, to the advantage of the family farmer. The last implication is that certain (theoretically) scale neutral crops and animals, for instance drought resistance wheat cultivars, that may enhance food security in rural areas and expand production to previous marginal areas. Of course, as the use of knowledge as a lumpy input is implied the implicit assumption is that the institutional infrastructure will be in place for the rural poor to get access to these technologies.

3.3.2.4. Demography

The world population reached the symbolic six billion mark on 12 October 1999. This is an increase of more than 1,5 billion people in the two decades since 1980. This increase alone is more than the population of the high income and upper middle

---

[1] *The acceptance of biotechnology in the US is astounding. In 1996 biotechnology crops were produced on only six million acres. This increased to 58 million acres in 1998. By 1998 approximately 45% of the cotton produced in the US, 38% of soybeans, 35% of canola and 25% of maize were products of biotechnology (Denis, 1999).*

income countries of the world combined. At the same time the wealth of the close to six billion people in 1997 was dependent on only 2,78 billion people; the labour force of the world (World Bank, 1999: 194 – 195).

It took close to eight million years for the population of the earth to reach the one billion mark at approximately 1804. The second billion was added in just 123 years (1927) after which the third billion was added in 33 years by 1960. Currently, with the sharp reduction in mortality in the less developed regions, another billion people are added to the population of the earth every 12 years. However, it is expected that this interval will increase in the 21st century and that the seventh billion will take 14 years (2013) to be added to the world population. The interval between the eighth and the ninth billion, which will only be reached in 2054, will take 26 years. (UN, 1999: 4-1 – 4-4). More significant is the fact that the most recent UN (1999) expectation of the world population by the year 2050 is in sharp contrast with previous expectations. In 1991 the UN predicted, as quoted by Laubscher (1996: 2-13), a world population of ten billion in 2050. This prediction has recently been adapted downwards to 8,9 billion (UN, 1999: 4-3).

Of course, these predictions are dependent on a number of variables. The aforementioned statistics are based on a medium fertility rate for the world. Under a high fertility scenario the world population may well reach 10,7 billion by 2050 while a low fertility scenario yields a population of 7,3 billion (UN, 1999). In 1348 and subsequent decades an unknown infectious agent, popularly known as the "black death" or "the plague" struck Europe. It is speculated that this infectious agent may have, in the hundred years since it's first appearance, reduced the population of Europe by two-thirds (Cohen, 1999: 26). In 1918 another agent, the grippe that led to numerous deaths and the devastation of some rural areas, struck the world. In the last decades of the 20th century the population of the world were faced with HIV/AIDS[1]: a new wild card[1] that may influence the growth rate of the world

---

[1] *Cohen (1999: 27) shows a very interesting possible link between the black death and AIDS. In some Europeans a mutant gene is found that prevents the HIV virus from attaching to lymphoid cells. This mutant gene is extremely rare in other population groups and it is estimated that it appeared about 700 years ago. Evidence also suggest that it has rapidly increased in its frequency due to very strong selective pressure; possibly the black death..*

population. Of the 34 countries most affected by AIDS, 29 are in Sub Sahara Africa (including South Africa). Although the life expectancy of a child in some of the worst hit countries (for instance Botswana) is 29 years less due to AIDS and a reduction in the population growth rate is expected, in none of those countries is the total population expected to decline due to AIDS. This is mainly due to the exceptionally high fertility rates found there. In the case of South Africa the epidemic started later than in some of the other countries. The full impact is therefore yet to be experienced and an annual population growth rate of only 0,3 percent is expected by the year 2010. This translates into a 21 year reduction in the life expectancy at birth (UN, 1999).

However, the UN (1999) does not expect AIDS to significantly change the geographical dispersion trends of the world's population, which is already expected to change considerably. In 1900 the largest part (57,4%) of the world population lived in Asia and Europe housed 24,7 percent of the world's population. Africa was a relatively minor role-player at 8,8%. Currently Asia is still the dominant (60,8%) locality of the world population, but the population of Africa (12,7%) is approximately equal to that of Europe (12,4%). It is expected that Asia will keep its ascendancy in the year 2050. However, the relative roles of Africa (19,8%) and Europe (7,0%) will change dramatically. More significant is that an actual decline is expected in the population of Europe, from the current ±730 million to ±628 million by 2050. It is thus no wonder that the developed region share of the world population is expected to decline from the 32,2 percent in 1950 to only 13,0 percent by 2050.

Although Africa will be the second most populous continent by 2050, its approximately 1,7 billion people (more than double the current population) will be slightly more than the projected 1,5 billion people of India (and that on a land area roughly one tenth of Sub-Sahara Africa). Of the current ten countries with a population larger than 100 million, six are in Asia and the tenth (Nigeria) is in Africa. By 2050 Asia will probably have eight countries in this category, while Africa will have four (UN, 1999). The problem in the developing world is that the

---

[1] *AIDS is used here as an example of one of the possible wild cards. Other possible wild cards could include global conflict, global warming, etc.*

non-agricultural sectors of the developing countries have not expanded fast enough to absorb this population growth. The result is that agriculture has to absorb this excess population, with a negative impact on rural welfare (Taslim, 1994). In this way the labour releasing function of agriculture, as discussed in Section 3.2.1.3, is changed into that of labour absorption with a consequential negative impact on economic development.

In analysing the World Bank data (1999: 194 – 195) some trends are clear. The annual population growth rate of the world has slowed from 1,7 percent in the eighties to 1,5 percent in the nineties and to 1,33 percent at the turn of the millennium (UN, 1999). With the exception of the high income countries of the world, where a constant (0,7%) annual population growth rate is experienced, this slowdown is being replicated in all country income groups. However, as usual there are a number of individual countries that are an exception to the rule. These exceptions can be categorised into the following three groups:

(a) Developing countries where the population growth rate increases, mostly due to high fertility rates, lack of infrastructure and poverty. For instance the annual population growth rate in Mozambique increased from 1,6 percent in the eighties to 3,8 percent in the nineties. The same is true for countries such as Cameroon (2,8% and 2,9%), Chad (2,4% and 2,5%) and Bolivia (2,0% and 2,4%).

(b) The second category includes thirteen former socialist countries of Central and Eastern Europe, which show a negative population growth rate. The most notable of these is Estonia, where the annual population growth rate declined from 0,6 percent in the eighties to –1,2 percent in the nineties. Also in this category is Bulgaria (-0,2% and –0,7%), resource rich countries such as Ukraine (0,4% and –0,4%), and even the Russian Federation (0,6% and –0,1%).

(c) The third category is high income countries that show an increase in population growth rate. However, this growth rate is not as a result of domestic population growth, but due to the fact that these countries serve as receptacle for the population of former socialist and developing countries. That is why the annual population growth rate in "border" countries such as Austria has increased from 0,2 percent in the eighties to 0,6 percent in the nineties and in the case of Germany from 0,1 percent to 0,5 percent over the same periods. Hong Kong (1,2% and 1,9%) also received its fair share from China before unification.

Even in the United Kingdom (0,2% and 0,3%) and the United States of America (0,9% and 1,0%) the annual population growth rate was allowed to increase through immigration. It could be expected that, in the absence of strict immigration rules and controls, these population growth rates would have been considerably higher for the developed countries. Israel (1,8% and 3,2%) is an unique case in itself due to specific religious reasons.

Corresponding with the evidence from population growth rates, is the data on fertility rates. In 61 countries of the world the total fertility rate (TFR) is below the replacement level of 2,1 children per woman. In those 61 countries, which for all practical circumstances include all developed countries of the world, there are currently 2,6 billion people (44% of the world population). The only "African" country amongst these countries is Mauritius with a TFR of 1,91. The 23 countries with a TFR of less than 1,5 are predominantly European and include Spain (1,15), Italy (1,20) and Germany (1,30). The only non-European countries in this category are Japan (1,43) as well as Macau (1,40) and Hong Kong (1,32); both now part of China (UN, 1999).

It is expected that the low TFR in a number of regions will lead to significant declines in the population of those regions by the end of the second quarter of the 21st century. In Northern Europe this decline will be moderate at four percent. It will be more notable in Western Europe at 6,5 percent and highly significant in Eastern Europe (18%) and Southern Europe (20%) (UN, 1999).

A major revision of the extreme long-term population forecasts has become necessary in recent years. This has resulted from changes in the TFR of most countries. In the medium TFR scenario, which assumes a stabilisation of the TFR in all major areas of the world at replacement level after 2050, the population of the world is expected to stabilise at 9,7 billion by the year 2150. In the high and low TFR scenarios, which assume a 0,5 TFR variation from the medium scenario, the world population is expected to be 24,8 billion and 3,2 billion respectively by 2150. However, if TFR for all major areas is kept constant at 1995 levels, the world population will be 256 billion by 2150. Of this number of people 169 billion will be

living in Africa (UN, 1999b). The latter scenario definitely provokes visions of a Malthusian type of society.

It follows that, due to the decline in TFR and increase in life expectancy, a significant larger proportion of the world population will be older than was the case in the past. In 1950 the median age of the world population was 23,5 while it is expected to be 37,8 in 2050. Again, significant variations are found between the developed and developing regions of the world. In Europe of the 1950's the median age was 29,2 compared to the African median age of 18,7 in the same period (a difference of 10,5 years). The expectations for 2050 are a median age of 47,4 and 30,7 respectively, with a difference of 16,7 years. More significant is the fact that persons older than 60 will constitute 33 percent of the population of developed regions by 2050, while children younger than 15 will only be 15%. Only at that stage will the proportion of the population that consists of older people be equal to that of children in the less developed regions of the world. In Africa there will still be twice as many children than older persons, with 24 percent of the population younger than 15 and only 12 percent of the population older than 60 (UN, 1999). One of the consequences of the longer life expectancy is that a trend towards late motherhood is experienced. For instance, in the USA the number of first live births per thousand women in the age-group 30 – 34 years increased by 146 percent from the 8,6 in 1960 to 21,2 in 1990 (Castells, 1996: 450).

From these changes in the age-structure it also follows that the number of oldest of the old (over 80 years of age) will also increase. This is the segment of the world population that is currently showing the highest growth rate (147% since the 1970's) and of which the number is expected to increase six-fold by 2050 – a total of 370 million persons. It is expected that of these 2,2 million will be centenarians (older than 100 years) and that in this age group there will be approximately four females for every male. People at the age of 80 and older will make up more than ten percent of the population of nine countries of Europe and three in the Far East.

One problem[1] that flows from the changes in geographic dispersion, TFR and age structure of the world population is the fact that a proportionally smaller number of

---

[1] *Not to mention the significant implications for the retirement-fund industry.*

economically active people in developed countries are responsible for the wealth of such nations. In Italy, for example, the working age (15 – 64 years) population is expected to decline from the current 39 million to 22 million by 2050. The corresponding statistics for Germany are 56 million and 43 million (UN, 2000). Magnifying the problem associated with this trend, is the fact that the number of hours worked annually by a worker in Italy declined from 2 886 in 1870 to only 1 556 in 1979. In Germany the comparative statistics show a decline from 2 941 in 1870 to 1 719 in 1979. It follows that the potential lifelong working hours for a worker in Germany declined from 114 170 in 1950 to 85 015 in 1985. In France a worker only has 77 748 hours available to complete his or her career and to make provision for retirement (Castells, 1996: 438).

One of the solutions to this problem is the migration of labour. The incentive for this can be found in the difference in wage structures between countries. A skilled worker in the OECD countries receives wages that are on average 80 times higher than an African farmer (the lowest paid wage category in the world). Whereas the per capita income in the richest countries was 11 times higher than that in the poorest countries in 1870, that ratio has increased to 52 (World Bank, 1995).

Returning to the example of Italy and Germany. For a country such as Italy to maintain its current population size it would need to take in about 240 000 immigrants annually. However, if Italy and Germany want to maintain their current working age populations, Italy would need 350 000 immigrants annually and Germany would need close to 500 000 annual immigrants. Yet, it has been shown that the age structure of those two countries is changing rapidly. Therefore, to maintain the current ratio of working age population to the retired age group (±4:1), Italy would need an annual inflow of 2,2 million people and Germany 3,4 million people annually (UN, 2000). This comes to a total of 188 million immigrants to the year 2050 out of a current population of 82 million (Holloway, 2000). Immigration of this magnitude is clearly not a viable solution because of the potential negative impact on the cultural and social fabric of the receiving country. It is necessary that the solution to the maintenance of the support base will have to be found elsewhere.

A section on demography would be incomplete if the migration of people from rural to urban areas (urbanisation) is excluded. In 1995 46 percent of the population of the world lived in urban areas. As the urban population of the world is growing three times faster than the rural population, it can be expected that by 2006 50 percent will live in urban areas. This will be the first time in history that city-dwellers outnumber the rural people of the earth. By the year 2030, this percentage will increase to 61 percent. Although the rural population of the world is still increasing, it is expected that it will start to decline slowly after 2020 (UN, 1998).

However, the rate of urbanisation in the developing regions is much faster than in the developed regions of the world[1]. The result is that, where 65,9 percent of the urban population of the world lived in developing countries in 1995, it is expected that this will increase to 80,2 percent by the year 2030 (UN, 1998). It follows that a change in the location of the biggest cities of the world can be expected. In 1950 New York (population 12,3 million) was the biggest city in the world. In that year six of the 15 biggest cities were in Europe, followed by five in Asia, three in North America and one in South America. By 1995 Tokyo (population 27 million) took the crown as the biggest city with New York only fourth on the list. None of the15 biggest cities in the world was in Europe, while eight could be found in Asia, four in South America, two in North America and one in Africa. It is expected that Tokyo (population 29 million) will still be the biggest city by the year 2015. New York will now only be ninth on the list and Los Angeles, at number 15, will barely make the list. Nine of the largest cities will be in Asia, two in South America and two in Africa (Lagos, Nigeria and Cairo, Egypt). The concentration of the urban population in Asia is further underlined by the expectation that of the 26 mega-cities (population more than ten million) of the world by 2015, 18 will be in Asia and 22 in the less developed regions of the world (UN 1998).

Closer to home a similar urbanisation trend is evident in South Africa (see Table 3. 10). It is expected that the urban population of South Africa will more than double to 48,7 million by 2030. Where the rural population is currently approximately the

---

[1] *Of course, the developed regions are currently (1995 data) more urbanised (75%) than the developing regions (38%) of the world (UN, 1998). In addition, as was discussed earlier, the population growth rate in the developing regions is higher than in the developed regions.*

same as the urban population, it will be less than a third of the urban population by 2030. More than seven percent of the South African population will, by then, live in Cape Town. More important, however, is that a negative growth rate for the rural population can be expected by 2030.

Table 3. 10: Selected urbanisation indicators for South Africa.

INDICATOR	YEAR		
	1950	**1995**	**2030**
Population Urban (mil)	5,9	20,5	48,7
Population Rural (mil)	7,8	21,0	27,1
% of Population Urban	43%	49,3%	64,3%
Urban growth rate	3,14	2,60	1,92
Rural growth rate	1,72	1,78	-0,23
% of SA Population in Cape Town	4,52%	6,58%	7,07%

Source: UN (1998)

It is expected that six cities in South Africa will have a population of more than two million people by the year 2015. Significant for the agricultural sector of the Western Cape is the fact that the population of Cape Town is expected to almost double from the 2,3 million in 1990 to 4,4 million by 2015 (UN, 1998). Although a significant market for agricultural produce is thus created, it will place tremendous strain on existing infrastructure and especially the scarce water resources of the Western Cape.

A very significant trend in especially developed countries is that of counter-urbanisation. Counter-urbanisation is a concept that describes the process where a city experiences a decrease in the size of the population and a decrease in population density. In Table 3. 11 a list of such cities, predominantly in the developed world, is provided.

The normal explanation for counter-urbanisation is that improvements in transport and communication as well as an increase in home-ownership leads to a deconcentration of people in the city centre. It is argued that the growth of cities follows a cyclical pattern along the lines of:

(a) The fastest growth takes place in the core of the city (urbanisation).

(b) Fastest growth in the ring around the core of the city (suburbanisation).

(c) Population decline in the core and the ring of the city, with the core losing more people than the ring (counter-urbanisation).

(d) An increase in the population density with the core growing faster than the ring (re-urbanisation[1]).

It appears that some cities in the developed world are in the third phase while some (i.e. New York) have already moved through the fourth phase and are again in a process of counter-urbanisation. Most cities in the developing world are currently in the first or second phase of the urban transition (UN, 1998).

Table 3. 11: Cities experiencing counter-urbanisation in the last three decades of the 20th century.

COUNTRY	CITIES (alphabetical order)
Denmark	Copenhagen
France	Lille, Lyon, Marseilles
Germany	Bremen, Dusseldorf, Essen, Hamburg, Hanover, Saarland
Italy	Florence, Genoa, Milan, Naples, Rome, Turin
Spain	Barcelona, Madrid
U.K.	Birmingham, Leeds, Liverpool, London, Manchester, Tyneside
Netherlands	Amsterdam, Rotterdam
Japan	Kyoto
USA	Buffalo, Cleveland, Detroit, New Orleans, New York, Pittsburgh, St. Louis

Source: UN (1998)

However, to look at absolute numbers may be misleading. Dahms (1995: 22) is of the opinion that events in the countryside are considerably more complex than is suggested by aggregate statistics. It may be more significant to investigate the income and skills levels of those people moving to the cities compared to those that

---

[1] *It must be noted that the fourth phase of urban transition has as yet only been experienced in New York, St. Louis and Milwaukee.*

relocate to more serene (rural) environments. A significant number of professional people, especially in the larger European cities, are moving to rural areas. Largely professional people now inhabit an increasing number of "rural villages" around London. These people either commute on an irregular basis to London, or communicate electronically with their clients. As the physical location of the person in a number of information society professions is immaterial, these people often choose for what they perceive as a better quality of life in a rural setting. It is therefore not strange that Bessière (1998: 22) proclaims that the present day rural society can no longer be associated with a "peasant society". As the number of farmers continues to shrink over the years, new categories of population have gradually appeared. Thus the term ruralisation rather than counter-urbanisation can be used. Other terms used for this phenomenon include "rural-urban turnaround", "urban field" and a "rural renaissance".

Dahms (1995: 28 – 29) shows that for a rural area or village to take advantage of this occurrence a number of elements should be in place.

(a) As any estate agent can testify, location is important. In this context location means distance to an urban centre or centres. However, distance is not measured in kilometres, but rather in terms of travelling time. It follows that the quality of physical infrastructure (roads, railways and communications) is of paramount importance.

(b) The environment is the second factor of importance. With environment is meant the physical setting (proximity of mountains, lakes, rivers, etc) as well as the built environment of the area.

(c) Even if the first two elements are in place entrepreneurial initiative is necessary to "market" their area. Entrepreneurial spirit is also necessary for the location or relocation of businesses with a client base larger than the immediate area.

Some conclusions follow from this discussion on demography. The possible impact of AIDS on the world has not yet been established to its full extent. Although a cure or vaccine for AIDS may be developed in the near future or spontaneous immunity[1] may develop, the opposite may also be true and the blight may be bigger than

---

[1] *For instance, a group of prostitutes whom shows spontaneous immunity to AIDS has recently been found along the N3 near Durban. Research into this phenomenon is currently ongoing (RSG, 2000).*

expected by the UN (1999). It can be argued that a reduction in the population, or at least a substantial reduction in the population growth rate, may lead to a shortage of workers in the worst affected areas. This, in turn, will necessarily lead to higher levels of productivity[1] and consequently to higher wages (Cohen, 1999). It follows that these circumstances may result in the development process as discussed in Section 3.2.1. However, the downside of the equation is that the downward pressure on the prices of agricultural commodities will probably increase due to a check in the movement of the demand function for farm products to the right (see Section 2.3.2. for the rationale[2]). However, lower food prices may lead to a healthier and thus more productive consumer population resulting in economic growth[3].

It is expected that, with or without a phenomenon such as AIDS, the growth rate of the world population will slacken by 2050. This in itself will have a significant implication on the movement of the demand function for agricultural commodities. In addition to the change in the movement of the demand function, the ageing of the population will probably lead to a crucial change in the structure of the demand for farm products. This will translate into new requirements for the packaging, nature and distribution of such produce.

A very significant trend with possible widespread implications is that of ruralisation. If it is true that an increasing number of professional people are moving from the cities towards rural areas (the so-called life-style farming), then the very characteristics of the countryside may change. This would imply that the extraction of economic rent from society along the lines of distribution according to merits might be replaced by distribution according to needs. The implications for support to

---

[1]   *In most affected areas a substantial technological gap exists between current practise and what is possible with existing technology – therefore the room for higher levels of production.*

[2]   *In Short the argument is that a check in the population growth rate will result in a check in the aggregate demand function for farm products. However, at the same time it is potentially true that the movement of the supply function will continue to move to the right, especially as AIDS the least severe in the developed countries that are responsible for the largest part of agricultural production. This combination of the movement of the aggregate demand and supply functions will lead to the downward pressure on the prices of commodities.*

[3]   *See Mellor and Johnston (1984) for a discussion on the relationship between nutrition and economic development.*

agriculture may be far-reaching. But, before this conclusion can be reached, it is necessary to investigate possible changes in agrarian fundamentalism.

3.3.2.5. *Agrarian fundamentalism*

It was argued in Section 2.4.2.2 that the success of the farm lobby in extracting economic rent from society is related to the effective exploitation of the principle of distribution according to merits or, in other words, ensuring just rewards for producers of important public goods. Especially within the framework of the pressure group approach the principle of merits plays a very important role in illuminating trends in the real world. At the basis of this argument is the sometimes intangible concept of agrarian fundamentalism.

Agrarianism initially consisted out of three elements. First, agriculture is the basic industry. Second, the farmer is self-sufficient and, therefore, independent. Third, farm life is natural and good. These elements underpinned the notion of an independent yeoman – the basic building block of the economy and of democracy (Dalecki & Coughenour, 1992: 49 – 51). In more recent years the tenets of agrarian fundamentalism includes the following:

(a) Farming is the basic industry upon which all others depend.

(b) Agricultural life is good and natural while city life is artificial and evil.

(c) Farmers should be economically independent.

(d) Farmers must work hard to demonstrate their virtue.

(e) Family farms are indissolubly linked with democracy.

These tenets do not differ from the earlier elements, but seeks to expand on the former (Beus & Dunlap, 1994).

Is agrarian fundamentalism still a prevailing force at the turn of the 20th century? In researching this question in the United States of America Drury and Tweeten (1997: 68) found that, compared to the general population, the farm family is more stable, religious, satisfied with life, happier and politically more conservative. It was also found that farm attitudes and morals are perceived to be a positive force in American society and can be translated into positive externalities in that:

(a) People have existence value for the family farm. In other words, people want to preserve family farming and their values just because those values are there[1].

(b) People may experience direct use value if they enjoy interacting with farm people and viewing family farms as they drive through the countryside.

(c) The option value of family farming is twofold. First in that they want the family farms to be there when they drive through the countryside. Second, they want the option of becoming a family farmer themselves somewhere in the future to be open.

(d) Attributes of family farmers have demonstration value in that it improves the values and behaviour of others and acts as a yardstick.

However, these values cannot be priced. Another problem is that commodity specific programmes do not necessarily preserve the family farm and it can be argued that company farms free-ride on the family farm issue.

In an earlier study (Dalecki & Coughenour, 1992) on agrarianism in American society it was found that Americans especially value three aspects of agriculture. That is the concepts of the family farm, farming as the basic building block of the economy and yeomanship. However, it was also found that the values underpinning agrarian fundamentalism are largely, but not wholly, an expression of the general societal values in the USA.

In a sharp attack on Drury and Tweeten (1997), Offutt et al (1998) argues that:

(a) Farmers, as a group, have never been significantly different than any other group that shares similar socio-demographic characteristics. Farmers have rather been the beneficiaries of an agrarian fundamentalist mythology that exists in the American political economy.

(b) The "weight" of the different groups in the political preference function is not dependent on objectively measurable variables. It is subjective weights that members of society and political decision-makers place on the support of that group, independent of the actual character of the group. Thus, the question is whether, due to the fact that a farm business increasingly adopts the attributes of

---

[1] *In an earlier study Jordan and Tweeten (1987) found that 80 percent of respondents in the United States agreed that the family farm must be preserved because it is a vital part of the heritage.*

any other business, the subjective weights is consistently being adjusted downwards?

(c) There is room for improvement in the research approach of Drury and Tweeten. Farmers as an occupational group were compared to residential areas and not other occupational groups. In addition the sample group was too small.

(d) Finally, Offut *et al* correctly ask "whose morality"? If it is argued that the morality of one group is superior to that of another group it is often from the subjective opinion of the author. At the same time what is considered to be "morally acceptable" in a society at a certain point in time may not be the same as was the case ten years in the past or will be ten years hence.

To debate the issue of the moral superiority or not of farmers is irrelevant. What is more important is the perception of the general public and, more specifically, the wealth that the general public are willing to forfeit in preserving that particular set of conditions. Can the concept of yeomanship stand in the stark contrast of the very high level of support that farmers in some countries receive from government? Can the idea of farm work as pure and good (close to nature) hold in face of "Frankenstein foods", industrial (fordist) agriculture and food-safety scares?

The European consumer's trust in the farm sector was severely tested during the past decade. Ranging from Salmonella and dioxins in eggs and poultry, BSE in cattle, hormones in beef, antibiotics in pork and chemical residues, food-safety scares eroded this trust (De Tavernier, 2000: 1). But is there substance in these scares, or is it an overreaction? North (2000) provides four essential elements for a hazard to become a scare:

(a) The hazard must be universal. If the hazard is limited to only a specific brand the problem will not have the same impact as is the case when it is of a generic nature (i.e. beef or eggs).

(b) There must be an actual or perceived element of novelty. It must be "news". This is of course the case with all new scientific developments. Although a specific hazard may be present for a number of years, the mere fact that technology may make it possible to isolate the hazard may give the hazard novelty status.

(c) The hazard must be plausible. People must be of the opinion that they can die or get seriously ill from the hazard. This opinion can be strengthened by pressure groups whose opinion is unbalanced by opposing views. Of course, the plausibility can be enhanced if there is an imbalance between the normal proponents and opposers of a specific hazard.

(d) People must be uncertain about the actual magnitude of the risk involved. As long as the threat remains a Nyktomorph[1] it has the potential to turn into a scare. It is no use to deny something is not true if there is even the slightest possibility that it is true – it will only stimulate the debate. But, as soon as the risk is quantified, there is no more room for the debate and the Nyktomorph turns into a reality.

The current debate concerning GMO's has all the elements of a food-safety scare. It is universal, it is novel, the hazard is plausible and there is considerable debate regarding the actual magnitude of the risk involved. To make matters worse, for the first time in history three of the mightiest lobby groups in Europe (the farm lobby, environmentalists and consumers), which are usually in some form of opposition, are joining forces on an issue. It is within this context that De Tavernier (2000: 8) argues that consumers desire to return to the original farm produce. To the time when it was still "safe"

It follows that Bessière (1998: 22 – 23) describes modern-day agrarian fundamentalism as a reaction against the complexity of the modern world in which social links are either falling apart or weakening. In this quest for identity the rural countryside, and what it represents, creates a feeling of belonging to a social group. Or, in the words of Burguière as quoted by Bessière "…we have a fantasy which urges us to think today that the countryside is the mother of all our traditions, to find in the country the origin of all that honours the national character in our tastes and habits."

Moving the focus for the moment to this search for identity. As part of the trends towards the globalisation of the economy, the internationalisation of political

---

[1] *From the Greek Nykto-morph which means night-shape. That shape in the dark that you can't substantiate, but which scares you to death. The "lion" that in daylight turns out to be a bush.*

institutions and universalism of culture, the nation-state has been declared declining for some time. However, can the same be said for nationalism? Castells (1997) is of the opinion that nationalism and nations do have a life of their own, independent of statehood and that current state borders do not necessarily overlap those of nations. He adds by saying that current nationalism is not necessarily elitist, but is quite often a reaction from the masses against the global elite. Finally, because contemporary nationalism is more reactive than proactive, it tends to be more cultural than political. The United States is an ideal example of a country that created nationalism in spite of the ethnic diversity of its population. At the root of this nationalism is the development of a cultural commune in people's minds and a collective memory from the sharing of history and political projects. By contrast, the USSR failed in the same objective. An example of a nation surviving without a state and against mounting odds, is that of Catalonia in Spain and Scotland in the UK. It is also possible for a number of nations to share a state, as for instance in Belgium and South Africa. The point is that, even as the powers of the nation-state seem to be eroded towards international and local structures, the identity of people is firmly rooted in their shared culture and history, or, in other words, nationality. This identity in itself becomes a value-adding object for certain commodities.

It is in the context of this resurgent debate on nationalism that the concept of an "African Renaissance" has been debated[1]. No "renaissance" can do the concept justice without incorporating and mobilising society as a whole. In other words, a true renaissance must have elements of economic, socio-political, cultural and scientific transformation. However, this transformation is rooted in a specific cultural and historical context. An early indication of a move in the right direction is the firm commitment to the "mobilisation of the people of Africa to take their destiny into their own hands" (Stremlau, 1999: 102). Castells (1998: 127 – 128) agrees with this reconstruction of African societies with self-reliance as basis. However, he warns that a political "revolution" to prevent elitist behaviour is a prerequisite.

It is clear that a schism is in the process of developing. The more fundamentalist family farm, yeoman and naturist concepts of agriculture have been opposed by the

---

[1] *The concept of an African Renaissance will be explored further in Section 5.6.1.*

"agriculture as a business" theme. Beus and Dunlap (1994) make the distinction between the alternative agriculturists (agriculture as rectifier of the natural and social environment) and the conventional agriculturists (progress in terms of yields, efficiencies and productivity through economies of scale). However, both these groups are committed to agriculture as an important economic and social activity and want what they believe is best for the sector. It is only recently that the confrontation between these two groups has reached global dimensions, among others with the demonstrations at the Seattle round of WTO talks. In this instance the fundamentalist group was outside the chambers while the conventional group was arguing, in the words of Alec Erwin as quoted by Barber (1999), "…that agricultural products are no different from industrial products."

It was argued in Section 3.3.2.4 that agrarian fundamentalism may be the basic vector of ruralisation but, at the same time, ruralisation may also fundamentally change the nature of economic activity in the countryside of developed nations. Ehrentraut (1996) gives a very picturesque description of the image, created by the mass media, of the rural setting. The preservation of this visual image of agrarian fundamentalism led to 703 000 visitors in 1988 to the Hida open-air museum in the Japanese Alps. It allows the visitor to experience the life of ancestors – not only the hard work, but also the sweetness of the products of past generations. Thus, while agrarian fundamentalism as vector is strengthened, the wealth of the region becomes more dependent on tourism and less on agriculture.

Moving from the concept of a visual to that of a culinary heritage. Food is not only an aggregation of nutrients for human survival, but also a:

(a) Symbol. Some foodstuffs are the basis of fantasy and concentrate symbolic virtues (bread, wine)

(b) Sign of communion. Food shared and eaten with others is a fundamental social link.

(c) Marker of class. Champagne, caviar, well matured wine are distinctive markers of the lifestyles of individuals.

(d) Emblem. In a specific geographical area or community food can serve as a "banner" beneath which the inhabitants finds their identity.

It follows that food also has psycho-sensorial and symbolic characteristics. However, as current urban eating habits show distinct fordist characteristics[1] there is a growing need for traditional or natural food with a "country touch" – food that is more than just nutrition. For an agricultural product to fulfil the role of a "traditional" product, it must be closely associated with a distinct *terroir*[2] and thus recreate the link, partly through agri-tourism, between the farmer and the producer (Bessière, 1998).

In the same vein Ray (1998) talks about a "cultural economy" in which space (and products) are becoming differentiated and imbued with symbolism. The types of products include ethno or cultural tourism, regional agri-food products, regional cuisine and traditional crafts. It is necessary to capture the territory and culture in the products before the *terroir* can be sold outside the community. Often the most difficult part is in selling the *terroir* internally as local culture and traditions have been devalued and are often seen as an obstacle in the process of regional development. As soon as a product is established with the *terroir* as identity, the identity of the product feeds back into and enhances the *terroir* and creates the opportunity for additional products. This interaction between the *terroir* and the (re)development of products is possible even in less developed regions as is shown by Vellante (1999). As is the case with visual heritage, it can be argued that culinary heritage strengthens agrarian fundamentalism as vector with subsequent economic and political implications.

The culinary heritage can provide a "filter" that limits the process of globalisation in the food sector to a certain extent. In addition the concept of "safe" food, especially when imported, forms one of the building blocks of trade restrictions (Nygård & Storstad, 1998). In this context, safe does not only mean food free of dangerous organisms, but also includes the absence of chemical residues. Recently and in

---

[1] *A McDonald's burger is the same in the USA, UK, China, Japan and South Africa. Add the habit of snacking, "fast"-foods, the disappearance of structured meals and the loss of "secret family recipes being handed from mother to daughter in "initiation rituals" as well as an increased distance between the farmer and consumer.*

[2] *The term "terroir" refers to a specific area with an outspoken geographic, cultural, historical and knowledge identity.*

certain communities safe also implies that the food is free of genetically manipulated organisms (GMO's)[1].

Organic farming thus forms a specific subset of farmers who endeavour to preserve traditional practices on the one hand, but also safe food on the other. However, within this subset a wide spectrum of considerations leads farmers into organic farming. On the one hand financial considerations often do play a role. Offerman and Nieberg (1999) show that, although yields are generally lower[2], a substantial price premium[3] can be extracted for organically produced products in Europe. This leads to a situation where, although varying, profits are generally higher (up to 200%) for organic farms than for conventional farms. On the other side of the spectrum Kaltoft (1999) argues that values, ethics and naturalism (both on the part of producer and consumer) play an important role in organic farming. This leads the spectrum of farmers to include modern, rational and globally informed farmers on the one side, through "back to the countryside" types to "old-fashioned" and biodynamic farmers on the other side. Albeit that organic farming may be the result of different motives (food safety, financial, of value/ethical) it remains a force that is strengthening agrarian fundamentalism as vector. It is significant to note that Kaltoft (1999) sees African agriculture as an example of farming without any external input. African agriculture thus forms an ideal in organic farming to strive towards – but more on this later.

Returning the argument to the relationship between agrarian fundamentalism and conventional farming. In a country such as Norway more than 50 percent (and up to 74% in some areas) of the disposable income of farm families originated from off-farm sources in 1996. It follows that the concept of the family farm (with the majority of farm's labour needs being supplied by the family) may be replaced by that of a farm family (with the majority of the family's labour available to activities

---

[1] *See also the discussion on food safety on page 134.*

[2] *In the case of vegetables yields comparable to that of conventional farming can be achieved. Cereal yields tend to be typically between 60 and 70% of conventional farming yields (Offerman & Nieberg, 1999:518).*

[3] *Price premiums for potatoes of up to 775% in Great Britain and 762% in Belgium have been recorded in 1998. In the case of wheat the price premium ranges from 50% in Norway to 200% in Denmark in the same period (Offerman & Nieberg, 1999:519).*

outside the farm) (Jervell, 1999). As off-farm income sources result in relatively high farm household incomes, the debate on farm subsidies is entering a new phase – possibly towards lower levels (Hill, 1996). Thus the traditional relationship between land and labour is changing.

At the same time the relationship between the ownership of land and the ownership of the farm business is changing. The ownership of (good) farmland can be equated to an investment in a blue-chip company. It follows that, for various reasons, people who are not interested in farming invest in farmland. This creates the space for people not owning the land to actually do the farming operation – an occurrence that is not that uncommon in the USA and Europe. An example is that of Velcourt, a UK based farming company. Although the company owns less than 1 000 hectares, it conducts farming operations on more than 33 000 hectares of land, producing *inter alia* 120 000 tonnes of wheat annually, of which approximately 40 percent is organically produced. In the case of Velcourt the actual land owners vary from professional people using the farm as a place of residence, through investors in land to owners of estates who have other priorities. By using appropriate technologies economies of scale (see also Section 3.3.2.3) can be extracted from the operation (Malim, 1999).

Boehlje and Doering (1999) argue that contracting through tightly aligned supply chains is increasingly replacing the more conventional neo-classical marketing and price discovery mechanisms. It would imply that farmers excluded from such arrangements face more volatile markets, have access to less accurate "public" information and will be the last to access and adopt new innovations. As the supply chain often favours the larger agribusiness, the smaller enterprise (i.e. the traditional family farm) is sidelined and limited to the exploitation of niche markets. As a result the gap between the more affluent and the less affluent sections of the farming community may widen.

What does all this imply for agrarian fundamentalism as a vector in farm support at the beginning of the 21st century? It is clear that the values and ethics of agrarian fundamentalism are still strong in developed countries and are manifested in, among others, consumer demand that reflects a visual, culinary and cultural heritage as well

as through organic products. At the other side of the schism agriculture as business is also ascending towards new altitudes. However, it is not necessarily only the traditional family farm that can provide these *terrior*-based products, but also the business-type enterprise. Indeed, the latter often have access to superior sources of knowledge, resources and capital needed for the development, introduction and continuous supply of these products. It follows that although this development may lead to the preservation and augmenting of agrarian fundamentalism, this will be on a commercial basis and for commercial purposes[1]. In the process the economic characteristics of the rural countryside in developed countries may change considerably.

But what is the possible impact on agricultural support programmes? If the pressure group approach of Olson and Becker is used as point of departure the answer depends on the ability of those groups in favour of the abolition of distortionary measures to effectively organise themselves relative to the protectionists. And, of course, it also depends on the relative domestic political muscle of the two groups. The group in favour of agricultural protection is usually a vocal domestic group. Those in favour of the abolition of distortionary measures are usually from abroad (i.e. the Cairns group) and therefore play a limited role in the re-election of local politicians. Thus the probability of abolition does not seem good. The only exceptions are if international political pressure can combine with domestic consumer pressure, and in the process overcome the free-rider and deadweight cost problems to such and extent that the "clearinghouse" role of politicians results in a favourable outcome (i.e. in less support to farmers).

Within the framework of the politician – voter interaction approach the relative *per capita* income and the relative changes in *per capita* income between groups are the chief determinants of agricultural support. In this case the activities of pressure groups are of only marginal importance. It follows that, although the conditions of the treadmill will probably continue to influence the prices of agricultural products, a new range of *terrior*-based farm products may change the characteristics of the rural

---

[1]   *Unsubstantiated rumours has been spread that the BSE scare and the GMO furore are more the result of respectively French and European commercial considerations than due to a genuine concern for consumer welfare.*

economy. Thus less subsidies can be foreseen. However, this does not necessarily mean the removal of non-trade barriers such as health and safety measures. The latter may, in the long run be more detrimental to developing countries caught unawares than traditional trade barriers such as import quotas.

Indeed, The Economist (1998) reports that there is already a debate starting among farm ministers to allow the EU's most efficient farms to compete freely in the world market while those on a difficult terrain or in picturesque places will be subsidised directly to preserve local country life. This solution would, of course, lead to a wedge being driven between "rich" and "poor" farmers (see Section 2.4.2.2. why this would erode the farm lobby) and give farm policy a social responsibility character. It would also stop the free-rider problem on the family farm wagon.

A number of closely related implications follow from these trends. The first is the market that is developing for *terroir*-based produce. The second is the diversion of agricultural land to agricultural related, but not primarily agricultural, rural and sometimes traditional activities. Third, that basic changes in the structure of agricultural support may be forthcoming.

3.3.3. Characteristics of an information society agricultural sector

From the brief description of some of the trends that will influence the future of the agricultural sector it is now possible to develop some characteristics that will probably describe the agricultural sector of an information society in the foreseeable future. In the words of Bonnen and Schweikhardt (1998) the complexity and the diversity of the agricultural sector will probably continue to increase for the foreseeable future and the schism between agriculture as a business and farming as a life-style will continue to widen. The concept of a negative income elasticity of demand (so-called "inferior goods") for certain products is not strange within the agricultural economics subject field. In the future, with more heritage, culture and green issues coming to the fore, the list of these inferior goods will probably increase. At the other extreme one would expect a higher level of demand for consumer and environment friendly produce. The range of income elasticity of demand would therefore increase from –0,1 to 0,3. Following this argument one would expect consumers to be less price sensitive over

the short run for agricultural produce in the information society countries (short run price elasticity of demand of –0,2). Over the longer run the price elasticity of demand would however remain unchanged at –1,0.

On the production side advances on the terrain of especially communication and transport technology, performance of technology used in agricultural production and the fact that commercial agriculture will probably become multi-sectoral and multi-national, will probably lead to higher price sensitivity among producers. A short-run price elasticity of between 0,3 and 0,4 therefore does not seem impossible, while over the longer run it will probably be closer to unity (1,0).

Urban congestion, advances in communication and transport technology combined with the ascendancy of the tertiary sectors in an information society will probably lead to a process of ruralisation. This process, that is the opposite to the well-known process of urbanisation, will entail that especially high-income earning individuals will prefer to live in the countryside. As developed countries are noted for a very low or negative population growth rate, an increase in the percentage of the population that is rural (10 – 25%) can therefore be expected. Depending on the definition of farming[1], the performance trends in technology, demographic trends and the importance of *terroir*-based products, one could expect an increase in the percentage of the labour force involved in farming activities (2 – 15%). However, the significance of this increase is debatable. The same holds for the income generated by the agricultural sector as a percentage of the GDP. Advances in technology will however ensure that a larger percentage (70 – 90%) of agricultural inputs is bought off-farm.

Due to pressure from international competition and technological trends, total factor productivity, and especially labour productivity, will probably continue to rise. The nature of the technology used in agriculture will lead to a possible dichotomy regarding capital investment. Although individual technological artefacts will probably imply a higher initial outlay of capital, the performance of these artefacts will probably result in a lower capital outlay per unit of land cultivated. Accommodation

---

[1] *Does farming only include the production of physical agricultural produce, or does it also include facets such as agri-tourism, cultural tourism, life-style farming etc?*

of this trend will result in either the ascendancy of the larger farming enterprise, or the establishment of dedicated farm cultivation enterprises. The net result will however be a lower capital to total land ratio in industrialised farming but a higher capital to labour force ratio in industrialised farming.

The performance trends of technology, coupled with ruralisation, tourism and lifestyle trends will result in an increase in the total number of farms. Important, however, is that a smaller percentage of the number of farms will be dedicated to commercial agriculture, albeit each with a larger size. Although the number of smaller farming units will therefore increase, the average size of farms will also increase. It can also be foreseen that a third party can farm a number of the smaller farms, each with its own owner, as a single unit.

3.4. CONCLUSIONS

Although the normal path of the economic development of a country, with few exceptions, leads to a secular decline in the agricultural sector, this sector still plays a significant role as catalyst in the development process. Ignoring this role of the agricultural sector by focussing on industrial support and infant industry strategies is usually to the detriment of the wealth and economic growth of the country or region concerned. Increased productivity and, therefore, lower production cost of food in the agricultural sector of a developing nation may lead to the ready availability of food and foreign exchange earnings. The resulting higher levels of rural income will lead to both public and private capital formation and will result in the development of a rural market for the industrial sector. The expansion of the industrial sector will lead to new job opportunities for which the agricultural sector is supposed to release labour. Due to the unique income elasticity of demand in developing countries, this in turn will again lead to increased demand for agricultural products, and therefore the start of a new cycle or, in other words, an upwards spiral of economic growth. It is therefore clear that productivity in the agricultural sector can play an important catalytic role in economic development.

In spite of the tremendous resource potential and enormous scope for efficiency increases in the agricultural sector of most Southern African countries, some of these countries are amongst the poorest of the poor in global terms with a significant percentage of the population

facing food insecurity. The reason for this delayed development can be found in a nexus of circumstances. These include inconsistent domestic policy, adverse trade regimes, inappropriate technology, the problems encountered in the management of a highly complex development process as well as high transaction costs. It follows that the development of the right policy, institutional, human and physical environment in Southern Africa can create the situation where agriculture can act as catalyst in the economic transformation of the region.

In this transition from the status of a developing to a developed economy, agriculture will be one of the most important sectors of the economy, albeit in an environment of secular decline. Farmers will operate in an environment where no government subsidised safety net is available and the trading of farm produce becomes more important to provide for cash needs (both household and for the farming operation). At the same time agriculture will remain an important source of public and private capital and labour will be abundant, resulting in relatively low capital to land and capital to labour ratios. Although farm sizes will still be relatively small due to managerial considerations, it can be expected that farm sizes will increase over time with a corresponding decline in the number of farms.

The dawn of the 21st century sees the development of industrialised economies into a new phase. Depending on the specific point of departure, this phase has acquired a number of names ranging from information economy, post-industrial society, post-fordism, informatised industrial society, knowledge society and learning society. What these approaches do have in common is that the new environment will result in changes at the core of society with information and knowledge replacing land, labour and capital as the sources of the creation of wealth. It is therefore appropriate to call this new phase the information society.

The structure of agriculture in an information society will depend on a number of key trends. Although agriculture will remain an important part of society, this importance will be more than just the provision of nutrition. Agricultural products can acquire significant heritage and cultural value, especially if they are connected with a specific *terroir*. However, the main market for *terroir*-based products over the short term will probably be in the current "wealthy north" where population growth is stagnating, ruralisation take place and the population is ageing. Considering the declining population growth rates in most countries, these trends may also become visible towards the second half of the 21st century. These products with a distinct niche character will not only be exploited by the traditional family farmer, but can

also be targeted by agribusiness. At the same time rapid technological development combined with the ascendancy of multi-national organisations and global supply chains will result in fordist agricultural commodities whose prices will remain under pressure. The combined effect of the exploitation of *terroir*-based products and fordist commodities may result in agricultural policy focussed on distribution according to need rather than the current distribution according to merits.

The characteristics of agriculture in an information society will probably show a widening schism between agriculture as business and farming as a style of life. Due to a new range of "value-added" *terroir*-based products, the number of inferior agricultural commodity products will increase and more emphasis will be put on the "content" of the product than the price in information society countries.

Treadmill technologies will however still be important for the average commodity-producing farmer. Increased agricultural productivity, and therefore lower production costs of agricultural produce, is an integral part of an agricultural and employment based development strategy. Especially in developing countries, regions and communities with limited lateral expansion possibilities for agricultural production, increased levels of agricultural productivity are of the utmost importance for development. That is, if agriculture is to play its full role in providing food, thus contributing to creating a market for industrial products, private and public capital formation and earning foreign exchange. This catalytic role must be supported by the creation of the relevant physical and human infrastructure.

The information society agriculture that will develop in the near future will probably show a number of characteristics that have an important influence in developing solutions for the Western Cape wheat industry. The first is the possible ascendancy of multi-national and multi-sectoral farming enterprises. This has implications for the type of technology that will be used as well as possibilities for the exploitation of ecological niches. The resulting market niches that may develop for *terroir*-based products may hold opportunities for the smaller family type farm. However, the bigger farms may also take advantage of these products. A clear trend towards ruralisation may hold certain implications for the rural to urban income gap (especially if the domestic rural areas can effectively be marketed globally as a preferred destination), and therefore for levels of agricultural support. The next chapter will be devoted

to understanding the local conditions and to the development of links between the local and domestic playing fields.

CHAPTER 4

THE SOUTH AFRICAN POLICY ENVIRONMENT

4.1. INTRODUCTION

History has shown that in the process of the economic development of a nation the agricultural sector will face problems such as price instability, the treadmill effect and asset fixity. However, notwithstanding these problems, agriculture plays the important role of a catalyst by providing food, earning foreign exchange, releasing manpower, forming public and private capital and serving as market for industrial produce. It is unfortunate that in the majority of countries in Southern Africa agriculture was not allowed to play this catalytic role due to an adverse policy and political environment. The explanation for this adversity can be sought in welfare, public choice and political economy theories.

However, economic development is not a final and static goal to be achieved, but is reminiscent of a moving target. At the beginning of the 21st century the ascendant "final" stage of economic development can be called the information society. It was shown in Chapter 3 that, in the information society, the nature of the demand for agricultural products is changing in that food is not seen as only a conglomerate of nutrients, but also as a form of identity. But it must be acknowledged that the information society will remain a small percentage of the global population and that the biggest part of the world could be described as either agrarian or industrial.

How is the South African agricultural sector and more specifically, the Western Cape wheat industry positioned to a) survive in this environment and b) take advantage of opportunities in the spectrum of agrarian, industrial and information society regions of the world? The answer to this question is not straightforward but depends on the characteristics of the current situation. The current situation did not develop in a vacuum, but is the derivative of various historical and other environmental factors. Following this line of argumentation this chapter will be devoted first to an understanding of the historical variables that gave rise to the current situation. This will be followed by a description of the current situation. In the final part of

the chapter the role of agriculture in the Western Cape Province will be quantified. In so doing extensive use will be made of the framework developed in the previous two chapters. Building on the insights gained the next chapter, Chapter 5 will be devoted to the development of a strategy for the Western Cape wheat industry.

4.2. THE HISTORICAL CONTEXT

South Africa is fortunately no longer isolated from the rest of the world. One therefore can expect that the changes and trends affecting the rest of the world would find their way to the local situation. At the same time, however, South Africa has a unique set of circumstances that shaped its current form. North (1991) has argued that institutions are the code that structure political, economic and social interaction. These institutions are not fixed, but evolve over time and connect the past with the present and the future. It thus follows that it is necessary to understand the historical perspective of South Africa and move through its unique duality to the characteristics of its nine provinces in order to understand the forces that will shape its future.

4.2.1. Historical factors that gave rise to the current South African agricultural structure

Many archaeologists proclaim that Africa is the cradle of humanity from where successive waves of humans migrated to the rest of the world. With the discovery of the footprints of "Eve" at Langebaan, it is clear that Southern Africa, and especially the Western Cape played an important part in the origins of mankind (Holzaphel, 1997: 1).

As the written history of South Africa starts with the Portuguese and Dutch seafarers, very little is unfortunately known about these early inhabitants of South Africa. What is known from the journals of the early seafarers is that these people were either hunter/gatherers or stock farmers.

Although the settlement at the Cape was part of the general European colonisation process, a number of important factors differentiated the local process from the others.

(a) The time of colonisation. Although Bartholomew Diaz reached the Southern point of Africa in 1488 and the trade route to Asia was established a decade later by Vasco Da Gama in 1498, the settlement at Cape Town was only established in 1652. The Americas were "discovered"[1] by Christophoro Columbus in 1492 and further exploration took place by Cabot (1496 – 1497) with the western trade route around the southern point of South America charted by Ferdinand Magellan (or Magalhães) in 1521. The first Spanish settlement in the Americas was founded in 1496 on the island of Hispaniola (currently Haiti), followed by settlements on Jamaica (1509) and Cuba (1511).

(b) The reasons for the establishment of the settlements. The objectives of the settlement at the Cape and the earlier Portuguese settlements at Sofala, Mozambique, Kilwa and Mombassa were primarily to provide safe anchorage and provisions[2] for trade ships plying the spice route to Asia. The primary objective for the settlements of North and South America was the economic exploitation of the hinterland regions. The economic exploitation rested on two legs. First, to get hold of the silver and gold[3] of the Inca and the Aztec civilisations. Second, to acquire land for the large landless masses of Portugal and Spain.

(c) The management of the settlement process. In the case of the Cape a company with private shareholders and national monopoly rights to trade with Asia managed the settlement. As is the case with the majority of private companies funded by shareholders, success is measured in the form of dividends. Any action that could possibly increase costs and therefore influence the "bottom line" was therefore discouraged. The American settlement process was managed on behalf of the Monarchs of the specific country (initially Portugal and Spain). All profits accrued to the King who usually squandered it on some or other European war.

---

[1] *The term "discovered" is put in parenthesis for two reasons. First, increasingly evidence suggests that Vikings reached North America as early as the eleventh century and, under the leadership of Leif Erikson, established a settlement called "Vinland" (Duke, 1996: 234 – 235). Second, of course the local population of the "discovered" continent always knew that it was there.*

[2] *The need to replenish provisions halfway was perhaps less out of concern for the health of the sailors and more as a result of the space that provisions for a full voyage takes up. By replenishing halfway more room was available for paying cargo.*

[3] *It is interesting to note that the relatively large quantities of silver and gold that reached Europe had unforeseen consequences. The result was that the exchange-value of silver and gold declined (a condition similar to today's commonly called inflation). As the annual dues of vassals and sub-vassals to the king was often bound to a specific weight of gold or silver this contributed to the financial ruin of some monarchs and thus to political instability in Europe.*

The result was that, from the perspective of a Monarch holding equal status and due to financial needs, the expansion and the development (economic, cultural and religious[1]) of the settlements was encouraged, albeit only with the objective of exploitation in mind.

(d) The reasons for the migration of the population to the new settlements. The Cape was settled predominantly by officials of the Dutch East India Company with freeholding initially being discouraged. Due to the privately owned nature of the Cape settlement process, settlers were initially discouraged lest it led to higher costs. At the same time it led to a wider distribution of wealth in the mother country and therefore less pressure to make a "new life". Although settlement in the Cape were encouraged in the latter part of the 17th century and the first decade of the 18th century, it was again discouraged and even prohibited during the greater part of the 18th century. This was mainly due to internal political and economic difficulties in The Netherlands. In the Americas settlement was supported. Any person who could subdue an area could automatically claim that area. In especially Central and South America this gave rise to the infamous *conquistadores* in order to satisfy the need for land (as basic source of economic wealth in feudal Europe) of the landless lower classes. In addition various groups of political and religious dissidents (i.e. the pilgrim fathers in the USA) were "forced" to find a new life. With the exception of the period of immigration of the French Huguenots this sort of land rush was only experienced at the Cape after diamonds and gold were discovered in the second half of the 19th century.

From this comparison with other colonisation processes it follows that the settlement at Cape Town was unique in the sense that, although it was basically agriculturally based, lateral expansion was discouraged. The early economic development of the Cape was largely influenced by the fact that it was only seen as a refreshment post for a commercial enterprise, especially when the Dutch East India Company (DEIC) experienced financial difficulties by the end of the eighteenth century (Louw, 1948: 26 – 27).

---

[1] *In order to put this "development" in perspective it is necessary to mention that it led to the widespread destruction of local cultures and atrocities in the name of Christianity.*

These driving forces led to the fact that Van Riebeeck, at his arrival at the Cape, immediately started to plant trials of herbs, vegetables, wheat and rice. The vegetable trials were so successful that four ships could be supplied with bartered cattle and sheep as well as locally produced cabbage, carrots, beetroot and other vegetables in May 1653. Rice never adapted to the local conditions and, due to damage by the notorious south-easterly wind, experiments with grains were less than successful. The frustrating result was that the DEIC initially had to allocate precious freight capacity to supply the Cape with bread (Sim, 1952: 109).

The successful experiments with wheat in the area where Rondebosch is currently situated led to the establishment of the first freeholders in 1657. The condition for their settlement gives a clear indication that grain production, and more specifically the production of wheat, was strongly encouraged. They received the land that they could cultivate in the first three years. In addition agricultural equipment was provided at cost-price and this equipment would be repaired for free during the first three years. For the first twelve years no taxes were levied and all farm and household requirements could be purchased on credit from the DEIC. However, these loans could only be repaid in the form of wheat delivered to the DEIC. Other measures implemented to encourage the production of wheat include the prohibition of the bartering of livestock from the local population (1657) and stock farming (1658). Except for own use, fishing (1658) and the gathering of firewood (1660) were not allowed (Du Plessis, 1933: 13 – 14). In 1673 the production of wine became so popular that even this activity was discouraged by the DEIC (Du Plessis, 1933: 37).

In addition, the DEIC was, by regulation, the only legal purchaser of agricultural produce and at a fixed price (Du Plessis, 1933: 13 – 14). The introduction of the first fixed price – single channel marketing arrangements in the agricultural sector of South Africa therefore coincided with the establishment of the first freeholders at the Cape. Schreuder (1948: 2) show that grievances regarding the price of wheat were not long in coming. Agitation in 1658 and again in 1663 led to the producer price of wheat being increased from 2½ to seven guilders a bushel. However, according to Du Plessis (1933: 43) the black-market price for wheat was 20 guilders a bushel at this stage.

In spite of all these measures self-sufficiency in wheat production at the Cape settlement was not achieved until the settlement of farmers in the Stellenbosch area in 1680 by Van der Stel (Du Plessis, 1933: 27 – 29). With the arrival of the French Huguenots and the further expansion of the area under cultivation, the shortage problem was transformed into one of surpluses. For instance, in 1719 15 000 bushels of wheat were exported to Batavia compared to the domestic consumption of 9 852 bushels of wheat. However, the problem was that the government of Batavia was forced to pay 8½ guilders a bushel compared to the six guilders a bushel at which they could get wheat from Bengal (Schreuder, 1948: 6 – 7). In these early days the problem regarding the international competitiveness of the local wheat industry was already apparent. However, as the objective of the settlement at the Cape was to provide farm produce to passing ships, it follows that demand was a derivative of the frequency of the arrival of such ships. As the frequency of the arrival of ships depended on the conditions in Europe, European wars determined the demand for agricultural produce at the Cape. It follows that the variations in the quantity demanded resulted in highly volatile prices for most agricultural produce during the 18th century. This volatility was countered by various monetary and marketing arrangements by the government.

The annexation of the Cape by the British in 1795 initially led to the abolition of trade restrictions and the shipment of the strategic wheat reserve of 36 000 bushels to England. However, as poor wheat harvests were reaped in the ensuing years and the military population of the Cape increased from 400 Dutch soldiers and sailors to the 7 600 British soldiers and sailors a shortage soon developed, with the result that control measures were reintroduced. These measures included control bodies (from which farmers were excluded), enforced delivery to bakers (who received exclusive purchasing powers) and higher prices to farmers in order to encourage the production of wheat. These measures were continued during the subsequent Batavian rule and the second British annexation of 1806 (Louw, 1948: 31 – 53). However, as grain could be sold for higher prices on the black market and the British were in urgent need of grain for their cavalry, the situation developed where barley was sold and wheat used as animal fodder (Van Zyl, 1967: 43). Only after the stabilisation of conditions in Europe after 1815 were these measures relaxed and could grain, according to Van Zyl (1967: 116), be traded on the open market.

The economic development of South Africa during the last part of the 19th century and up to the present day can be divided into a number of distinct phases. A summary of the main characteristics of these phases is provided in Table 4. 1.

The agricultural or first phase of South Africa's economic development ended around 1868 when the mining sector of the economy started to become important. This second phase, stretching to approximately 1924, was characterised by significant transfers of labour, capital and entrepreneurs to South Africa. The result was not only an increased demand for agricultural produce, but also for manufactured goods. In the case of the latter very little domestic capacity existed at the beginning of this period. However, import replacement, especially during the First World War, led to the expansion of industrial capacity (Townsend, 1997: 9 – 10).

The third phase, focussing on consolidation and restructuring, started in 1924 and ended in 1933. During this phase the mining, manufacturing and electricity sectors continued to expand at the expense of agriculture. This, coupled with the "Great Depression" of 1929, led to the so-called "poor white" problem and a range of remedial measures[1], many in the agricultural sector.

This paved the way for the formation of Marketing Boards and the promulgation of the Agricultural Marketing Act of 1937[2] in the next phase (Townsend, 1997: 10). It is interesting to note that the establishment of the Wheat Board in 1935 took place at a time when vast domestic and international surpluses of wheat were produced resulting in extremely low producer prices at that time. The irony is that the policy environment in which the Wheat Board was created focused on managing surpluses while domestic shortages were experienced for the following couple of decades (Sim, 1952: 113 – 114).

---

[1] *The implications of these measures on South African society will be highlighted in Section 0.*

[2] *Although the actual establishment of the Marketing Boards only took place in the fourth phase, it was as a direct result of the conditions during the third phase.*

Table 4. 1: **Changes in sectoral shares and GDP growth rates at factor incomes in South Africa since the Union.**

| PERIOD | YEAR | SECTOR | | | | | | | |
		TOTAL	Agricult., For & Fish	Mining & Quarry	Manufact.	Construct	Electricity & Water	Transport & Storage	Other
WW I and aftermath	1911	100	21,5	27,3	4,15	0,7	1,03	10,03	35,3
	1923	100	20,1	17,1	7,9	1,9	1,3	11,0	40,6
	Share	-	NS	-5,26	5,71	8,43	2,38	NS	1,29
	RGDP	NS	NS	-5,68	5,29	8,00	1,96	NS	0,89
	RGDPC	-1,99	NS	-7,25	3,72	6,44	NS	NS	-0,69
Consolidation & Restructuring	1924	100	21,0	16,6	7,8	1,8	1,2	10,8	40,6
	1933	100	13,3	21,4	10,1	1,1	2,5	10,8	48,7
	Share	-	-6,20	NS	2,89	-5,27	8,58	NS	NS
	RGDP	NS	-4,83	NS	4,26	NS	9,95	2,00	2,15
	RGDPC	NS	-6,97	NS	2,11	-6,10	7,79	NS	NS
Pre WW II	1933	100	13,3	21,5	10,1	1,1	2,5	10,8	40,6
	1939	100	13,2	18,8	12,4	2,2	2,5	10,2	40,7
	Share	-	NS	-2,61	3,41	10,53	NS	-1,10	NS
	RGDP	6,90	6,80	4,29	10,31	17,42	8,05	5,80	7,02
	RGDPC	5,00	4,90	2,34	8,42	15,53	6,16	3,91	5,13
WW II and aftermath	1940	100	12,6	19,4	12,8	1,9	2,4	9,7	41,1
	1947	100	15,3	10,5	17,6	2,7	1,9	10,1	41,9
	Share	-	NS	-8,64	5,01	NS	-2,81	NS	NS

PERIOD	YEAR	SECTOR							
		TOTAL	Agricult., For & Fish	Mining & Quarry	Manufact.	Construct	Electricity & Water	Transport & Storage	Other
	RGDP	3,90	5,50	-4,74	8,91	8,08	NS	4,69	4,32
	RGDPC	2,16	3,76	-6,48	7,17	6,34	NS	2,95	2,59
Diversifying Industrialisation	1948	100	16,4	10,3	18,1	3,4	1,8	9,9	41,9
	1974	100	9,4	12,2	21,4	5,3	2,3	8,9	40,1
	Share	-	-3,02	-0,80	0,75	1,63	1,53	NS	0,48
	RGDP	5,09	2,12	4,34	5,89	6,77	6,67	5,09	5,62
	RGDPC	3,22	NS	2,42	3,97	4,85	4,75	3,17	3,70
Secular stagnation	1975	100	8,34	11,2	23,4	5,2	2,6	9,2	40,3
	1993	100	4,3	8,3	22,3	0,7	3,8	7,7	50,1
	Share	-	-2,86	-2,64	NS	-2,20	1,11	-1,56	1,38
	RGDP	1,94	NS	NS	2,27	NS	4,04	0,57	3,52
	RGDPC	NS	-3,07	-2,48	NS	-2,41	1,70	-1,77	1,18
Total Period	1911	100	21,5	27,3	4,2	0,7	1,0	10,0	35,3
	1993	100	4,3	8,3	22,3	3,1	3,8	7,7	50,6
	Share	-	-1,78	-0,92	1,94	1,74	1,53	-0,27	0,07
	RGDP	4,51	2,73	3,59	6,45	6,25	6,04	4,24	4,58
	RGDPC	2,56	0,78	1,63	4,50	4,29	4,09	2,29	2,62

Source: Townsend (1997: 11)

Abbreviations: Share – sectoral share; RGDP – Real Gross Domestic Product; RGDPC – Real Gross Domestic Product per Capita.

The domestic surplus of 1935 can be traced back to the fact that import tariffs on grains were doubled during the period 1920 to 1930 (Leppan, 1931: 67). The very high levels of regulation (fixed price and single channel marketing) that followed in the wake of the 1937 and 1968 Acts were only finally dissolved following the 1996 Marketing Act (NAMC, 1998).

The fourth phase, from 1933 to 1974, was a period of diversifying industrialisation. In the early thirties the impetus for industrial growth was provided by the abandonment of the gold standard. This impetus was replaced by the demand surge resulting from the Second World War and then by the world-wide economic boom of the sixties. The final impetus was provided by the increased gold price resulting from the oil crises of the early seventies (Townsend, 1997: 10 – 12). During this period, with the exception of the particular conditions during and immediately after the Second World War, agriculture continued on the path of secular decline. However, right through this period agriculture grew in terms of both real GDP as well as real GDP per capita. Vink (1993: 154) illustrates the rapid mechanisation of agriculture during this period. In 1968 only 16 percent of the maize crop in South Africa was harvested with combines compared to the 81 percent by 1977. According to Hadley *et al* (1999) the result was an over-capitalisation of agriculture. Indeed, more than one third of the investment in land, livestock and machinery was beyond the point of maximum efficiency.

Townsend (1997: 12) calls the final stage, from 1975 to the present, that of secular stagnation. This phase was characterised by low growth in real GDP and a decline in the real GDP per capita contribution of most sectors of the economy. In the case of agriculture the secular decline of the sector continued. At the basis of the stagnation of the economy were factors such as the international recession, overvalued exchanges rate and, of course until 1994, the sanctions that resulted from South Africa's apartheid policies.

The implications of the high levels of support for the domestic price of wheat are clearly illustrated by Figure 4. 1. For most of the decades of the seventies, eighties and nineties the domestic price of wheat was markedly higher than the international price of wheat of comparable quality.
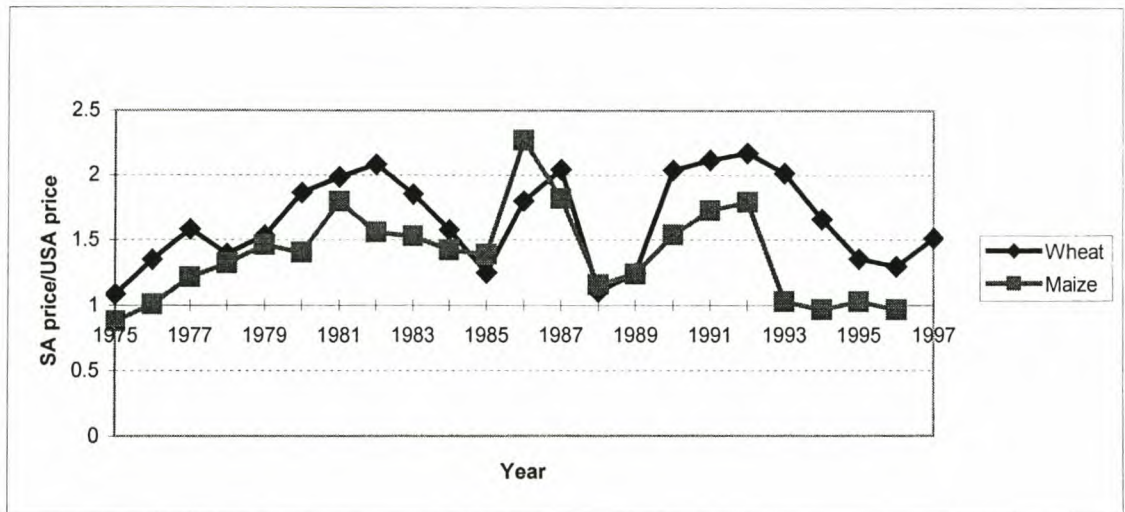
Figure 4. 1 The relationship between the domestic (South Africa) and international price of wheat and maize.

Source: Kirsten & Vink (1999: 10)

From an historical perspective a number of factors are clear. First, the introduction of regulatory measures to order the marketing of wheat coincided with the introduction of the crop in South Africa in the 17th century. After that the introduction of regulatory measures unerringly followed any attempts at deregulation. The last period of regulation, which lasted six decades (almost two generations), eliminated any corporate memory in the wheat industry of production in a deregulated environment. Second, various policy incentives and not necessarily economic considerations led to the development of a "culture" of wheat production in the Western Cape. These policy incentives can also be traced back to the introduction of the crop in South Africa and gave rise to the specific structural characteristics of the wheat producing areas of the Western Cape.

4.2.2. The rise of duality in South African agriculture

It was clearly indicated in the previous section that farming was the main reason for the establishment of the Dutch settlement at the Cape. Stock farming, and the bartering of livestock from the local Khoikhoi as the prerogative of the DEIC, formed one of the important activities in this endeavour. As could be expected, disputes between the settlers and the Khoikhoi regarding grazing rights ended in war in 1659.

During this war the leader of the Khoikhois, Harry the Strandloper (actually, Autshumao of the Goringhaikona tribe), was caught and banned to Robben Island. In 1660 he was brought back for peace negotiations[1] at which he was told by Van Riebeeck that "not enough grazing land was available for the cattle of the colonists and the Khoikhoi". To the question of Autshumao "If the country is too small, who has the greater right, the true owner or the foreign intruder?", Van Riebeeck responded by stating that "We have won this country in a just manner through defensive war and we have the intention of keeping it". This sentiment of Van Riebeeck, based on the accepted European (mercantilist) dogma of the time, formed the basic creed of (white) agricultural expansion in South Africa up to the 20th century (Terreblanche, 1998: 13).

It was also shown in the previous section that South African agriculture only really started on the road to commercialisation after the discovery of diamonds and gold in the latter part of the previous century opened up a consumer market in the interior of the country. Vink and Van Zyl (1998: 61) argue that, by this time (±1870) areas in the Cape and Natal started to show the characteristics of a commercial agriculture (due to the export orientation of the crops grown there) while farming (black and white) in the rest of the country was mainly subsistence by nature. However, Terreblanche (1998: 18 – 19) is of the opinion that black farmers had distinct advantages in commercialising or, in other words, making the transition from pastoralism to cultivation. As the ox-drawn plough was the main technological item facilitating this bridge, the advantage of black farmers was situated in:

(a) The special relationship between Africans and cattle.

(b) The extended family from which the paterfamilias could draw labour, at very favourable terms, for the process of cultivation.

(c) Given his strict control over the extended family the paterfamilias could more easily accumulate the necessary capital for the acquisition of capital inputs.

These are further examples of the discussion in Section 3.3.2.3, where it was argued that the family farm has a distinct advantage above those relying on hired labour because of lower supervision costs. Adding to the problems of the white farmers was the fact that surplus labour was increasingly being diverted to the mines at wages that

---

[1] *It seems as if banishment to Robben Island and a return for the purpose of peace negotiations is a recurring theme in the South African political scene.*

were far in excess of what they could afford. White farmers were therefore left with a shortage of labour at farm level (Vink & Van Zyl, 1998: 63). The result was that commercial (white) farmers lobbied their governments for protection against competition from African farmers. From this lobbying activities flowed various measures, including taxes on livestock, huts and polls, road rents and location, vagrancy and pass laws aimed at favouring the white farming community (Bundy, 1979).

This process gained momentum after the Union of South Africa was established in 1910 (Terreblanche, 1998: 16). Fényes *et al* (1990: 588) identified a series of agricultural laws that contributed to this situation. These include:

(a) Black Land Act (1913),

(b) Development Trust and Land Act (1936),

(c) Separate Amenities Act,

(d) Group Areas Act,

(e) Co-operative Societies Act (1939),

(f) Land and Agricultural Bank of South Africa Act (1944),

(g) Agricultural Research Account Act (1964),

(h) Agricultural Credit Act (1966),

(i) Marketing Act (1968),

(j) Soil Conservation Act (1969),

(k) Subdivision of Agricultural Land Act (1970),

(l) Common Pasture Management Act (1977),

(m) Designated Areas Development Act (1979),

(n) Conservation of Agricultural Resources Act (1983),

(o) Various Proclamations and Government Notices promulgated in terms of these Acts,

(p) Various Provincial Ordinances.

These Acts can be seen as a deliberate attempt at supporting "white" agriculture at the expense of "black" agriculture (see for instance Vink & Van Zyl, 1998: 63 – 68 and World Bank, 1994: 44 – 60). The result was the notorious 87 – 13 percent split in land ownership, with the latter part largely owned by the government. In addition, the inverse spatial development of farm sizes, with the smallest farms the greatest distance

from the main urban areas, also flows from this legislation (Vink, 1993:153 – 154). These legislatory measures did not only directly influence agriculture in South Africa, but also contributed to the increasing isolation of the country during the seventies and eighties. This in turn provided added incentives for additional statutory measures and a policy of food self-sufficiency. This policy especially affected staple foods such as maize, wheat, meat and milk.

The so-called commercial or "white" component of the South African agriculture followed a development pattern that is very similar to those in most developed countries in the rest of the world (see also Section 4.2.1). Agriculture[1] as a percentage of the Gross Domestic Product of South Africa declined from 22 percent in 1920 to 11 percent in 1960 (Brand & Tomlinson, 1966: 42) to 5,1 percent in 1994 (DASMI, 1998: 83). The percentage of the population[2] that is rural declined from 72 percent in 1921 to 53 percent in 1960 (Brand & Tomlinson, 1966: 44) to 11 percent in 1991 (CSS, 1991). The percentage of the economically active labour force involved in agriculture followed the same tendency by declining from 33 percent in 1921 to 11 percent in 1960 (Brand & Tomlinson, 1966: 43) and to four percent in 1993 (CSS, 1993). Productivity, as measured in volume produced by a farm worker, increased from an index value of 93 in 1920 to 147 in 1952 (Brand & Tomlinson, 1966: 30). Total factor productivity increased by 2,7, 5,2 and 6,1 percent per annum in respectively the Cape Coastal areas, summer rainfall cropping and grazing areas of South Africa over the period 1976 to 1988 (Van Schalkwyk & Groenewald, 1992: 124). This analysis is supported by Spies (1998b: 6-20) who indicates that multi-factor productivity in agriculture increased by 73,6 percent from 1960 to 1996 while labour productivity increased by 134,5 percent over the same period. For the non-agriculture private economy the comparative figures were 9,7 and 48,8 percent respectively.

The subsistence, homeland or "black" part of South African agriculture shows considerably different characteristics. Van Rooyen (1990: 3 – 5) provides a concise summary of the main structural differences between these two parts. On labour

---

[1] *Official statistics combine agriculture with forestry, hunting and fishing. For consistency this data therefore includes this conglomerate of sectors.*

[2] *For the current purpose the definition of population and workforce includes the White, Colored and Asian sections of the South African society, but exclude the Black section.*

productivity he states that the output for each worker in commercial agriculture was twenty times higher than in subsistence agriculture (R1 298 *vs* R65 per person). The contribution of agriculture to the economy of the former homeland areas (measured as percentage of GDP) were as high as 29,4 and 27,5 percent in the respective cases of Lebowa and KwaZulu. The other extreme was Bophuthatswana, with its highly profitable casino industry, where agriculture only contributed 3,9 percent to the GDP. Regarding the economically active population in these former homelands, agriculture played an equally important role. Venda (85%) and Transkei (76%) were the two homelands where agricultural employment was most important. Even in Bophuthatswana 47 percent of the economically active individuals were involved in agriculture. The relatively low percentage of people employed in local agriculture in QwaQwa (3%) and Ciskei (8%) can probably be ascribed to the number of people working in border industries or as contract workers in the urban centres of South Africa.

It follows that the peculiar duality of South African agriculture is the result of the expansionist vectors and the racial policy of Government during the last part of the 19th and the 20th century. As no "homelands" were created in the Western Cape, this Province was not affected to the same extent as the other provinces of South Africa. However, the legislation that accompanied the racial policy did affect the land use and tenure systems in the Province (Groenewald *et al*, 1992: 96).

4.3. THE SOUTH AFRICAN POLITICAL TRANSITION

In the previous section it was clearly indicated that the structure of agriculture in South Africa was the result of considerable Government intervention that reached its zenith during the early 1980's (Vink *et al*, 2000: 23). It was also indicated that this intervention was not only the result of agricultural considerations, but also predominantly the result of political and economic variables. It follows that it could be expected that the political changes of the late 20th Century would have considerable impact on the agricultural sector of South Africa. In the first part of this section the focus would fall on the transition at a national level. It will be endeavoured to place this transition in wider perspective. In the second part of the section the focus will move to the second tier of Government, the nine provinces of South Africa.

4.3.1. The political transformation in context

Terreblanche (1998: 35 – 44) are of the opinion that a series of events between 1973 and 1976 eventually led to the political transformation of the early 1990's, albeit delayed for close to 20 years by desperate attempts by the white elite. These events include the "unlawful" strike by black trade unions (1973). The latter gave rise to a series of strikes by black workers that shook South African industries and illustrated the economic power of labour. The OPEC oil crisis (1973) resulted in a downturn of the international economy and a serious recession in the South African economy. The coup d'etat of General Spinola in Portugal (1974) and the subsequent independence of Angola and Mozambique broke the cordon of white colonial regimes around South Africa and exposed South Africa to "Uhuru" Africa. The resulting abortive invasion of Angola (1975) resulted in the deployment of Russian-backed Cuban troops in Angola and an escalation of the armed conflict – further draining the South African economy. Finally, the Soweto-unrest (June 1976) was not only a catalyst in the psychological liberation of the Black Consciousness Movement, but also culminated in the process of disinvestment and the subsequent erosion of the white hegemony between state and capital (Terreblanche, 1998: 36 – 37).

In an attempt to ensure survival the Botha-government (1978 – 1989) based its policy agenda on three policy measures that forged an alliance between the securocrats, bureaucrats and capitalists:

(a) A "total strategy" to counter the so-called "total onslaught".

(b) The reform of "neo-apartheid" to meet the needs of the business community for permanent semi-skilled workers who would be loyal to the system of "free enterprise" economy. It was deemed that this would salvage the economy.

(c) "Centralised managerialism" to meet the ambition for the government and its bureaucracy to maintain a strong grip on the process of reform.

One of the unintended results of these strategies was the emergence of powerful trade unions with a political agenda in an "African political vacuum". A second result was the high cost of defence spending (from 2,4% of GDP in 1971/72 to 9% of GDP in 1987/88 – or 25% of the budget) that resulted in fiscal pressure. In addition the

approach to the Tricameral Parliamentary System[1] (1984) led to a split in the National Party (NP) in 1982. Important for agriculture is that the political base of the breakaway Conservative Party (CP) was predominantly in the rural white areas. The combination of "neo-apartheid", fiscal pressure and the political base of the CP in the rural white areas, resulted in lower subsidies to agriculture and the liberalisation of certain input markets, specifically capital. However, statutory agricultural marketing arrangements were predominantly left intact (Terreblanche, 1998: 38 – 40).

In spite of these changes the duality of agriculture were still imbedded on both farm level as well as at institutional level. With regard to the "white" agricultural population the agricultural policy were outlined in the White Paper tabled in 1984. The general goals included self-sufficiency in food and optimum participation in international trade. Marketing goals focussed strongly on "orderly marketing" which should be equated to market regulation. However, as the broader economic policy propagated "free enterprise", control under the Marketing Act needed to be applied with circumspection to ensure minimal market distortions. Production goals included striving towards optimum use of natural agricultural resources, the preservation of agricultural land and the pursuit of a high number of well-trained and financially sound owner occupant farmers. As most remaining subsidies and disaster management aids were only available to "*bona fide*" farmers, part-time farming was implicitly discouraged (Vink *et al*, 2000: 25 – 27).

Even so the eighties were a time of change for South African Agriculture. According to Vink (1993: 155 – 156) the main areas of change were:

(a) Deregulation of marketing arrangements;

(b) Liberalisation of price controls;

(c) Changing tax treatment of agriculture;

---

[1] *Whites, Coloureds and Indians each had their own Parliament. Blacks in "homelands" lived in either "independent" or "self-governing" states. As Blacks was supposed to exercise their political rights in their "homelands" this left urban Blacks and rural Blacks living in "White" areas in a political vacuum.*

Each Tricameral Parliament had its series of "own affairs" Departments (for instance education and housing). However, certain matters such as defence, foreign affairs and police were housed in "general affairs" Departments. Agriculture had the dubious honour of being serviced by both "own affairs" and "general affairs" Departments. The result was that in addition to the four Tricameral Departments (three "own affairs" and one "general affairs") there was also the four Departments of agriculture from the "independent" states and those of the five "self-governing" areas. The result was 13 "Departments of Agriculture" in South Africa.

(d) Lower direct budgetary expenditure on agriculture;

(e) A shift in the farmer support philosophy in the homelands;

(f) Reduction in the institutional confusion due to the large number of institutions responsible for agriculture;

(g) Changes in labour legislation for agriculture;

(h) Scrapping of the Land Acts in 1991; and

(i) The tariffication of farm products.

It is thus not strange that the over-capitalisation of agriculture started to decrease to more acceptable levels during the eighties (Hadley *et al*, 1999: 14 – 15).

The result was that these changes, combined with high inflation, high interest rates and sanctions, led to a deterioration of farm profitability (Terreblanche, 1998: 38 – 40). This is clearly indicated by the fact that total agricultural debt was 1,29 times total net farm income in 1974, 1,96 in 1980 and 3,04 in 1990 (DSI, 2000). It is important to take note that, although the franchise was enlarged during this period, the underlying strategy was one of co-option rather than power transfer. The *de facto* political power still remained in the hands of the white electorate.

The watershed announcement by President de Klerk on 2 February 1990 of the unbanning of the liberation organisations and the freeing of political prisoners was on the one hand the culmination of the process started in the mid 1970's. However, it was also precipitated by a series of events. One of these events is the "Rubicon-speech" of 1985 that accelerated disinvestment. A second is the accord between Presidents Ronald Reagan and Michel Gorbachev in October 1987 to seek negotiated solutions to regional conflicts. This resulted in renewed pressure on the South African Government from "friendly" powers to find a negotiated solution. Third, the fall of the Berlin wall in November 1989 undermined the credibility of the "total onslaught" doctrine. Finally, the international reaction to the Tiananmen Square massacre in Beijing in June 1989 demonstrated to the South African Government the potential damage of a repeat of the Sharpville and Soweto incidents. It is speculated by Terreblanche that the NP entered into the negotiations with the firm believe that the "structural power" of the white establishment would ensure a "white veto" in a negotiated settlement. It was only after South Africa hovered on the brink of civil war that Minutes of Understanding were signed on 26 September 1992 and the idea of

democratic majoritarianism was accepted, paving the way for the transition of 1994 (Terreblanche, 1998: 44 – 46). It is clear that until the end of 1992 the NP believed that the *de facto* political power would remain in the hands of the white population.

4.3.2. Political transformation leads to a new perspective on agriculture

Although the Minister of Agriculture in the Government of National Unity (GNU), formed after the 1994 elections, was still a member of the white-dominated NP, it was apparent that considerable changes in agricultural policy were on the cards. These changes were embodied in the White Paper on Agriculture that was tabled in June 1995 (DOA, 1995). The most important objectives embodied in the White Paper were:

(a) *Broadening access to agriculture to previously disadvantaged persons and to persons previously excluded from farming*. This was an important deviation from the previous demarcation of farming areas according to race.

(b) *Financial and technical support to beginner farmers and resource constraint farmers*. Implied in this objective is a paradigm shift to research and extension services that, in the past, focussed mainly on large-scale commercial farms.

(c) *The promotion of national and household food security*. This objective embodied the very important policy shift away from "food self-sufficiency" towards "food security".

(d) *The promotion and support of a marketing system that enables free domestic competition and a maximum advantage abroad*. No mention was made of "orderly marketing" and thus the way was paved for market deregulation.

(e) *A production approach based on the sustainable use of the natural agricultural and water resources*.

(f) *The promotion of the role of women in and farm workers in agriculture*. The fact that women were explicitly stated in this White Paper indicated a clear paradigm shift.

(g) *The management of drought as natural occurrence which every farmer must consider as part of his or her production and marketing planning*. This can also be considered as an important shift in emphasis away from drought as a government responsibility and toward drought as the responsibility of the farmer.

Although some of the policy changes were implemented immediately, a number of others (specifically market deregulation) were only fully implemented after the NP left the GNU in 1996 and a Minister of the African National Congress (ANC) took over the portfolio of Agriculture[1]. These policy changes reflected in various ways. Prices started to reflect international prices (see Figure 4. 1) and the areas planted to various crops changed notably (see Table 4. 2).

Table 4. 2: **Change in area planted to selected crops (substitutes) in South Africa from 1980 to 1999.**

YEAR	AREA PLANTED (1000 HA)				
	MAIZE	WHEAT	GRAIN SORGHUM	GROUND-NUTS	SUN-FLOWER SEED
1984	4 502	1 942	354	237	315
1985	4 829	1 983	388	236	327
1986	5 063	1 946	401	193	394
1987	4 736	1 749	326	231	476
1988	4 394	2 009	228	178	436
1989	4 163	1 843	196	106	555
1990	3 816	1 563	166	104	621
1991	4 173	1 436	191	245	474
1992	4 377	750	239	198	435
1993	4 661	1 075	227	135	411
1994	3 526	1 048	180	107	540
1995	3 761	1 363	174	135	608
1996	4 023	1 294	161	95	464
1997	3 560	1 382	131	59	511
1998	3 491	748	99	95	828
1999	NA	718	NA	NA	NA

Source: DSI (2000)

---

[1] *Although a "Green Paper" on agricultural policy, reflecting the views of this Minister of Agriculture was published in 1998 (see DOA, 1998), this document never achieved the status of the official agricultural policy of South Africa.*

The agricultural research capacity of the South African Government were corporatised in 1992 in the Agricultural Research Council (ARC). The government investment in this function of agricultural research is graphically illustrated in Figure 4. 2. It follows that, although the nominal appropriation to the ARC increased until the 1997/98 financial year, this represented a steady decline in the real value of the appropriation. The linear trend-line shows that the real average annual decrease was more than R5 million. This situation was compounded by the fact that in the last two years the real decline was more than six and 21 percent respectively.
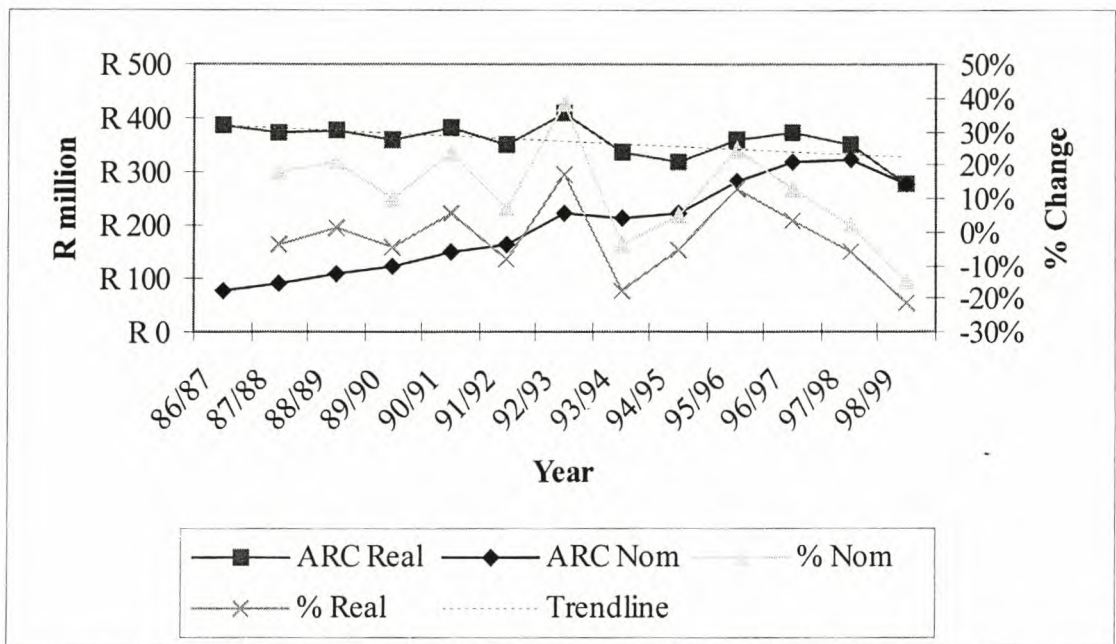
Figure 4. 2:   **Nominal and real expenditures from Government appropriations to the ARC for the period 1986/87 to 1998/99.**

Sources: Bosman (1997) and Maré (1998)

Note: ARC = Agricultural Research Council

                 Data before 1992 represents the total of the budget allocations to the Institutes that later formed the ARC.

It needs to be considered that this drastic decline coincided with the deregulation and market liberalisation of South African agriculture that commenced in 1996. South African agriculture currently receive only very limited statutory protection from the government. In addition a sharp decline in subsidies of all forms and loan assistance is clear from the data in Figure 4. 3. What makes this trend even more significant is the fact that this data includes loans to previously disadvantaged farmers. It was already

shown that all protection for agriculture through the exploitation of monopoly rents was removed through the 1996 Agricultural Marketing Act (NAMC, 1998). It is also true that import tariffs on agricultural products, with few exceptions, are already below the bound rate commitments under the Marrakech Agreement. It follows that the only leverage that agriculture has in ensuring its international competitiveness is in technology, management and human capital. It is clear that the technology part of this equation is currently under pressure.
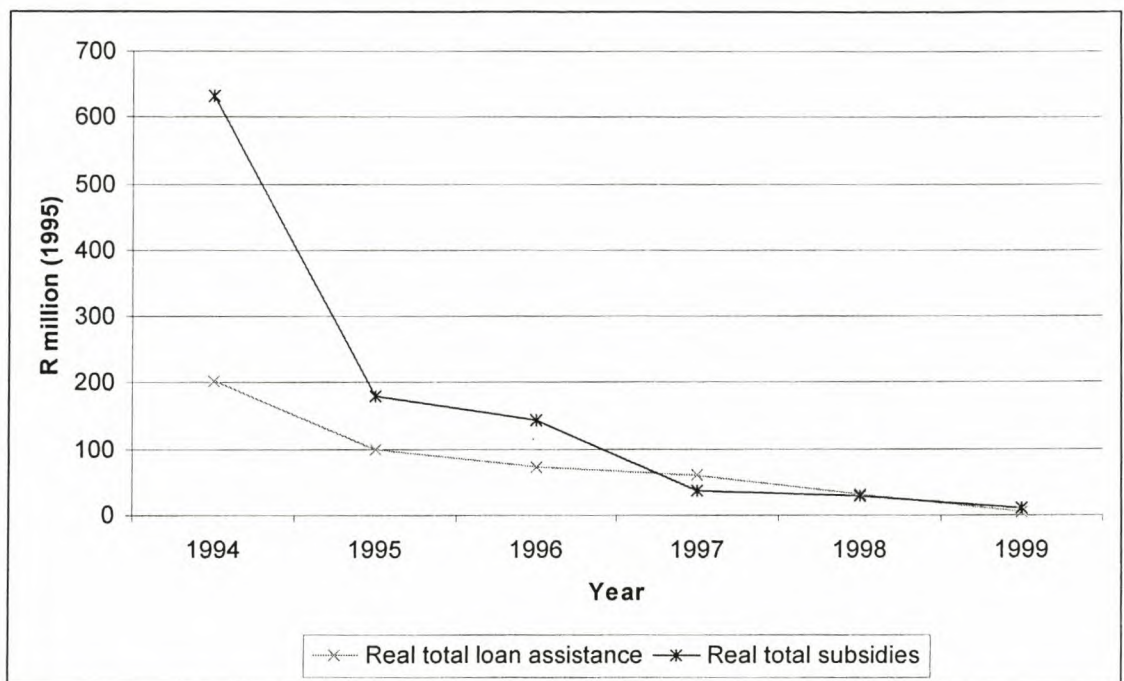
Figure 4. 3: Change in real loan assistance and agricultural subsidies to South African agriculture (1994 – 1999).

Source: DSI (2000).

It is clear that the political transformation of 1994 was associated with a notable change in the attitude towards agriculture. Although not all elements of this change took place immediately, the lagged effect can be ascribed to structural and bureaucratic rigidity. To what extent is it possible to explain this change in terms of the political economic theory? In answering this question it is important to take note of the fact that the political transition resulted in the expansion of the base of the electorate. In other words, before and after the 1994 election politicians were faced with two electorates of totally different characteristics, also regarding agriculture. In

Table 4. 3 an attempt is made to represent the characteristics of the agricultural sector, from the perspective of politicians, before and after the 1994 elections.

Table 4. 3: **The politician's perspective of some characteristics of the agrarian sector in South Africa before and after the 1994 political transformation.**

Agrarian or Farm sector Economic Characteristics	Before the political transformation	After the political transformation
Income Elasticity of Demand [a]	0,42	0,65
Price Elasticity of Demand	Inelastic	More elastic
Price Elasticity of Supply	0,92[b]	Less elastic
% of Population Rural [c]	11 %	53 %
% of Labour force in Farming [d]	4 %	10 %
% Farm Sector Income is of GDP [e]	5,1	5,1
% of Farm Inputs Purchased	High	Lower
Labour &Total Productivity of Farm Sector [j]	2,88%	Lower
Capital/Total Land in Farms Ratio (R/ha) [e]	959	845
Capital/Total Labour Force on Farms Ratio [d&e]	263 229	54 713
Number of Farms [e]	62 427	1 355 027
Size of Farms (arithmetic average) [e]	1 380	74
Rural/urban Income gap [f]	95%	33%
Farm units as % of econ. active population [e&f]	2,69%	14,2%
Food % consumer expenditure [i]	11,6%	19,88%

Source: [a] Calculated from Loubser (1990);

[b] Van Schalkwyk & Groenewald (1993);

[c] Calculated from CSS (1991);

[d] Calculated from CSS (1993);

[e] Calculated from DASMI (1998);

[f] Calculated from CSS (1994);

[i] Calculated from CSS (1997).

[j] Vink (1993:160)

Note: The argument in this table is not that certain dramatic changes took place overnight (for instance a sudden increase in farm numbers), but rather that the hitherto hidden side of agriculture entered the political economy calculus.

Before the elections of 1994 whites had *de jure* power over parliament. According to Loubser (1990: 20) the income elasticity of demand for food of the white section of the community is 0,42[1]. In determining the post-election income elasticity of demand for food in South Africa it is necessary to calculate an aggregate. This was done by taking the income elasticity of demand for food of all sections of the South African population and weighing the specific elasticities of each population group (from Loubser, 1990: 20) by the number of people in each group (from CSS, 1991). The resulting aggregate income elasticity of demand for food thus calculated is 0,65. This is a notable increase of approximately 0,23 points.

It is difficult to determine the relationship between the political transformation and the aggregate price elasticity of demand and supply in South African agriculture. From the excellent literature survey on the elasticities of agricultural products by Liebenberg and Groenewald (1997) it is clear that no systematic set of data is available. The available price elasticities of demand are not segregated by population group. With the study of Niebuhr and Van Zyl (1992) on the demand for bread as point of departure, however, it is clear that in a city such as Bloemfontein (-0,37) and Pietermaritzburg (-0,24) the price elasticity of demand for bread is relative more inelastic than a region such as the Ciskei (-0,67). The price elasticity of demand for rice (-1,26) among urban blacks calculated by Elliot (1991) supports this observation. It is therefore argued here that the demand for food of the *electorate* in South Africa is more price sensitive after the political transformation than before.

The aggregate price elasticity of supply for South African agriculture (0,9177), as calculated by Van Schalkwyk and Groenewald (1993), is exceptionally close to unity. Liebenberg and Groenewald (1997: 29 – 31) found, however, that a wide spectrum of supply elasticities exist, depending on the product, region and timeframe. Based on the international literature and the argument in Section 2.2, it can be proposed that the aggregate supply of agricultural products is less elastic after the 1994 elections than before.

---

[1] *Although the statistics cited was based on a 1990 survey, there is no reason to assume a drastic change in the income elasticity of demand over the period 1990 to 1994.*

Productivity in the pre-election agricultural sector can be considered to be high. At the basis of this statement is the fact that multi-factor productivity in agriculture increased by 73,6 percent over the period 1960 to 1996 compared to the 9,7 percent increase in the non-agricultural private economy of South Africa (Spies, 1998b: 6–20; See also Brand & Tomlinson, 1966: 30 and Van Schalkwyk & Groenewald, 1992: 124). Although it is not necessarily true that productivity on smaller units is lower than on larger units, the data presented by Van Rooyen (1990: 3 – 5) indicates that the labour productivity on commercial farms may, in some instances, be twenty times higher than on subsistence farms. This statement is supported by Piesse *et al* (1996) who clearly show that considerable efficiency gains can be achieved through larger farm sizes in the former homelands of KaNgwane, Lebowa and Venda[1]. The statistics provided by Vink and Kassier (1991: 221) show that the value added *per capita* in the former homelands is R81,94 compared to the R1 424,70 in the rest of South African agriculture. It can therefore with confidence be stated that the agricultural productivity of the electorate, as perceived by South African politicians, will be lower in the post election period than before.

One could expect that the average capital to total land in farms ratio, as well as the average capital to total labour force on farms ratio would decrease if the *expanded electorate* where taken into consideration. Although the total land in agriculture only increased from 86 to 100 million hectares, the number of farming units increased from 62 thousand to 1,35 million (DASMI, 1998). At the same time the number of economically active people involved in farming increased from 314 thousand to 1,55 million. It can therefore be expected that the two ratios mentioned, as well as the average size of farms would decrease.

If the statistics provided (and summarised in Table 4. 3) is compared with the data in Table 2.1, it is clear that the characteristics of the South African agriculture, from a political perspective, have changed from that of a developed country to one that shows definite similarities to that of a country in transition.

---

[1] *It is interesting to note that, although those farmers using modern inputs (hybrid seed, fertiliser) showed higher levels of efficiency during "normal" years, the inverse situation was found to be true during times of severe drought. This leads to the conclusion that the adoption of modern technology increases the production risk of the farmer.*

It is appropriate to evaluate these changes in characteristics with collective action models (the pressure group approach) and structural changes (politician – voter interaction) as points of departure. According to collective action models the relative (to other groups) ability of a group to organise itself is a determining factor in the size of policy rents to be extracted. Group efficiency, in turn, is negatively correlated to group size and spatial distribution but positively correlated to uniformity of interest, communication infrastructure and to the financial resource available (see Section 2.4.2). From the data in Table 4. 3 it is clear that there are more farms to contend with after the 1994 transition than before and that it can be expected that group efficiency would decline. Similarly communication infrastructure in a number of the traditionally "black" rural areas is worse than in the traditionally "white" rural areas with negative net result on group efficiency. Resources per farmer available for lobbying activities would on average also be lower. On the positive side uniformity of interest (issues regarding resource constraints) and spatial distribution (the majority of the number of farms is located in the former homelands) would enhance group efficiency.

From the perspective of the politician – voter interaction approach it is expected that transfers to agriculture is positively correlated to the absolute value of the rural to urban income gap and negatively correlated to rural incomes as a percentage of urban incomes. A positive correlation is also expected with expenditure on food as a percentage of household expenditure and the number of landowners. A negative correlation is expected with the size of agriculture as part of the economy and the relative initial endowment (see Section 2.4.3). If the data in Table 4. 3 is analysed it is clear that the rural to urban income gap is considerably larger after the transformation than before, the expenditure of food as a percentage of consumer expenditure increased and the number of landowners also increased. However, the relative initial endowment decreased and agriculture's share of the economy remained constant for all practical purposes.

What is the situation at the second level of Government? It will be endeavoured to answer this question in the next section.

4.3.3. South Africa's nine provinces

The political transition of South Africa took place under the (interim) Constitution of the Republic of South Africa (Act 200, 1993). Under this constitution South Africa were divided into nine provinces[1] and, following the precedent of the previous constitution (see Section 4.3.1), agriculture was classified as a joint responsibility between the national and provincial spheres of government. Section 126 of the Constitution required that the Public Service Commission divide the functions of joint areas of competence between national and provincial departments. This was done in 1994 and the resulting areas of competence are provided in Table 4. 4. If the data in this Table is analysed it is clear that a lot of grey areas exist between where national competencies end and where provincial responsibility start. For instance, the national government has the function of the "determination of macro-agricultural policy" while the provincial governments have the capability of the "determination of agricultural economic policy". The interim Constitution was replaced by the "final" Constitution of the Republic of South Africa (Act 108, 1996) that was signed into law on 10 December 1996. In this Constitution agriculture is a Schedule 4 function that means it is a joint responsibility of the national and provincial areas of competence. Thus the split between national and provincial areas of responsibility for agriculture and the resulting grey areas was further entrenched.

However, to get a clear idea of the relative powers of national versus provincial government one of the basic policy instruments of government – to tax its citizens – has to be investigated. Although Section 228 (1)(a) of the Constitution (Act 108, 1996) allows provinces to impose "levies, duties and duties", it specifically exclude "income tax, value added tax, general sales tax, rates on property and customs duties". In addition Section 228 (2)(b) prescribes that such levies, duties and taxes must be regulated in terms of an Act of (National) Parliament. This Act has yet to be enacted.

---

[1] *Before the transition of 1994 the Republic of South Africa was divided into four provinces (Cape, Orange Free State, Transvaal and Natal), four independent states and five self-governing areas. Under the 1993 Constitution the geographic area of the Orange Free state (now Free State) and Natal (now Kwazulu/Natal) remained the same with only the incorporation of independent states and self-governing areas within its natural geographic borders. The Cape Province was divided into three provinces (Western Cape, Northern Cape and Eastern Cape) and the Transvaal was divided into four provinces (Gauteng, Mpumalanga, Northern Province and North West Province). Only the Western Cape and the Northern Cape have, for all practical purposes, no areas of former independent states or self-governing areas within its borders.*

Table 4. 4: Division of agricultural functions between the national and provincial spheres of competence.

NATIONAL	PROVINCIAL
Determination of norms and standards.	***Rendering of support to farmers and agricultural communities regarding:***
Plant improvement.	Extension services.
Livestock improvement.	Training.
Subdivision of agricultural land.	Financing.
Agricultural resource conservation.	Household food security.
Utilisation of agricultural resources.	Disaster aid.
Agricultural credit and financial assistance.	Agricultural economics.
Regulation of:	Agricultural engineering technology.
Animal health.	Marketing infrastructure.
Plant health.	Irrigation.
Agricultural marketing.	Stock-watering systems.
Combating of agricultural pests.	***Promotion of:***
Co-operatives.	Agricultural resource conservation.
Quality of plant and animal material and products.	Sustainable utilisation of agricultural resources.
Veterinary public health.	Agricultural technology development, adaptation and transfer.
Livestock brands.	Improvement of livestock, plants and related products.
Determination of macro agricultural policy	Agricultural marketing.
Control of:	***Rendering of:***
Import and export of animals, agricultural material and products.	Animal health services
Agricultural and stock remedies, stock feeds and fertilisers.	Veterinary public health services. Plant health services.
Rendering of:	Agricultural statistical services.
Specialised diagnostic and research services regarding animal diseases.	Veterinary laboratory services.
Agricultural statistical services.	***Determination of agricultural economic policy***

NATIONAL	PROVINCIAL
Financial assistance in national disaster situations.	*Administration of matters pertaining to state agricultural land.*
Maintenance of international agricultural relations.	*Combating of agricultural pests.*
Promotion of agricultural research, technology development and transfer.	*Regulation of abattoirs and subdivision of agricultural land.*
Production of vaccines and other animal health products.	*Registration of livestock brands.*

Source: PSC (1994)

In practice the South African Revenue Service (SARS), according to rules determined by the National Parliament, procures government revenue at a national level. A certain amount of this revenue is held back for the activities of the national government and the balance is distributed amongst the provinces according to the following formula (FFC, 2000):

$$P = S + m + T + I + B$$

Equation 4.1

Where: P = the provincial allocation;

S = a minimum national standards grant to support provincial education and health care services;

m = a spillover grant to provide financing for services with interprovincial spillover effects;

T = a fiscal capacity equalisation grant;

I = is an institutional grant to finance the core legislative functions;

B = a basic grant to establish programmes and fulfil constitutional responsibilities.

As variable T has been zero since 1996 (FFC, 2000: 8), it is clear that the only discretionary funds available to provinces is variable B. Rausser (1982) makes the distinction between government policies as political economic resource transactions

(PERT) on the one hand and political economic-seeking transfers (PEST) on the other. PERT policies are defined as those activities aimed at enlarging the economic "pie" by rectifying market failures through the reduction of transaction costs of the private economic system. PEST policies, in turn, are those activities aimed at the redistribution of wealth from one group to another through *inter alia* taxes and subsidies. By evaluating the information in Table 4. 4 and the revenue system in South Africa it is clear that the national government has the capability to introduce both PERT and PEST type policies while provincial governments have only the capability to focus on PERT type policies.

Two organisations are primarily responsible for service delivery in agriculture at the national level in South Africa. These are the National Department of Agriculture (NDA) and the Agricultural Research Council (ARC)[1]. From the previous discussion it follows that the NDA is primarily responsible for matters at national and international level while the primary agents for service delivery to agriculture are the Provincial Departments of Agriculture (PDA). The appropriation for the ARC is primarily earmarked for agricultural research, and therefore the enhancement of the local agricultural sector's international competitive position through cutting-edge technology.

In 1996 the Function Committee on Agriculture evaluated the role of the PDA's and calculated the budget allocation that each PDA would need in order to ensure an effective service delivery in each Province. The formula used incorporated factors such as the Human Development Index (HDI), agriculture's contribution to the Gross Geographic Product (GGP), the extent of the rural population and the development potential of the agricultural sector in each Province. The results are provided in Table 4. 5. However, before this allocation could be implemented to its full consequences, the funding of the Provincial agricultural functions was devolved to the Provinces.

---

[1] *Although the National Agricultural Marketing Council (NAMC) and the Department of Land Affairs (DLA) also provides some services to agriculture, it is very limited in scope. The first is primarily involved in the regulation of the marketing of agricultural products, while the focus of the latter is on land reform. However, land reform does not only include farm land, but also residential and industrial properties.*

Table 4. 5: **The agricultural budget allocation needed by each Province, given the objectives and priorities of the government, in order to ensure an effective service delivery to the agricultural sector (1996/97).**

PROVINCE	BUDGET ALLOCATION (R million)	BUDGET ALLOCATION AS % OF TOTAL
Western Cape	190	10,3%
Northern Cape	87	4,7%
Freestate	177	9,6%
Eastern Cape	288	15,7%
Kwazulu/Natal	333	18,1%
Mpumalanga	183	10,0%
Northern	293	15,9%
Gauteng	98	5,3%
North West	190	10,3%
TOTAL	1 839	100,0%

Source: Function Committee (1996)

The result was that actual budgets deviated from these recommendations (see Figure 4. 4). In the Western Cape a decline in nominal terms was experienced from the R98 million allocated to agriculture in the 1996/97 financial year to the R68 million in 1998/99 (see Figure 4. 5). In real terms (1999 values) this constituted a decline from R119 million to the 1998/99 levels, or, almost a 44 percent reduction in the budget allocation. It is clear that a marked deviation realised from the expected allocations to agriculture. In some cases, for instance in the Western Cape, the expenditure on agriculture was considerably lower than foreseen. In other instances (Northern Province and Eastern Cape) the expenditure was higher than expected by the Function Committee[1]. It is important to note that, for reasons of Constitutional powers and financial reasons, provinces are constraint in the nature and extent of the policies that they can implement.

---

[1]   *No attempt is made in this dissertation to evaluate the effectiveness of provincial expenditure on agriculture.*
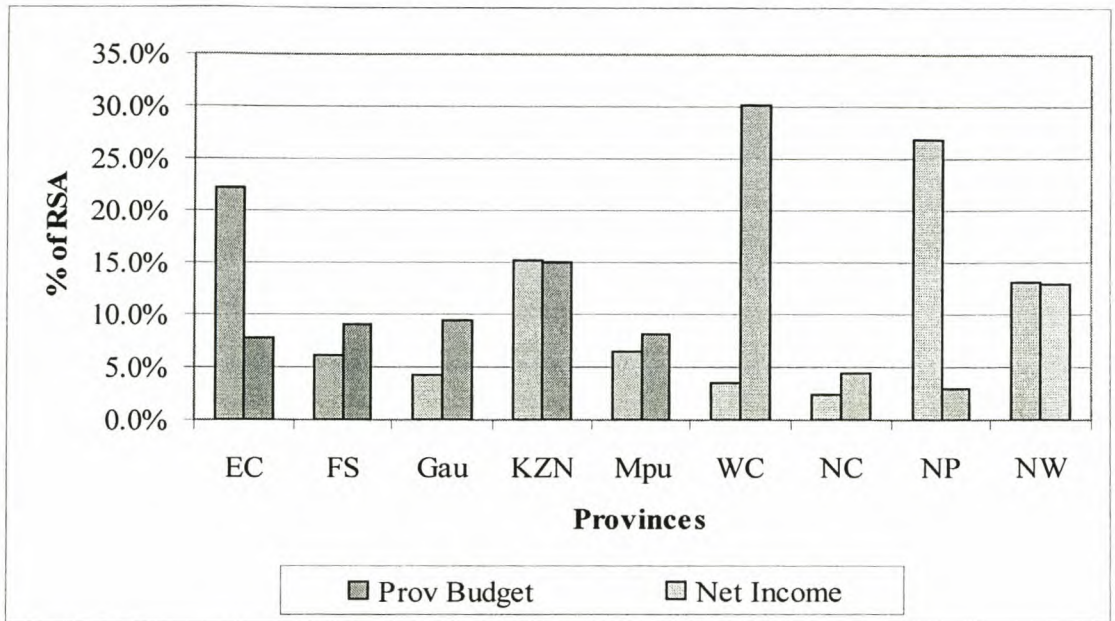
Figure 4. 4 Percentage of agricultural provincial budgets (average 1995 – 2001) per Province and the net income from agriculture.

Source: Department of Finance, 1998.

DASMI, 1994.
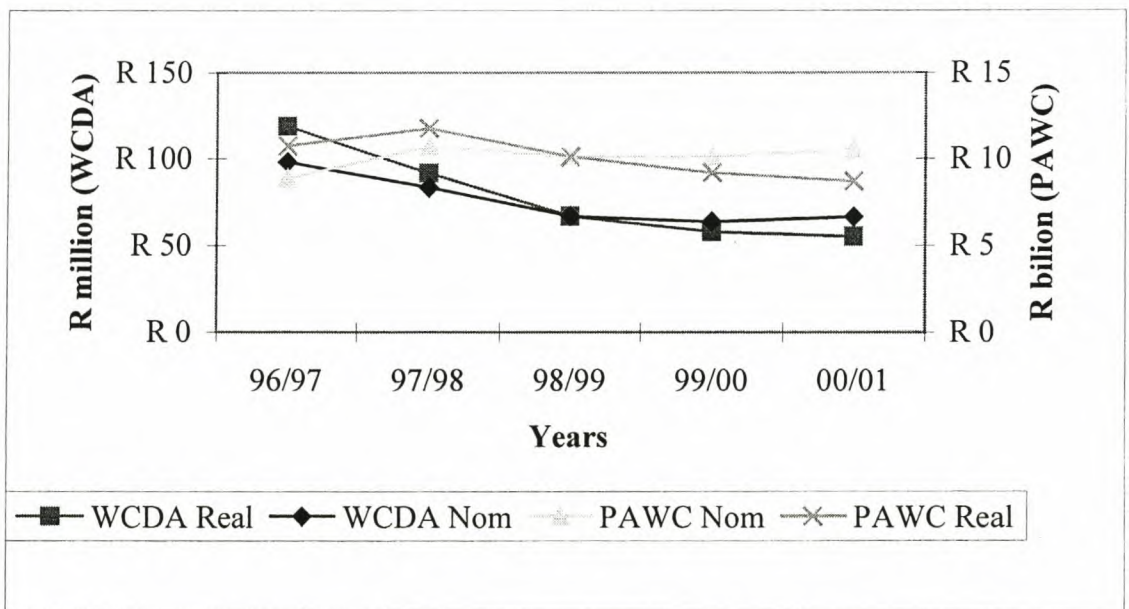
Figure 4. 5: Nominal and real budget allocation to the Western Cape Province and the Western Cape Department of Agriculture (1996 – 2000).

Source: Department of Finance, 1998.

Note: WCDA = Western Cape Department of Agriculture

PAWC = Provincial Administration of the Western Cape Province

In the past a number of studies have used the pressure group approach (see for instance Van Rooyen *et al*, 1987 and Vink & Kassier, 1991) to explain the fact that most policy rents in South African agriculture were captured by large-scale, full time white farmers. In the case of provincial expenditure on agriculture it is appropriate to also use the politician – voter interaction approach. In Table 4. 6 the expected impact of different variables on provincial agricultural expenditure is evaluated.

Table 4. 6: **The expected influence of different variables on provincial expenditure on agriculture.**

VARIABLE	PROVINCE								
	EC	FS	Gau	Kzn	Mpu	WC	NC	NP	NW
Pressure group approach									
Number of farms	--	+	++	--	-	++	++	--	-
Infrastructure	--	+	++	-	+	++	+	--	--
Uniform interest	+	+	+	-	-	-	+	+	-
Distribution	-	+	++	-	+	+	-	-	-
Resources (lobby)	--	+	++	-	-	++	+	--	+
Politician – voter interaction approach									
Rural/urban gap	++	+	-	++	++	--	-	++	++
Ag. as % of econ.	+	--	++	+	-	-	--	-	-
Food expenditure	++	-	--	++	+	--	+	+	+
Initial endowment	++	+	--	-	-	-	++	++	+
Land owners	++	+	--	++	++	--	+	++	++

Source: Based on the data in Table 4. 7 and interpreted in terms of the arguments in Section 2.4.2 and 2.4.3.

Note: EC = Eastern Cape; FS = Free State; Gau = Gauteng; Kzn = Kwazulu/Natal; Mpu = Mpumalanga; WC = Western Cape; NC = Northern Cape; NP = Northern Province; NW = North West Province. -- = strong negative influence; - = negative influence; + = positive influence; ++ = strong positive influence.

From the perspective of the pressure group approach one would expect the farmers in the Western Cape Province and Gautent to be able to extract the highest levels of

government support. They are relatively few in number (see Table 4. 7) and the communication infrastructure in the province is of a high standard. It would therefore be easy to organise them in an effective pressure group. In addition the relatively high net farm income (30% of the RSA in the case of the Western Cape) earned by these farmers indicates that they have the means to fund pressure group activities. Although the interest of farmers is not uniform due to the wide variety of products being produced in these provinces, the different modes of production tend to be geographically concentrated thus enhancing group efficiency. In the Eastern Cape, the Northern Province, Kwazulu/Natal and the North West Province the number of farmers are relatively numerous and their net farm income is lower than in the Western Cape. In addition the communication infrastructure in these provinces (especially in the former independent states and self-governing areas) are usually of a lower standard. Although the farming activities in these provinces vary from commercial to subsistence, the different modes of production are usually located in specific geographic area. One would therefore expect it to be very difficult for these farmers to organise effectively into pressure groups.

If the point of departure is the politician – voter interaction approach, it is clear that the rural to urban income gap is the smallest in the Western Cape and the Northern Cape. This will have a negative influence on rents to be extracted. It has also been argued in Section 2.4.3 that if agriculture is a large part of the economy it will have a negative influence on transfers as is the case in the Free State, Northern Cape and Western Cape. However, food expenditure as a percentage of household expenditure should have a positive influence while the initial endowment (capital intensity) will have a negative influence. Finally, as PERT-type policies will predominantly favour landowners, the number of landowners will have a positive influence on transfers. It is clear that, based on the politician – voter interaction approach, provinces such as the Eastern Cape and Northern Province should expect the largest relative share of agricultural expenditure.

It is appropriate to test these assumptions. Unfortunately time series data is not available for the majority of the variables and thus limiting the techniques that can be applied. The dependent variable used as an indication of provincial governmental support to agriculture was the average of the provincial budgets per province over the

period 1995 to 2001 (BudA). As the 1995/96 financial year was the first during which provinces budgeted for the agricultural portfolio from their own allocation, earlier data are not available. However, the Medium Term Expenditure Framework (MTEF) currently in use makes it possible to include data up to the 2000/01 financial year. This short time-span of available data makes it very difficult to return statistically significant results. At the very least it is, however, possible to evaluate the correlation between the dependent and independent variables. The resultant correlation matrix is provided in Table 4. 8.

As independent variables the following were used:

Farm: The number of farming units in each province.

FaTEm: The number of farming units in each province as a percentage of the total economically active population.

NI: The net income (in R million) received from farming activities per province.

Bgap: The *per capita* rural to urban income gap for the black section of each provincial population.

Tgap: The *per capita* rural to urban income gap for the total population of each province.

Bperc: The *per capita* rural income of the black population as a percentage of the same for the urban black population per province.

Tperc: The *per capita* rural income of all sections of the population as a percentage of the same for all sections of the urban population per province.

AgGGP: The contribution of agriculture at factor cost to the economy of each province expressed as a percentage.

TAgEm: Percentage of the total economically active population employed in agriculture.

BAgEm: The percentage of the black economically active population employed in agriculture.

CapInt: The capital intensity of agriculture in each province expressed as average capital investment per hectare.

Table 4. 7:   **Some characteristics of the agricultural sector in South Africa's nine provinces**

Item	Group	Unit	PROVINCE								
			EC	FS	Gau	KZN	Mpu	WC	NC	NP	NW
Number of farming units [a]	All	Number	316 988	43 326	2 960	420 305	95 486	8 747	6 857	304 755	155 603
Average budget allocation [b]	All	R mil	R 436	R 119	R 82	R 298	R 126	R 68	R 48	R 530	R 258
Net farm income [c]	All	R mil	R 885	R 1 032	R 1 069	R 1 685	R 915	R 3 393	R 502	R 327	R 1 449
Agriculture as % of GGP [d]	All	(%)	5,43%	10,44%	0,64%	5,59%	7,82%	6,53%	10,00%	7,95%	8,86%
Capital intensity [c&e]	All	R / ha	R 464	R 833	R 3 024	R 1 480	R 1 659	R 1 119	R 169	R 508	R 645
Food as % of consumer expenditure [f]	White	(%)	12,76%	14,00%	10,63%	10,98%	12,06%	10,52%	11,39%	10,56%	11,78%
	Black	(%)	31,13%	26,81%	19,59%	30,15%	28,95%	26,13%	33,22%	27,48%	24,73%
	All	(%)	24,26%	19,53%	13,68%	21,28%	21,49%	16,34%	18,66%	24,09%	19,58%
Agricultural employment as % of total [e]	White	(%)	5,37%	9,12%	0,64%	3,92%	5,96%	5,56%	17,38%	8,86%	0,48%
	Black	(%)	16,58%	28,72%	2,99%	17,75%	27,15%	11,92%	33,61%	23,99%	21,14%
	All	(%)	15,09%	24,36%	1,89%	13,32%	22,92%	14,46%	26,00%	22,50%	18,55%
Rural/urban income gap [g]	Black	(R)	R 4 467	R 811	R 1 620	R 5 383	R 769	R –1 568	R 555	R 7 618	R 6 198
	Black	(%)	41,25%	85,60%	86,43%	45,51%	84,75%	120,64%	87,72%	42,56%	42,01%
	All	(R)	R 8 422	R 6 134	R 977	R 12 221	R 8 507	R 4 106	R 1 065	R 11 578	R 12 229
	All	(%)	32,41%	50,29%	96,07%	30,95%	40,19%	77,92%	90,66%	35,46%	27,10%

Sources: [a] DASMI (1998), [b] Department of Finance (1998), [c] DASMI (1994), [d] CSS (1995), [e] CSS (1993b), [f] CSS (1997), [g] CSS (1994)

Table 4. 8: **Correlation matrix of factors influencing the average provincial budget for agriculture (1995 – 2001).**

	INDEPENDENT VARIABLES													
	BudA	Farm	FaTEmp	NI	Bgap	Tgap	Bperc	Tperc	AgGGP	TAgEm	BAgEm	CapInt	TFoExp	BFoExp
BudA	-													
Farm	0,852	-												
FaTEm	0,973	0,827	-											
NI	-0,351	-0,185	-0,426	-										
Bgap	0,876	0,803	0,863	-0,425	-									
Tgap	0,737	0,800	0,782	-0,075	0,782	-								
Bperc	-0,846	-0,836	-0,832	0,499	-0,952	-0,765	-							
Tperc	-0,721	-0,766	-0,765	0,158	-0,701	-0,956	0,758	-						
AgGGP	-0,018	-0,087	0,103	-0,170	-0,015	0,230	-0,011	-0,298	-					
TAgEm	0,067	-0,029	0,220	-0,344	0,004	0,214	-0,040	-0,299	0,954	-				
BAgEm	0,004	-0,016	0,161	-0,471	0,018	0,164	-0,092	-0,254	0,911	0,966	-			
CapInt	-0,367	-0,228	-0,406	0,176	-0,246	-0,291	0,291	0,362	-0,793	-0,771	-0,698	-		
TFoExp	0,805	0,757	0,872	-0,441	0,621	0,724	-0,702	-0,812	0,393	0,524	0,484	-0,606	-	
BFoExp	0,204	0,362	0,287	-0,236	0,043	0,173	-0,196	-0,273	0,549	0,652	0,689	-0,705	0,638	-

TFoExp: The household expenditure on food as a percentage of total household expenditure for all sections of the population.

BFoExp: The household expenditure on food as a percentage of total household expenditure for the black sections of the population.

The first significant observation is the relationship between the FaTEm, TAgEm and BAgEm variables. A relatively weak correlation is found between agricultural employment and budget allocation. A much more significant correlation exists between the number of farming units as a percentage of economically active people and the budget allocation. This observation is consistent with the distinction that De Gorter and Tsur (1991: 1244 – 1245) made between labour owners and land owners. Although the system of land tenure in South Africa, especially in the previous homelands, is fraught with peculiarities and insecurities, it still is a form of land ownership.

The second significant observation is the correlation between the rural to urban income indicators (Tgap, Bgap, Tperc and Bperc) and the budget allocation. These indicators are highly significantly correlated with the budget allocation. The negative sign associated with the percentage indicators are the result of the fact that it represents rural income as a percentage of urban income. Therefore, the bigger the income gap the lower the percentage will be. An interesting fact is the higher correlation found between the indicators for the black community and the budget allocation than is the case for the total population. This is probably a clear indication that the *de facto* political power is now vested in the former. Although De Gorter and Tsur (1991) and Swinnen (1994) emphasised that the relative movement of rural to urban incomes is the important criteria, and not the absolute gap, this observation is still relevant within the wider framework and given the lack of available time-series data.

It is also interesting to note that the expenditure on food as a percentage of total household expenditure is highly correlated with the budget allocation. The lower correlation for the black community can probably be explained by the fact that a relatively large part of this section of society gets their food supply from subsistence farming activities. The last interesting observation is the negative correlation between

the normal economic indicators (NI, AgGGP and CapInt) that are used to underline the importance of agriculture and the budget allocation. The reason for this is probably that the higher these indicators, the smaller the rural to urban income gap and therefore the less the support.

It is clear that the results obtained fit into the theoretical framework as developed by deGorter and Tsur (1991) and expanded by Swinnen (1994). It was found that the rural to urban income gap and the ratio of land to labour owners is highly correlated with provincial budget allocations to agriculture.

Significant differences do however exist between these results and the empirical results obtained by Swinnen and De Gorter (1997) and Crommelynck *et al* (1998). A number of reasons for this dichotomy can be mentioned. The first is that, due to the lack of time-series data, a full regression analysis on the South African case study could not be done. The second reason is situated in the peculiarities of the South African constitutional system. Although provinces are responsible for the rendering of services to agricultural and rural communities, they are not responsible for taxes and international trade protection measures. The authority that taxes is therefore not the same one that provides the services. The typical small country closed economy assumptions can therefore not be applied to this case study.

The findings of this case study do not bode well for agricultural support by the provincial government in the Western Cape Province. If it is accepted that the underlying economic characteristics preclude fast increases in the provincial budget allocation to agriculture, lobbying activities will only be of limited success. In addition it must be mentioned that the Western Cape is the only province where the rural black population receives a higher per capita income than the urban black population (rural to urban ratio of 120,6%).

One last interesting observation flowing from this case study is the disincentive for efficiency that can be deduced. The rational maximising behaviour of civil servants and bureaucrats, as described by Black and Dollery (1992: 22 – 23), leads to demands for bigger budget allocations, higher ivory towers and more power. The easiest way that this can be achieved is through ensuring that the rural to urban income gap does

not decrease, but is increasing. Effective rendering of services could therefore be to the detriment of the bureaucratic system in most provinces of South Africa!

4.4. QUANTIFYING THE ROLE OF AGRICULTURE

From the discussions in the previous sections it is clear that the current structure of the agricultural sector in the Western Cape Province is as much the result of certain historical forces as of economic considerations. It is also clear that the fundamental vectors that were responsible for the current structural situation have changed dramatically. During the discussion of the problems to be investigated in this dissertation the second problem was phrased as "what is the origin, nature, extent of and prospects for the interaction between agriculture and the rest of the economy of the Western Cape Province" (see Section 1.2). It was established in Chapter 3 that traditionally agriculture has a very important role to play and certain reasons were presented why this role has not materialised in much of Sub Sahara Africa. However, this question has not yet been answered for the Western Cape. The objective of this section will be to quantify this role of agriculture and, with the aid of a number of scenarios, to investigate future quantitative prospects.

4.4.1. The role of agriculture in an economic development strategy: the Western Cape case study

Various historical, social, economic and political forces led to the adoption of the GEAR macro-economic strategy by the government of South Africa in 1996. In order for this strategy to succeed, job opportunities must be created, the economy must expand, wealth must be redistributed and, in order to fulfil its social obligations, government revenue must increase. In other words, agriculture must play its development role as described by Cochrane, Mellor and Johnston.

In an attempt to quantify the possible contribution of agriculture, the Sub-Directorate: Agricultural Economics and Finance of the Western Cape Department of Agriculture (WCDOA), in conjunction with the Impact Analysis Unit of the Agricultural Research Council (ARC) embarked in 1996 on a joint project to develop the necessary enabling framework for objective and scientific decision making. In the development phase of this framework expertise from the Universities of Pretoria, Western Cape,

Stellenbosch, Cape Town (South Africa) and Colorado (USA) and institutions such as the Development Bank of Southern Africa, Institut National de la Recherche Agronomique (INRA), Centre de Cooperation Internationale en Recherche Agronomique pour le Developpement CIRAD (France) and the Landbouw Ekonomiche Instituut – Dienst Landbouw Onderzoek (LEI-DLO) (Netherlands) was utilised.

The Western Cape Agricultural SAM (WCAGRSAM) was developed from a preliminary and "unbalanced" SAM for the Western Cape economy compiled by the Central Economic Advisory Service (CEAS), which has since been disbanded as part of the public service transformation process. Another source of the SAM was the extended multi-regional input-output model (based on 1988 data) developed earlier for the Western Cape by Eckert and Van Seventer (1995). The WCAGRSAM, based on 1993 data, differs in a number of ways from normal convention. In the first instance 25 commodities or commodity groups of policy interest were modelled separately. In addition to production agriculture itself, key forward and backward linked agricultural industries are kept explicit in the framework in order to quantify their transactions with the agricultural sector *per se*. The second departure is that farm households are separated from non-farm households in order to explicitly capture consumption linkages that might flow from changes in farm incomes. The third innovation was to identify farm worker households separately from farm owner households. Thus, households in the WCAGRSAM consist of five groups; each disaggregated for high, low and middle-income categories. Naturally, incomes earned by each household are traced from salaries and wages etc. earned by the head of the household. Lastly, the addition of a modestly disaggregated set of government accounts, private and public capital accounts and transactions with the rest of the world completes the framework of the SAM: the first such provincial SAM constructed in South Africa. The details on the structure of the SAM can be found in Eckert *et al* (1997a), and the first research results are presented in Eckert *et al* (1997b).

Certain structural limitations in WCAGRSAM, similar to those in all South African Social Accounting Matrices, have since came to light. These include the fact that no distinction is made between commodities and activities, and the use of the RAS

method[1] in balancing the matrix. In addition the static nature of a SAM, combined with the usual lag between the accumulation and publication of macro-economic data, limits the usefulness of the average SAM being constructed in South Africa (see McDonald, 1998 and McDonald *et al*, 1997 for a more detailed discussion on the limitations). These limitations are currently being removed during a second round of updating and rebuilding of the WCAGRSAM. However, the limitations do not preclude the use of the preliminary results in evaluating the role of the local agricultural sector in achieving government objectives.

4.4.1.1. Job creation

As can be expected from the analysis in Chapter 3, the agricultural sector is an ideal vehicle to reach the objective of job creation. The fixed price multipliers for employment in the Western Cape economy verify this statement. For each one million Rand increase in the final demand for the products of the Western Cape agricultural sector, 82,8 new job opportunities are created. For each one million Rand increase in the final demand for products of the agribusiness and non-agricultural sectors, only 39,7 and 29,4 new job opportunities are created respectively. Within the agricultural sector certain industries have an even better record. For instance the comparative multipliers for citrus fruit is 120 job opportunities for each R1 million increase in final demand, while for dried fruit and deciduous fruit it is 123 and 116 respectively. (Eckert *et al*, 1997b).

4.4.1.2. Economic growth

The GGP (Gross Geographic Product) multiplier indicates the contribution of a specific sector to the economic growth of the province. It is indicated in Eckert *et al* (1997b) that agriculture is one of the growth sectors of the Western Cape Province. The GGP multiplier for agriculture was found to be 1,29 compared to the 1,02 in the

---

[1] *The RAS method is the most common method used to balance SAMs. The method achieves reconciliation by adjusting the elements of a matrix by means of row and column multipliers such that the row and column totals are made consistent with the control totals. It is clear that under conditions of unknown or suspect control totals (as is often the case with South African data) the usefulness of the method diminishes. A more appropriate method for these conditions is the entropy difference method. In this method the guiding principle is to use only the known information and then to seek the most probable distribution, consistent with known data, of other elements (McDonald, 1998).*

case of the agribusiness and 1,10 for the non-agricultural sectors of the Western Cape economy. These multipliers indicate that, with each R1 increase in the final demand for the products of the specific sector, an additional R1,29 (in the case of agriculture) will be generated in the economy of the province. Within the agricultural sector certain industries make a more important contribution to economic growth than other sectors. For instance the GGP multiplier of the deciduous fruit industry is 1,49, 1,48 for fynbos, 1,46 for vegetables and for table grapes it is 1,44. This indicates that these industries have a far greater ripple effect on the economy as a whole than other sectors of the economy.

4.4.1.3. Contribution to government revenue

It has become a sort of cliché to claim that farmers do not pay taxes, or that agriculture is a net user of government revenue. The fact however is that the government receives 6,13 percent of direct taxes from farm level. This figure does not include the effect of forward and backward linkages or the effect of certain indirect taxes such as customs and excise duties. The contribution of the agricultural sector to the fiscus can be illustrated through the government revenue multipliers. For each R1 increase in the final demand of agricultural products government revenue increases with R0,26. The comparative figures for the agribusiness and non-agricultural sectors are respectively R0,20 and R0,22 (Eckert et al, 1997b). It is therefore clear that growth in the agricultural sector is to the advantage of the government, which is currently walking a tightrope between social responsibilities and a relatively small tax base.

4.4.1.4. Redistribution of wealth

It has been found by Eckert et al (1997b) that growth in the agricultural sector has a greater equalising effect than growth in other sectors of the economy. The Gini coefficient for agriculture is 0,464 compared to 0,500 for the agribusiness and 0,540 for the non-agricultural sectors. The Gini coefficient for pig production is 0,373, that for vegetables 0,384, for deciduous fruit industry 0,413 and for the table grape industry 0,404. It is therefore clear that growth in the agricultural sector greatly contributes to a society with a more equal distribution of income.

The last fact that needs to be mentioned is that with every R1 million increase in disposable income received by the lower income groups, 35,9 job opportunities are created in the economy of the Western Cape. The comparative figure for the middle and higher income categories is 29,9 job opportunities (Eckert *et al*, 1997b). It is therefore evident that, as an increase in income in the agricultural sector accrues more to the lower income groups than to the higher income groups, a dual advantage is reached. It is also evident that the redistributive factors created by the jobs are more likely to be in favour of other low income earners and it will be physically closer to their own communities, and therefore to the advantage of the rural economy. It is therefore no wonder that if the industries and sectors of the Western Cape are listed according to their development impact, the fourteen top ones are agricultural industries, with the deciduous fruit industry rated as number one.

4.4.1.5. The relevance of the WCAGRSAM-results

The Western Cape agricultural sector, which is relatively more developed than in other parts of Sub-Saharan Africa, may sometimes be seen as having little to contribute to economic development. The model of Johnston and Mellor (1961) is however still relevant within the Western Cape context. This was clearly shown by the results of the WCAGRSAM. The local agricultural sector still plays an important role as provider of food, markets, foreign exchange and, especially as contributor to public and private capital formation.

4.4.2. Agriculture as catalyst in a liberated trading environment

The greatest achievement of the Uruguay Round of trade negotiations has been the development of a set of legally binding rules and commitments for agricultural trade, which formalise the intention of trading countries to reduce the distorting and costly policies which characterised the years before the round. Now, at the eve of the next round of negotiations, it is appropriate to identify the possible role of agriculture *vis a vis* the rest of the economy of the Western Cape Province regarding the outcome of such negotiations. Various scenarios can be developed to estimate the potential effect of price and tariff changes on the Western Cape economy. To this end the model

described in Section 4.4.1 has been used and the results of the research published in Berning and Troskie (2000).

4.4.2.1. Assumptions used

In Scenario I the effect of a liberalisation of agricultural trade, without the Western Cape participating through increased exports, was estimated. This is the typical situation that can arise if non-tariff barriers, such as phytosanitary and sanitary measures prevent the local agricultural sector from participating. The assumption was made that, as a result of a reduction in trade tariff quotas, the world prices of various agricultural commodities would increase on average with two to three percent. This assumption was based on the previous analysis done, in preparation for the Uruguay-round of negotiations, by UNCTAD/Wider (1990), Page *et al* (1991), FATRI (1993), Brandao and Martin (1993) and Goldin *et al* (1993) and as reported by DeRosa (1996) (see Table 3.5). Because the Western Cape economy is comparatively small in size, the latter can be regarded as a price taker and hence the increase in world prices implies an increase in domestic prices.

In Scenario II, the impact of an increase in international exports on the Western Cape economy was estimated. The assumption was made that, as a result of the reduction in trade tariff quotas and the fact that production is anticipated to shift from protected to unprotected economies, there will be a greater market for products from the Western Cape. Potential growth sectors in the Western Cape that are expected to increase production in order to take advantage of greater market access on international markets were identified and the following conservative increases in exports were assumed:

(a) five percent for table grapes, citrus, deciduous fruit, vegetables, flowers and bulbs, indigenous teas, other horticultural products, animal fibres and small stock;

(b) 10 percent for fynbos;

(c) 200 percent for canola; and

(d) 2.5 percent for the distilleries and wineries, as well as the canning industries.

4.4.2.2. The effect of a trade liberalisation excluding the Western Cape agriculture

It was found that an increase in the world prices of agricultural commodities (two to three percent) would result in a net increase (i.e. excluding the original increase in world prices) in the domestic prices for those commodities. The magnitude of this increase in domestic prices is as high as 0,44 percent for agricultural commodities and up to 0,89 percent for agribusiness and non-agricultural commodities. Agricultural products that showed the greatest price increase include, in order of decreasing magnitude: vegetables (0,42 percent), livestock (beef, dairy, etc.) (between 0,3 and 0,4 percent), wheat (0,29 percent), dried fruit (0,27 percent) and fynbos (0,25 percent). In the case of the manufacturing sector industries that use agricultural commodities as inputs in the production process (forward linkages) were the most affected by the price increases in the agricultural sector. Specific industries affected include canning (0,89 percent), dairy products (0,77 percent), beverage and tobacco (0,74 percent), distilleries and wineries (0,70 percent), grain products (0,64 percent) and animal feeds (0,61 percent). The lowest total multiplier effects in the non-agricultural sectors were found in the industries that supply inputs to the agricultural sector.

It is obvious that price increases in the agricultural sector will have repercussions on the cost of living for consumers. Household categories were based on a) race, b) location and c) income level. Table 4. 9 show that the increase in the cost of living was the greatest for the coloured and black households, living in rural areas. The cost of living increased between 0,42 percent and 0,58 percent for these households.

By contrast, the households that experienced the smallest increase in the cost of living are the white and asian middle and high income groups, with an increase of between 0,15 percent and 0,11 percent in the cost of living. In general it is found that for a given race and location, the lower income groups will experience relatively greater increases in cost of living. This can be explained by Engel's law, i.e. low-income households spend a relatively greater percentage of their income on food; thus an increase in food prices will have a greater impact on these households.

Table 4. 9: The estimated increase in cost of living of different households categories as a result of the assumed increases in world prices of selected agricultural commodities.

Households	Increase in cost of living (%)
1 Coloured & Black Rural Households (Low)	0,58%
2 Coloured & Black Rural Households (Middle)	0,47%
3 Coloured & Black Rural Households (High)	0,42%
4 Coloured Urban Households (Low)	0,38%
5 Coloured Urban Households (Middle)	0,30%
6 Black Urban Households (Low)	0,27%
7 Black Urban Households (Middle)	0,26%
8 Coloured Urban Households (High)	0,21%
9 White & Asian Rural Households (Low)	0,18%
10 White & Asian Urban Households (Low)	0,17%
11 Black Urban Households (High)	0,16%
12 White & Asian Urban Households (Middle)	0,15%
13 White & Asian Rural Households (Middle)	0,15%
14 White & Asian Rural Households (High)	0,11%
15 White & Asian Urban Households (High)	0,11%

Source: Berning & Troskie (2000)

4.4.2.3. The effect of an increase in agricultural exports

In Scenario II, in which increased exports of selected agricultural commodities from the Western Cape were assumed, the total output of the Western Cape economy increased by 0,39 percent. This increase, which amounts to R432 million, represents three times the value of the initial assumed increase in exports of R136 million, indicating the great extent of the linkages in the Western Cape economy. Furthermore, it was estimated that 22 951 employment years could be created within the production sectors: 9 505 in the agricultural sector and 13 446 in the non-agricultural sector.

Table 4. 10 show the assumed increase in exports (I) of selected agricultural and non-agricultural commodities, the multiplier effect (M) and the employment years created within each sector. Thus if the export demand for commodities increased as indicated in Table 4. 10, the level of gross output of deciduous fruit in the Western Cape economy is expected to increase by R36,84 million in order to meet this demand and 4 261 employment years will be created within this industry. It must be noted that the above total multiplier effects and employment created in each industry is the result of the combined effect of a simultaneous increase in exports of all the industries included in the WCAGRSAM. The table shows the twelve agricultural industries with the greatest price increase in order of decreasing magnitude, and the four non-agricultural industries and agribusiness' with the highest and lowest price increases respectively.

In Table 4. 11 the household income effects resulting from the total increase in exports are indicated. The impact of the increase in exports on the redistribution of income between different household categories based on a) race, b) location, c) income level and d) race and location was also estimated. The initial total income of each household income group is shown, together with the total multiplier effect, which implies an increase in the level of incomes. The increase in income for each group is also expressed as a percentage of the initial income.

On an aggregate level there appeared to be no significant evidence of income redistribution across racial groups. Incomes from both white and asian households as well as coloured and black households increased with 0,27 and 0,28 percent respectively. However, there was a very significant redistribution from urban households (0,24 percent) to rural households (0,83 percent). With regard to the three income categories, there appeared to be greater proportionate benefits for the less well off, i.e. low-income households. When a combination of race and location was used to evaluate redistribution, it was found that the coloured and black rural households received the greatest benefit, namely 1,54 percent followed, by white and asian rural households (0,43 percent) and white and asian urban households (0,25 percent). The smallest benefit accrued to coloured and black urban households, which gained only a 0,22 percent increase in their incomes.

Table 4. 10:   The estimated stimulation of the Western Cape economy as a result of increased exports of selected commodities.

Industry		Increase in exports *(I)*	Total multiplier effect *(M)*	Employment created (Years)
1	Deciduous Fruit	R 30 588 315	R 36 839 959	4 261,2
2	Table Grapes	R 17 851 231	R 18 200 523	2 073,3
3	Viticulture	R 0	R 14 274 371	986,0
4	Animal Fibres	R 4 898 796	R 5 273 359	409,7
5	Vegetables (ex potatoes)	R 2 268 903	R 4 886 364	401,8
6	Flowers and bulbs	R 2 293 231	R 2 631 653	301,1
7	Citrus	R 1 910 253	R 2 292 641	275,5
8	Layers	R 0	R 1 787 804	127,3
9	Cereal (excl wheat)	R 0	R 1 637 780	43,1
10	Potatoes	R 526 116	R 1 633 501	81,6
11	Broilers	R 0	R 1 263 722	147,2
12	Dried Fruit	R 0	R 911 794	112,4
:				
Agriculture (25 sectors)		**R 61 466 000**	**R 96 204 000**	**9 505**
1	Distilleries and wineries	R 37 910 701	R 48 832 548	2 269,8
2	Canning	R 38 732 445	R 48 573 693	2 655,9
3	Commercial Services	R 0	R 38 534 239	1 147,5
4	Trade	R 0	R 37 663 247	1 454,3
:				
20	Fish and oil	R 0	R 1 845 756	84,7
21	Forestry and Fishery	R 0	R 1 092 683	61,1
22	Animal Feeds	R 0	R 870 048	36,5
23	Agricultural machinery	R 0	R 715 512	3,9
Non-agriculture & agribusiness (23 sectors)		**R 76 643 000**	**R 336 438 000**	**13 446**
TOTAL		**R 138 109 000**	**R 432 642 000**	**22 951**

Source: Berning & Troskie (2000)

Table 4. 11: Household income effects from the increase in final demand for exported agricultural products.

Households	Initial total income (R'000)	Total multiplier effect *(M)* (R'000)	Increase in household incomes (%)
Race:			
White & Asian	21 822 159	57 889	0,27%
Coloured & Black	20 082 742	55 752	0,28%
Location:			
Urban	39 486 165	93 658	0,24%
Rural	2 418 736	19 983	0,83%
Income:			
Low	5 417 002	17 496	0,32%
Middle	13 376 717	38 798	0,29%
High	23 111 182	57 346	0,25%
Race and location:			
White & Asian Urban	20 271 679	51 257	0,25%
White & Asian Rural	1 550 480	6 632	0,43%
Coloured & Black Urban	19 214 486	42 401	0,22%
Coloured & Black Rural	868 256	13 351	1,54%

Source: Berning & Troskie (2000)

4.4.2.4. The importance of the results

Results from the first scenario indicated that the domestic prices of all commodities, agricultural and non-agricultural, increased proportionately more than the original increases in world prices. The increase in commodity prices was accompanied by an increase in the cost of living of all household groups, but especially that of low income groups. Thus although the aim of improving fair trade will be reached through a liberalisation of trade, the development objective of South Africa is not promoted.

In the second scenario it was found that the improvement of market opportunities and fair trade conditions within the agricultural sector would have a significant effect on

levels of production in other economic sectors, the creation of employment, the cost of living etc. More important, however, is that this economic growth coincided with a redistribution effect from the urban to the rural areas as well as from rich (high income) to the poor (low income) households.

It follows that conditions to improve access to markets for Western Cape agricultural produce should be an important consideration in any trade negotiations. This will contribute towards the achievement of the policy objectives of the South African government. Trade liberalisation without increased market access would, however, be detrimental to government objectives.

4.5. CONCLUSIONS

It follows from the insights gained in this chapter that the structure of the agricultural sector in the Province was shaped as a result of political rather than economic pressures. This is true from the earliest days of the Dutch settlement at the Cape when the provision of passing ships was the sole reason for the existence of the settlement. Apart from the fact that the local process of colonisation differed substantially from that in other parts of the world, undue emphasis was placed on the production of wheat. This emphasis was often to the detriment of the development of other farming activities and gave rise to a culture of wheat production in certain areas of the Western Cape. The system of protection of wheat farming started with the Dutch settlement and continued well into the British era. This protectionism was again maintained for the biggest part of the 20th century.

Starting at the end of the 19th century, but gaining momentum during the 20th, the racial policy of South Africa resulted in a unique dualistic structure along racial lines in the South African agricultural sector. The commercial or white part of this sector developed along conventional lines, resulting in a secular decline, as is the case in most developed economy agricultural sectors of the world. The subsistence or black part of the sector stagnated at the level common in most developing countries of the world.

By the time of the political transition of 1994 it had become clear that the farm lobby had lost its political dominance in the 1980s. However, the political transition of 1994 represented a real catharsis in the way politicians perceived agriculture, with the new parliamentarians

identifying more easily with the developing nature of the sector. Analysing the characteristics of this "new" agricultural sector from a political economy perspective, and then specifically at provincial level, it is clear that farmers in the Province cannot expect large remittances from government. They will have to develop their own systems of surviving in an turbulent world.

However, it was also shown in this chapter that the Western Cape agriculture could still play the role envisaged by Cochrane, Mellor and Johnston. Agriculture can substantially contribute to the provision of food, markets, foreign exchange and the formation of private and public capital. Growth in this sector will lead to significant economic redistribution from higher income urban households to lower income rural households.

Within the framework of the information gathered in Chapters 2, 3 and 4, it is now appropriate to investigate possible options for the development of the wheat industry in the Western Cape Province. This will be the objective of the next chapter.

CHAPTER 5

A FRAMEWORK OF SOLUTIONS FOR THE WHEAT INDUSTRY IN THE WESTERN CAPE

5.1. INTRODUCTION

The objective of the previous three chapters was to investigate and understand the environment within which a solution for the problems of the wheat industry of the Western Cape can be found. Therefore, the objective of this chapter will be, by building on the insights gained in the previous chapters, to develop a framework through which solutions can be created. The first section of the chapter will focus on the development of a general framework of solutions. Thereafter the focus will be on the specific details flowing from the general framework.

5.2. A GENERAL FRAMEWORK OF SOLUTIONS

It was shown in Chapter 2 that the economic structure of the agricultural sector of developing economies differs from that of developed economies. It was also shown that during the process of development a specific set of problems is usually experienced. This set of problems, known as the farm problem, manifests itself in price instability, the treadmill effect and asset fixity. It is important to recognise that at the base of the problem is the fact that both the aggregate supply and aggregate demand of agricultural products are relatively inelastic. It can be argued that by "changing" either the supply or the demand function (or both) the farm problem and its manifestations can be countered.

But how to go about changing the relative price-elasticity of the supply and demand functions for farm products? It was argued in Section 2.2 that the price elasticity of supply is influenced by five factors. These include:
(a) The length of period over which the change is measured.
(b) The availability and suitability of other uses for the natural resources.
(c) The degree of specialisation of farms.

(d) The objective of the farming activity.

(e) The relationship between the prices of agricultural products and those of agricultural inputs.

It must be remembered that the short term supply function is a) the aggregate of the marginal cost functions of a number of small businesses and b) the marginal cost functions of various different technological practices. The most obvious part of the solution would thus lie in developing alternative uses for resources; natural, capital and human. In this way the marginal businesses, practices and land (which will show the highest marginal cost and thus the most inelastic part of the supply function) will be removed, resulting in a relatively more price elastic supply function. A number of alternative ways of achieving this, ranging from alternative crops to agri-tourism, will be investigated in Sections 5.3 and 5.4.

Increasing levels of specialisation, combined with the limited alternative uses for certain agricultural capital inputs, necessitates a more creative solution. There are, for instance, few alternative uses outside of agriculture for a combine harvester. However, certain measures can be taken in managing the problem. The first is the renting of specialist equipment or the voluntary sharing of assets. Although a rental market for agricultural equipment in the Western Cape is still in its infancy, the first vestiges can be observed. The development of such a market is best left to private entrepreneurs. Examples of asset sharing have also come to the fore. For instance some farmers in the wheat producing areas of the Ruêns and Mosselbay, which have a two week difference in the time of harvesting, are sharing combine harvesters. A second example is reported in Myburgh *et al* (1996:50 – 51). John Slade, a farmer near Forbes in New South Wales, Australia, farms on 2 000 hectares of irrigated land without a single machine on his farm. He exclusively uses rented machinery, as his objective is to be more flexible in his enterprise choice. A final example is a UK vegetable farmer with interests in Chile who ships equipment between the two countries and thus uses the Northern/Southern Hemisphere difference in production seasons. The shipment of the equipment is, for him, more cost effective than the opportunity cost of two complete sets of equipment (Kirkham, 1999). In this regard a role for (central) government can be foreseen in, for example, ensuring that import duties are not paid every time the equipment is shipped.

One other way of addressing the problem of capital fixity needs to be investigated. This is by changing the form of the raw product. In so doing the capital assets can be used to produce

different final products, each with their own demand function. Some possibilities will be discussed in Section 5.5.

Before moving to the demand function it must be acknowledged that limiting the supply on the market may have the effect of slowing the movement of the supply function to the right and thus arresting the downwards pressure on the prices of farm commodities. In the past various policy measures, domestically and abroad, have been introduced to manage this problem. One solution that is not strange to local conditions is to try to manage the supply of the product through, for instance, quotas or set-aside programmes. Another solution that has been tried domestically is to manage the supply chain and price of the product through various marketing arrangements, including single channel and fixed price arrangements. A number of problems exist with these programmes:

(a) Programmes of this sort are usually associated with extracting consumer rent and large overhead costs.

(b) It has been argued in Section 4.3.3 that the political climate is of such a nature that general rent transfers from consumers to producers under current South African conditions is not realistic.

(c) Climatic conditions still influence the volume being produced and thus prices remain volatile. Although the treadmill may thus be arrested, the volatility of net farm income and associated problems usually increases.

(d) Downward pressure on the prices of agricultural commodities is not a domestic one, but of a global magnitude. Therefore, a domestic supply management solution will not solve the problem over the longer term, but would rather result in structural inefficiencies that would manifest at a later stage.

(e) Given the global accord on, and current objectives of the World Trade Organisation, the chances of cooperative global supply management strategies seems slim. In addition commodity specific support programmes are trade distortionary, and are therefore "Red Box", or unacceptable practices.

It follows that state interventionist supply management programmes will not be part of the solution to the problems of the Western Cape wheat industry.

Turning to the demand function. According to Thomsen and Foote (1952) the demand for agricultural products is derived from:

(a) The size of the population. As agricultural products are usually consumed as food (where each individual has a specific capacity to consume food) or used as some sort of body protection (in which case there are a limit to the number of garments in the closet that one really needs), this is a very logical assumption.

(b) The income of the population. Although all individuals have a need for agricultural products, not all have the means to acquire it. As agricultural products usually represent a basic need, it will be one of the first to be addressed. But, as income increases, other priorities will become more important and the percentage of expenditure on food will decline (thus Engel's law[1]) and more luxury (agricultural) products will be purchased.

(c) Consumer preferences. Each group of consumers has specific preferences and consumption habits. This will influence the demand for specific products and the utility derived from such products.

(d) Environmental factors, which are closely related to the former. Soup will be more in demand during winter and ice cream during summer.

(e) The availability and the prices of substitutes. It is logical that if effective substitutes for a specific product exist, then the logical option is to compare the prices of the substitutes.

The price elasticity of demand for agricultural products will be influenced by these factors. A number of other characteristics of the elasticity of demand must be added (see Kohls & Uhl, 1980: 162 – 168):

(a) The price elasticity of demand for an agricultural product varies according to the specific point on the demand function. Typically the elasticity is greater for small quantities of products and becomes less elastic at higher volumes.

(b) The demand for farm products is often an intermediate demand that is derived from the final demand for specific products (i.e. wheat and bread, wool and clothes).

(c) The price elasticity of demand of farm products usually increases as it moves closer to the consumer. Thus, the price elasticity of demand for wheat would be relatively less elastic than that of flour, which, in turn, would be less elastic than that of bread.

---

[1] *Engel, a nineteenth century German statistician, observed that expenditures on food as a proportion of total expenditure declines as income increases. Engel's Law, as it has become known, implies that a) the income elasticity of demand for food will decline as income increases and b) as income increases a greater proportion of disposable income will be spent on luxuries (Barker, 1989: 28 – 29).*

It must be remembered that the demand function is derived from the demand (utility) functions of a magnitude of independent households. It follows from this line of argumentation that a producer can be confronted by a relatively more elastic demand function if the higher income, specific preference, final demand and close to consumer part of the demand function can be targeted. To achieve this end it is necessary to differentiate the farm product from the wider pool of commodities available on the world market. It is important to note that care must be taken that a product, once differentiated, stays unique. If not, the same problems of a relatively inelastic demand function will again be faced at a later stage.

One option available is to invest in a dedicated advertisement campaign. In the case of agricultural products it is however difficult and expensive to convince consumers of the uniqueness of one's product without encountering the free-rider problem or running the risk of legal action. Another option is through adding value to the product. Value adding is not only the physical transformation of the product (i.e. canning, preserving, and drying), but can also include adding either time, place, service or information value to the product. The possibilities of such actions will be discussed in Section 5.6.

At this stage it must be acknowledged that not all farmers will be able to take advantage of either the supply function or the demand function measures described here. A large number of farmers will still be normal commodity producers and will thus have to cope with the manifestations of the farm problem. No framework of solutions would thus be complete without also making provision for those farmers.

It is evident that those producers electing to focus on the production of agricultural commodities must do so with the clear understanding that their financial survival is dependant on their ability to be the first to adopt cost-reducing and/or yield increasing technology. For these producers farming will increasingly acquire the characteristics of an industrial operation. The responsibility of the Provincial Government towards these farmers is to:

(a) Provide an effective research and extension service.

(b) Provide an empowerment structure for farmers to contribute in their own right to research and development expenditure. In South Africa national and provincial expenditure on research and development activities is declining. It was shown in Section 4.3.3 that underlying structural realities limit the possibilities of fast increases in government

expenditure on these activities in the Western Cape. The filling of this gap through the payment of producer levies will be discussed in Section 5.7.

(c) Cultivate national and international contacts and collaborative research and development programmes in order to distribute costs, share expertise and increase returns on investment.

(d) Develop a structure through which the surpluses in years with a relatively high income can be saved for use in years with a relatively lower income. In this way the problem of instability can be faced. It follows that part of the problems of asset fixity can be addressed through such a programme. As a commodity specific risk management strategy for most commodities is available through the SAFFEX commodity exchange and yield risk can be managed through crop insurance, the nature and extent of a more general strategy will be discussed in Section 5.8.

(e) Develop a system through which farmers can exit farming as an occupation in order to reduce asset fixity of own labour. Two inter-linked strategies should be embedded in such a system. First, the opportunity to develop the necessary skills to compete in the job market off farm. As South Africa has a well developed tertiary and vocational training infrastructure, the main constraint for farmers who wish to exit is the opportunity cost to acquire the necessary skills. This opportunity cost can be measured in terms of time and money. The second strategy should focus on the development of a "retirement" programme for farmers who wish to exit agriculture. Both these strategies will make it easier for farmers whose opportunity cost of time in farming is relatively high to dis-invest, improving opportunities for other commodity farmers to increase their scale of operation and, hence, net returns to their management time. As the main constraint for farmers who wish to exit farming is usually money to invest in education, training or retirement, the creation of an income stabilisation fund, with the option of withdrawing money for such purposes, can contribute towards a solution. This will be discussed in Section 5.8.

The implicit assumption in the largest part of this section was that all market institutions are operating on an optimal level and that government could adopt a laissez faire attitude. However, certain externalities lead to market failure and intervention is thus required. In this context market failure means that the best attainable outcome has not been achieved. According to Lipsey et al (1987: 412 – 416) the externalities that could influence market institutions include:

(a) Private and social costs;

(b) Pollution;

(c) Common-property resources;

(d) Congestion;

(e) Collective consumption goods;

(f) Moral hazard and unequal information;

(g) Neglect of future consequences of present actions; and

(h) Transaction costs.

It was argued in Section 3.3.2.1 that information and knowledge, as key variables will replace land, labour and capital as the major sources as wealth. In Section 3.2.3 it was explained that transaction costs, of which the lack of information forms part, contributes to market failures. In Southern Africa excessive transaction costs even contributes to "missing markets" in some cases. However, it was shown in Section 3.3.2.5 that knowledge and information are exceedingly captured in supply chains, which are replacing the conventional neo-classical marketing and price discovery mechanisms. It follows that part of the strategy should be an investigation into the supply and value chains of the wheat industry of the Western Cape Province. This investigation should focus on wheat as a differentiated product as well as wheat as a commodity. The periphery of such an investigation will be discussed in Section 5.9.

5.3. ALTERNATIVE CROPS AS ALTERNATIVE USE FOR THE NATURAL RESOURCE

One of the questions that is often asked by farmers in the wheat producing areas of the Western Cape is along the lines of: "but if we can't farm with wheat anymore, what alternatives exist?" It is important to take note that the number of alternative uses of the rainfed production in the Western Cape Province is the severe annual drought stretching from October to April. This excludes the production of traditional substitute crops such as maize, sunflower, groundnuts, cotton and in certain areas even grazing crops such as lucerne. It follows that the substitutes traditionally available to cropping farmers in the Western Cape Province was limited to winter grains (i.e. wheat, barley, oats and triticale).

In this section a number of alternatives will be explored. The line of reasoning, flowing from Chapter 2 and Section 5.2 is that the propagation and implementation of alternative uses for the natural resources will have two effects. First, an increase in the number of alternative uses of the natural resource will result in more choices for the farmer and, as a result, more flexibility in decision making. This, in turn, will lead to a more elastic supply function for wheat. Second, if the area of land used for alternative applications is substantial, then it will lead to a decrease of wheat production in the Western Cape. The result will be that less wheat will have to be transported to other provinces or exported. It has been shown in Chapter 1 that wheat production in the Western Cape, due to its location, is faced with a comparative disadvantage regarding transport costs. The reduction in the quantity of "exported" wheat will lead to a higher average farm-gate price for wheat.

There are approximately 300 000 different plant species in the world of which only a few hundred are used in agriculture. The USDA in 1957 initiated a programme to gather and analyse plant material that may have commercial potential and, amongst others, more than 100 different and new types of oils were found. The subsequent research resulted in a number of new products of which the following are worth mentioning (USDA, 1992):

(a) Vegetable oils. Oils from traditional crops such as soybeans, sunflower, etc. are well known for their uses ranging from soap to lubricants and even as an alternative for petroleum fuels. A new range of crops such as crambe, canola, lesquerella and others produce oils with unique compositions and thus new applications in lubricants, plastics, nylon, cosmetics and industrial chemicals. Other crops, even further down the line to commercialisation include cuphea, veronia, jojoba and meadowfoam.

(b) Starches. Starch forms an important raw material for the chemical industry. Possible applications range from stabilisers and flow modifiers in the paint industry to binders in explosives and ingredients in adhesives. A new starch based product, the Super Slurper, can absorb 648 times its own weight in water.

(c) Fibre. Kenaf is an annual crop that produces fibre that can be used in the pulp and paper industry. Other applications include use as a filter medium for fruit juices, oil and as a medium for oil-spill cleanup. It can also be used as a substitute for fibreglass in the manufacturing of moulded parts.

(d) Rubber. Guayule is a plant that yields about five kilogram of rubber for each 100 kg of plant. Although rubber can be synthetically manufactured from petroleum, synthetic rubber lacks certain characteristics that can only be found in natural rubber.

(e) Pharmaceuticals. A significant part of the medicines in use today had their origins in plants. This search is never-ending and may give rise to new applications for old and new crops. For instance new cures for conditions such as cancer may flow from chemicals in the Yew-tree (more renowned in the Middle-Ages for longbows manufactured from its wood).

In the Western Cape a number of new crops have been evaluated for local production. Drawing heavily on Arkcoll (1998) some characteristics of these crops will be discussed below.

5.3.1. Oilseeds

Although olives have been the traditional source of oil in Mediterranean climates, a number of oilseeds can also be grown with winter rain. These include certain varieties of canola (toxic free oilseed rape), linseed, sunflower and safflower. Of these, canola has the best prospects locally because it is the highest yielding and the oil is edible, and of high quality. The high protein meal is also of exceptional quality.

Industrial markets for the drying oil of linseed exist, but are small, and no premium is paid for safflower oil in South Africa, although the product fetches high prices on world markets. Linola, a variety of linseed selected for edible oil, produces little over half the canola yield. It is less tolerant of drought but might find a niche because of tolerance to waterlogging, and in canola rotations when oilseed prices are high.

Canola varieties bred in Australia for a similar climate to that of the Western Cape have proved very successful here and the area grown is expected to reach 30 000ha in 1998. Production should rise rapidly to satisfy the large local market of well over 100 000t within a few years. Apart from the good and stable yields and high quality of the products, canola is very attractive as a break crop to rotate with wheat as it reduces disease, weeds and pests in the following crop. Its large root system is also said to improve the soil structure. This in turn increases subsequent root penetration as well as infiltration of rain that can reduce sheet erosion. Large crop residues also improve these effects and return a considerable amount of nitrogen to the soil. The combined result is that following wheat yields are increased by about 25 percent. Furthermore,

the crop fits well into normal farm practice as it uses conventional wheat equipment and can be sown and harvested out of sequence with wheat to spread these periods of high activity. On farm use to partially replace dairy rations has been an unexpected development. A low local price has also led to whole seed use in other animal rations when fishmeal has been expensive.

Local prices have usually been well above those of wheat and the relative profit has been the most important factor encouraging, but occasionally inhibiting, the expansion of the crop. Teething problems include the low yields achieved by farmers initially unfamiliar with the crop and in seasons with late droughts. Unfamiliarity has also led to damage from herbicide drift and residues in soil and equipment.

5.3.2. Legume grain crops

Lucerne is widely used as a cereal break crop in the Southern Cape where some summer rain allows it to persist. The crop has been very important in giving many farmers a stable source of income from animal production. Medics and clovers are being introduced into the Swartland as alternatives for the drier climate.

There has also been considerable effort put into finding a stable legume grain from a large number of varieties of many species examined. Several types of lupins have been successful in certain areas but have suffered from diseases in wetter soils and low prices. Faba beans and chickpeas have also shown very variable yields due to disease and poor pod set and drought tolerance. On the other hand, some lentils and dry peas have shown very good drought tolerance and it is hoped that some varieties will become better adapted to wetter regions as Ascochyta resistance is bred into them. Both these crops are difficult to harvest and market, but have useful fodder by-products. Narbon and lathyrus peas are also being evaluated.

The considerable site specificity that is being encountered with these legume grains, suggests that different ones will work in different areas and soils. Work on this detail is still needed. So far, it is known that most varieties are poorly adapted to the typical shallow Swartland soils that waterlog for a month or more each winter. The root rots associated with this wetness are also exacerbated by the herbicides currently used for

these crops. Damage from herbicidal spray drift is also a major problem. Nevertheless, these crops offer an attractive way of reducing nitrogen dressings on following crops as well as the opportunity to move to four course rotations with two cereals and an oil/protein crop.

5.3.3. Fibre crops

Fibre crops like flax and hemp have been looked at briefly. Flax grows well, being simply a taller variation of linseed. It has been rejected historically because of the difficulty of removing the fibre. This retting requires a large amount of water in November and expensive specific processing facilities to obtain the final fibre. Dew wetting is now practiced in wet areas of Western France and there is considerable research elsewhere on mechanically removing the fibre from the waste stems of linseed. This latter approach seems the most appropriate for the dry climate of the Western Cape. An alternative is to use the whole straw to strengthen the fibreboards due to be made here from wheat straw in the near future. Any use of the linseed straw would probably turn the production of linseed and linola viable.

Low narcotic hemp varieties from Northern Europe have so far proved to be poorly adapted to the Western Cape. A breeding programme would be needed to transfer the high fibre and low narcotic characteristics to locally adapted varieties. One would then face the same problems as flax to separate fibre in a dry climate unless the fine fraction required by the textile industry and the by-products were of sufficient value to justify irrigation.

A local *Asclepias* sp. from the Karoo has been identified as having considerable potential as a fibre crop especially once the dry retting problem is solved.

5.3.4. Horticulture and Minor crops

There are numerous niche crops that can be grown in a Mediterranean climate, especially in higher rainfall areas or if a little irrigation is available. These include a multitude of summer crops, vegetables, fruits, herbs, medicinal and ornamental plants.

A surprisingly large effort is also devoted to local ornamentals. In contrast, vegetables of similar value, are given little emphasis. This is strange when one considers the potential for out of season export to the Northern hemisphere, perhaps using fruit storage and transport systems out of season. Rustic fruit and vegetables for drier areas like dates, prickly pears, melons, figs and pistachio nuts, various nuts and berries, lesser known fruits like persimmons, pomegranates, shaddocks, loquats and cherimoyas, as well as cold tolerant varieties of subtropical fruits, are also neglected and require more research and promotion.

However, it is often hard to justify the use of limited research resources to work on niche crops that might be highly profitable for just a few farmers. The Western Cape Department of Agriculture has briefly looked at a few examples. One is coriander because there is a good local market for a small area. The crop is also worth growing on a larger scale than most herbs as it can be treated like a winter cereal. Unfortunately, yields are very variable as the crop is intolerant to water logging and drought. Brief research on peppermint, licorice, geraniums and jojoba, has also yielded disappointing results. This is despite some private efforts to grow and promote them commercially.

5.3.5. Local crops

The native flora of the Western Cape is both unique and large because of the many climates and altitudes and the geographic isolation that gives rise to climatic niches. Apart from being a source of numerous well-known ornamentals like Freesias, Gladioli, Leucospermums, Pelargoniums and Proteas, some very interesting crops have also been developed in the region.

Rooibos or red tea (*Aspalathus linearis*) is the best known with over 20 000 hectares grown in dry areas with 200 to 400mm of rain on extremely poor sandy soils. This has been accomplished by a small band of farmers with practically no research inputs. Further expansion is limited by the development of foreign markets. So far these have hardly been touched and a major promotional drive is obviously needed. This is especially relevant as the crop is ideally suited to the large dry arable areas of the Northern Swartland that are becoming marginal for wheat.

A few hundred hectares of several other local crops are grown. These include Buchu (*Agathosma* and *Barosma.*spp.) for essential oils rich in diosphenol and pulegone; the immature flowers of Waterblommetjies (*Aponogeton distachyos*) eaten as a green vegetable; bitter watermelon (*Citrullus lanatus*) grown as a stock feed in some semi-arid areas and *Aloe ferox* for two extracts used by the cosmetic and pharmaceutical industries. Small areas of honeybush tea (*Cyclopia* spp.) have also been planted recently.

Some of these species are gathered on a reasonable scale from the wild as well. This is also the case with *Thamnochortus* spp. for excellent thatch and several escaped Australian *Acacia.*spp. for firewood. Numerous other fruits, roots, spinaches and medicinal plants are collected from the wild on a very small scale for survival and home consumption.

Research is now in progress to expand the areas of these lesser known crops, to induce the rational planting of gathered species and to identify and develop other wild species as new crops for marginal areas. Work on wild species has concentrated on sources of hidden products and chemicals as it was felt that these are the most likely to have been overlooked in the past. A source of a Tung-like drying oil, a wax, a fibre, a rubber latex and raw material for basket making, are amongst the most promising options found to date.

5.4. OTHER ALTERNATIVE USES FOR THE NATURAL RESOURCES

In Chapter 3 it was argued that the population of the earth reached the symbolic six billion mark in 1999 with another billion being added every 12 years. However, this trend of rapid population increase is slowing down and all expectations are that the world population will peak at ± ten billion sometime during the second half of the 21st century. More important is the fact that the population in some developed regions (especially Europe) will start to decline, with the consequent trend of ageing, in the foreseeable future. Another trend with its origin in globalisation, technology and internationalisation is that of a search for identity. It was also argued in Chapter 3 that, due to the specific historical characteristics of agriculture, the demand for *terrior*-based products may increase in the near future. To recap, the term *terrior*-based product refers to a product originating in a region with an outspoken

geographic, cultural, historical and knowledge identity and where that identity is incorporated as a integral part of the product.

This line of reasoning regarding the demand for *terrior*-based products will be continued in Section 5.6. For the moment let the argument focus on a related possibility, that of agri-tourism. Some facts on global tourism[1] (Nowers *et al*, 2000):

(a) Tourism generates between six and 10,9 percent of the gross domestic product of the world.

(b) Tourism represents 7,3 percent of capital investment in the world.

(c) It provides work for approximately 127 million people, or, one out of every 15 economically active people.

(d) Approximately 13 percent of consumer expenditure is on some form of tourism or related activities.

(e) It is expected that the magnitude of the aforementioned data will double by 2005.

(f) It is expected that income from tourism activities will amount to US$ 2 trillion by the year 2020.

It is clear that an opportunity exists for the alternative use of the natural agricultural resources. Based on the work of Dahms (1995: 28 – 29) it was argued in Section 3.3.2.4 that a rural area or a village, to take advantage of these opportunities, must consider the following:

(a) The location, including the physical infrastructure.

(b) The environment and what it has to offer in terms of natural amenities and *terrior*.

(c) Entrepreneurial inputs.

It is clear that there are currently still more questions than answers regarding agri-tourism as a potential alternative use for the natural resource. These questions can be encompassed in a number of broad categories amongst which the following is pertinent:

(a) What is the specific nature of the demand for agri-tourism activities?

(b) What is the specific nature of the supply of agri-tourism activities in the Western Cape?

(c) What is the specific nature of the potential supply of agri-tourism activities in the Western Cape?

---

[1] *It can be expected that tourism and thus agri-tourism must be highly income elastic. As per capita incomes in South Africa keeps falling, this may create certain problems for the agri-tourism industry unless foreign tourists can be attracted effectively. However, this is a new issue that should be investigated in a separate research project.*

(d) What are the main factors (institutional, organisational, bureaucratic and personal) limiting the growth of agri-tourism activities in the Western Cape?

(e) What is the nature and extent of a strategy, and who are the role-players to be involved in that strategy, that will lead to the development of a vibrant agri-tourism industry in the Western Cape?

It is obvious that a research project of this nature cannot be conducted as part of this dissertation. However, it is equally clear that answers to the above mentioned questions are urgently needed.

The second possibility related to *terroir-* based products flows from a combination of the previous line of reasoning with the arguments presented in Section 3.3.3. If the notion presented in Table 3.8, that the number of lifestyle farms in an information society will increase, is accepted, then the question that arises is what the possibilities and implications are for the Western Cape. It has been reasoned that the people living on these lifestyle farms are usually professional people and thus of the higher income groups. The result is that the levels of rural income would probably increase. However, it is necessary that efficient rural infrastructure[1] exists for this "counter-urbanised" section of society to make rural areas their permanent residence. If not, they will probably have the characteristics of weekend farmers. It can also be maintained that the people moving to the rural areas will not necessarily be citizens of the Western Cape, but could also migrate from other areas of the country, or even from abroad. Observation suggests that this is currently happening in certain parts of the Western Cape – for instance in the Stellenbosch and Paarl regions. A number of questions arise from this discussion. These include:

(a) What is the specific nature of the demand for lifestyle farms?

(b) What is the current trend regarding lifestyle farming in the Western Cape?

(c) What does the Western Cape has to offer, especially in the outlying regions, for people interested in lifestyle farming?

(d) What is the main constraints currently being experienced by counter-urbanised people?

(e) What can be done to remove these constraints?

(f) What are the social, political and economic implications of such actions?

---

[1] *In the term infrastructure is included physical infrastructure such as roads, telecommunications and railways. Also included is social infrastructure such as schools, hospitals and general amenities. Almost the most important part of infrastructure is the condition of the natural environment.*

As was the case with agri-tourism, the answers on these questions form a research project on their own and cannot be fully investigated as part of this dissertation.

5.5. WHEAT IS NOT ONLY WHEAT

It was argued in Section 5.2 that one supply-side option in managing the problem of asset fixity is to develop alternatives that can be produced with similar capital artefacts as is the case with wheat. Of course, it is no use to produce a product for which there is no market. The objective of this section will then be to investigate a number of these options. This investigation will not only focus on the supply side, but will rely heavily on demand side issues.

5.5.1. Durum wheat

The first option to be investigated is that of pasta produced from durum wheat. Although durum wheat (*Triticum durum*) is generally accepted as the most favourable form of wheat for the making of pasta, normal bread wheat (*Triticum vulgare*) can also be used for this purpose. The most important reason why durum is preferred follows from the fact that durum is the hardest type of wheat available and the fact that durum traditionally contains a higher protein content. The result is that the durum product shows a relatively higher level of stability and is less inclined to disintegrate when it is boiled. In addition it is less prone to sag if it is left after boiling or when it is preserved.

According to Walsh and Gilles (1974) a minimum protein content of 11 percent is necessary for the preparation of high quality pasta and pasta products. This relatively higher protein content of durum wheat can be ascribed to the fact that it originated in the dryer parts of the Mediterranean regions of the world. This resulted in lower yields and thus higher protein levels. However, research indicates that similar protein levels are achieved if durum and bread wheat are cultivated under comparable conditions (Irvine, 1971).

As wheat and durum both compete for similar resources and due to the fact that these products are to a certain extent substitutes for each other on the demand side, it can be

expected that a close correlation between the prices of these two products should exist. This expectation is confirmed by the data in Figure 5. 1 in which the relationship between the prices of comparable grades of wheat and durum in Canada are represented. Due to the volume of production of both types of wheat in Canada data from this country is used.
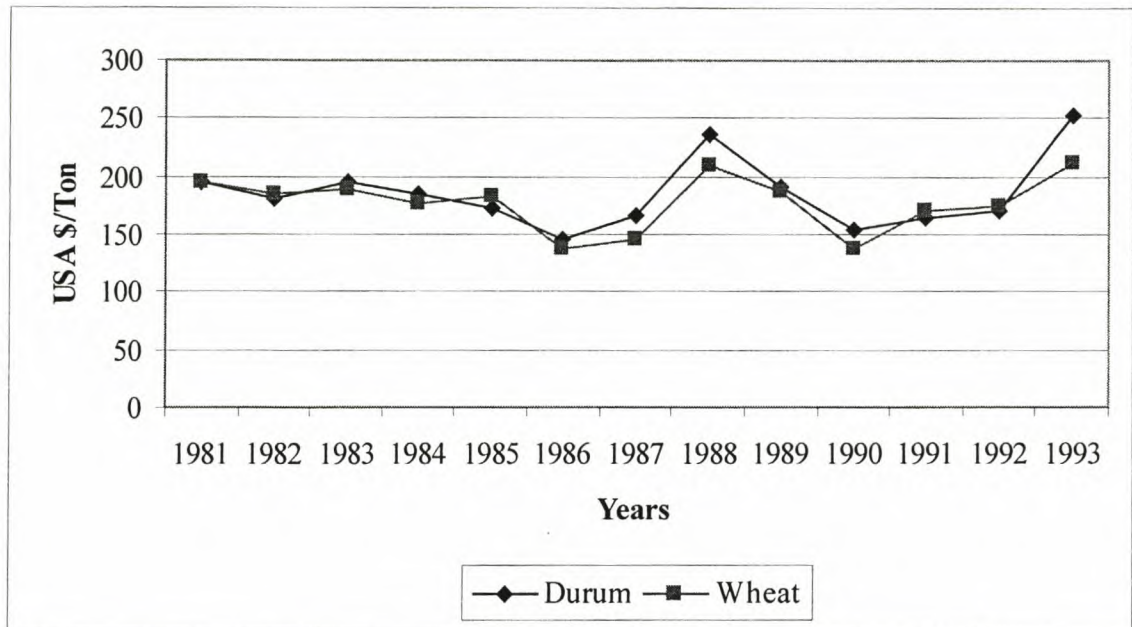
Figure 5. 1: The relationship between the price of durum wheat (FOB No1 CW Amber Durum St. Lawrence) and wheat (FOB No1 CWR St. Lawrence in Canada.

Source: IWC (1994) and IWC (1991).

The free on board (FOB) price of No1 CW Amber Durum at the St Lawrence sea route is used as reference price for durum. In the case of wheat the FOB price of No1 CWR wheat (13,5%) at the same location was used as reference. The first-glance close relationship between the prices of these two products is corroborated by the correlation of 88 percent between the two over the period 1981 to 1993. Over the same period the average price of durum was US$ 181 per ton compared to the US$ 177 for wheat, indicating a slight margin for in the favour of the former.

What is not apparent at first glance is the higher levels of volatility of the durum prices. Over the period under discussion a standard deviation (σ) of US$ 29 was

found for durum compared to the US$ 23 for wheat. The coefficient of variation is respectively 15,8 and 13,2 percent (calculated from IWC, 1994 and IWC, 1991).

This higher level of volatility is supported by the information contained in Figure 5. 2 in which the production and area of world production are presented. The price parameters used in this instance is the FOB price of No1 CW amber durum and the No3 hard amber durum in the lakes area of the USA. From a production perspective the volatility of the global volume produced is indicated by the coefficient of variation of 11,9 percent over the period 1981 to 1994 compared to the 6,6 percent for wheat.
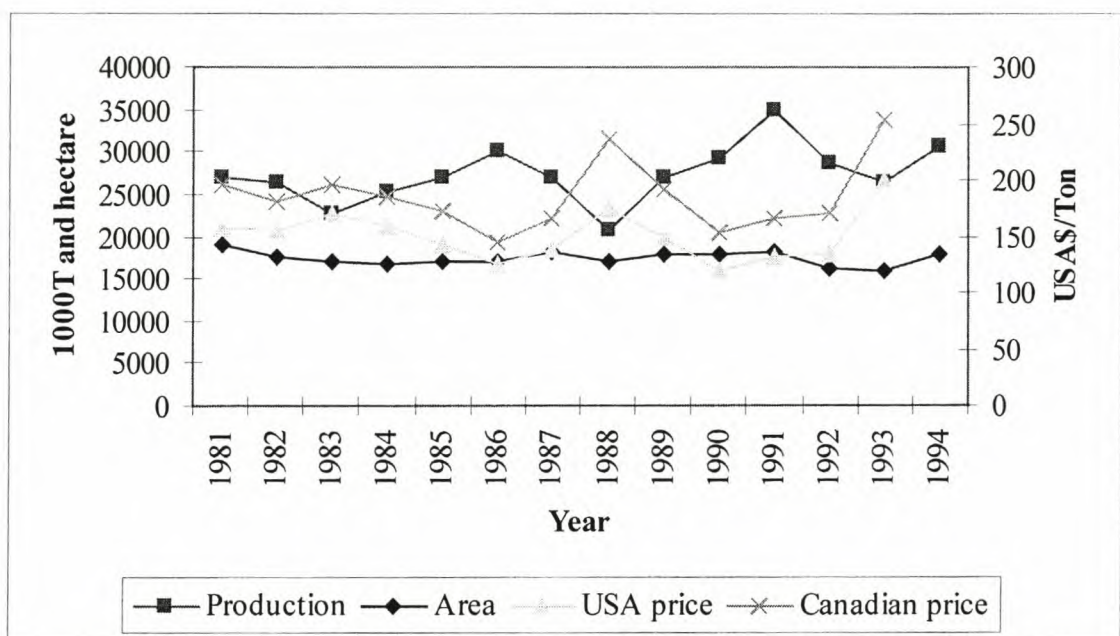
Figure 5. 2: World trends in the production of durum wheat

Source: IWC (1994) and IWC (1991).

The same trend is apparent regarding the global areas under production. Changes in the global area used for durum production show an coefficient of variation of 4,8 percent compared to the 3,4 percent of wheat (calculated from IWC, 1994 and IWC, 1991). It follows that any party interested in the production or usage of durum wheat must do so with a clear recognition that the prices, volumes and stocks of durum are prone to more rapid changes than is the case with normal wheat. Some form of hedging or risk transference is thus a prerequisite.

Turning from supply to consumption. As could be expected Italy (29 kg/capita/year) is the country with the highest level of consumption of pasta and pasta products. Second on the list is a group of countries consisting of Argentine, Libya and Switzerland with ±12 kg/capita/year and Chile, Tunisia and Venezuela with ±10 kg/capita/year. South Africa, together with the UK and Norway, shows a relatively low level of consumption at 0,5 kg/capita/year (Irvine, 1971). Table 5. 1 gives an indication of the distribution of this demand in South Africa between the different population groups. The white section of the community, as could be expected, shows the highest levels of consumption for pasta. However, the income elasticity of demand for pasta amongst this group is relatively inelastic which is a clear indication that pasta is not considered as a luxury product. Economic growth in this sector of the community would therefore not lead to any significant increase in the demand for pasta products.

Table 5. 1:   Some elements of the demand for pasta in South Africa

ELEMENT	POPULATION GROUP				
	White	Brown	Asian	Urban black	Rural black
Per capita consumption (R/a)	8,91	2,03	0,70	0,58	0,23
Income elasticity of demand	0,30	0,63	0,83	1,99	0,59

Source: Kleynhans & Liebenberg (1994)

The black section of the community show an interesting difference between the urban and the rural population. Although the per capita consumption of pasta for both the urban and rural population is currently relatively low, the black urban section show a relatively high income elasticity of demand (1,99) for pasta and its products. Given the government objectives of economic growth and redistribution as well as the process of urbanisation (see Section 3.3.2.4) it could be expected that the demand for pasta and pasta products may increase rapidly in the next decade or two. Kleynhans and Liebenberg (1994), who found that the demand for pasta could increase by 383 percent over the period 1993 to 2010 if an economic growth rate of five percent is achieved in the South African economy, corroborate this expectation.

In South Africa the production of durum wheat has met with mixed success. The data in Table 5. 2 indicates that South Africa is for all practical purposes a net importer of durum wheat. It is also clear that the domestic production of durum is prone to considerable levels of fluctuation. Marais (1998) ascribes this fluctuation to a number of reasons. The first is that in the previously regulated environment the production of durum was only allowed in certain isolated regions, for instance along the banks of the Great Fish River. As it was considered good practice for these regions to be isolated, they were often situated in the dryer parts of the country. It follows that durum was cultivated under irrigation and, other than in the more recognised rain fed grain producing areas of South Africa, farmers experienced a high opportunity cost for the production of durum.

Table 5. 2: Volumes produced, imports and producer prices of durum wheat in South Africa

YEAR	PRODUCTION	IMPORTS	PRICE[1] (R/T)	
	Tons		Nominal	Real
1987	3 198	6 500	438,50	1 107,32
1988	29 662	-	398,00	890,38
1989	5 454	-	470,00	916,18
1990	16 747	6 050	570,45	973,46
1991	777	22 101	620,76	918,28
1992	631	21 500	713,09	926,09
1993	-	35 794	752,79	890,88
1994	126	27 768	754,90	820,54
1995	-	24 928	786,62	786,62
1996	-	36 363	894,26	832,64

Source: SAGIS (1998)

[1]   Net producer price for grade D1 durum wheat

A second limiting factor can be found in the lack of appropriate cultivars. Although good progress was made in developing durum cultivars for cultivation under irrigation, to date no programme has focussed on the development of cultivars for rain fed cultivation. Yet, because the natural origin of durum was in the more arid regions of

North Africa and Southern Europe, it could be expected that by using the correct programmes a relatively drought resistant durum cultivar could be selected. This could be good news for drought prone areas such as the Southern Cape. Irvine (1971) supports this line of reasoning by mentioning that durum is currently better adapted to Mediterranean conditions than is the case with wheat for bread. A third limiting factor flows from the preference that local manufacturers of pasta shows towards imported durum. Apparently this preference has got little to do with the quality of domestically produced durum, but is rather a reaction to the inconsistency of domestic supply.

It is important to note that the durum cultivars that have been evaluated under South African conditions have shown a remarkable resistance against rust. It can be deduced that, although farmers producing durum in South Africa may experience higher levels of price risk, this may be offset by lower levels of production risk. A source of concern is that despite the fact that considerable amounts of plasma is available in South Africa the funds for durum breeding in South Africa have slowed to a trickle. If this situation is not resolved soon valuable local knowledge and capacity may be lost in the process. A possible solution will be discussed in Section 5.7.

Pasta, and the different forms of the final pasta products, is not a difficult product to make. It can even be manufactured by a home industry. This is especially valid if the production of pasta is combined with other local products from the Western Cape. An opportunity that definitely has merits is that of organically grown durum. The rationale behind this statement has been discussed in Section 3.3.2.5.

It is possible to provide numerous examples and designs for the production of pasta and pasta products. Manzini (1987) and Papotto (1987) provide guides for the production of pasta and pre-cooked lasagne respectively. The running costs of these plants varies between R0,97 and R1,20 per kilogram of the pasta product produced.

5.5.2. Wheat for biscuits

Another option that could be considered is the production of white wheat. This is a soft wheat that is mainly used in flour for biscuits. Currently in South Africa wheat for bread is normally used for this purpose with the result that a niche for development

does exist. Counting in the favour of the Western Cape wheat industry is the requirements of low protein content and poor water absorption qualities necessary for high quality biscuit flour. However, the industry lacks appropriate cultivars and those that do exist show poor resistance against rust. This lack of appropriate cultivars is a direct result of the emphasis placed on the supply of bread in the previous marketing regime (Marais, 1998).

The relationship between the price movements of white wheat and comparable bread wheat at the Pacific coast of the USA is graphically represented in Figure 5. 3.
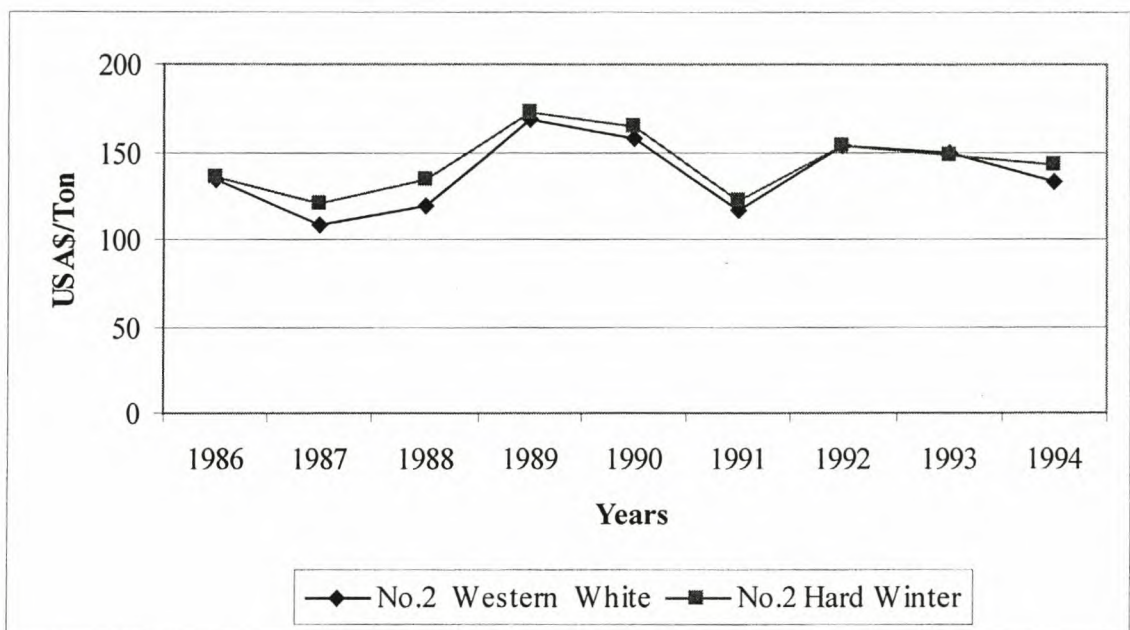
Figure 5. 3: The relationship between white wheat (FOB No2 Western White Pacific) and wheat (FOB No2 Hard Winter 13% Pacific) in the USA

Source: IWC (1994)

As was the case with durum, wheat and white wheat both compete for similar resources and are to a certain extent substitutes for each other. The high correlation of 96 percent between the prices of these two products is therefore no surprise. Although the average price (US$ 142) over the period of 1985 to 1994 of white wheat was lower than that of comparable wheat (US$ 153) over the same period, white wheat has shown a higher level of price stability. The standard deviation in the price of white wheat over this period was US$ 18 per ton compared to the US$ 20 per ton for wheat.

The coefficient of variation is respectively 12,9 and 13,2 (Calculated from IWC, 1994).

Some elements of the demand for cakes and biscuits in South Africa are presented in Table 5. 3. As could be expected the white section of the population show the highest consumption and, with the exception of the rural black population, the lowest income elasticity of demand for cakes and biscuits. The same argument presented in Section 5.5.1 is also applicable in this instance. As economic growth, redistribution and urbanisation increases, the demand for cakes and biscuits in South Africa will increase. Kleynhans and Liebenberg (1994) found that the demand for cakes and biscuits could increase by 405 percent over the period 1993 to 2010 if the economy grows at five percent per year.

Table 5. 3: Some elements of the demand for cakes and biscuits in South Africa

ELEMENT	POPULATION GROUP				
	White	Brown	Asian	Urban black	Rural black
Per capita consumption (R/a)	27,28	3,60	16,02	1,74	0,91
Income elasticity of demand	0,78	1,00	0,96	1,98	0,73

Source: Kleynhans & Liebenberg (1994)

Despite the problems identified, the lower protein requirements combined with the higher levels of price stability results in the production of white wheat being a deserving option to be considered. In this instance the production of organically certified white wheat may also be an additional option to consider.

5.5.3. Grains for use in animal feeds

With the exception of a small part of the South-Eastern corner of the Western Cape Province, very little maize is produced in the Province. The result is that the Province annually "imports" a considerable amount of maize from the rest of the country and even from abroad. As was argued in Chapter 1, the Western Cape exports a large part of its wheat to the rest of South Africa at R180 per ton railage. It is now clear that the

Province also imports a large amount of maize, also at R180 per ton railage. The possibility of a feed grain industry for the Western Cape was reported in ELOI (1993), which will form the basis for the discussion in this section.

The annual demand for feed concentrates in the Western Cape is approximately 790 000 tons (Meadow, 1993). Due to a number of reasons small grains cannot replace maize in total in the rations of animals. The rate of inclusion depends on the specific species for which the ration is formulated as well as the specific type of small grain. However, conservatively calculated, this potential demand is still significant at 470 500 tons of wheat, 223 000 tons of barley or 220 500 tons of triticale (ELOI, 1993: 2 – 4).

It must be remembered that the consumers of feed grains (indirectly millers and finally livestock farmers) will only use locally produced feed grains if it is more cost effective than maize. A significant amount of feed-grade wheat and barley is produced in the Province annually, usually as a result of adverse weather conditions. If follows that the price of intentionally produced feed grain will find an equilibrium somewhere between that of feed grade grain and the local price of maize.

The opposite side of the coin is that producers will only produce feed grain if it is financially profitable for them. Or, in other words, the risk-adjusted gross margin of feed grain production should be equal to or higher than that of traditional grain. If it is further assumed that the production of feed grain should not be a third-rate activity but rather a form of specialty, then it can also be assumed that the cost of feed grain production will be comparable to that of traditional grains. It follows that the only way in which comparable gross margins will be achieved, and farmers will consider the production of feed grains, are if the yield of feed grains is considerably higher than in the case of traditional grains.

At the time when the report was written Sensako was in the process of evaluating a very promising wheat cultivar by the name of Alpha. Due to the fact that Alpha could not be morphologically distinguished from Adam Tas and Nantes (two common wheat cultivars used for the production of traditional wheat), and because of the very poor baking qualities of Alpha, Sensako was requested to incorporate a colour-gene in

Alpha. The result would be that Alpha could not by accident (or by intent) be presented as Adam Tas or Nantes.

.

From a risk perspective the production of feed grains will probably also hold certain advantages for the producer. First, the risk for the producer that his product will be downgraded to feed-grade grain if unfavourable weather conditions occur during harvest time is smaller. Second, it seems as if a cultivar such as Alpha has a very high level of tolerance against eyespot and *septoria tritici* as well as *septoria nodorum*. This could lower the risk and, accordingly the production costs of feed grains.

It is clear that considerable opportunities exist for the production of feed grains in the Western Cape if the right cultivars can be released.

5.6. INFORMATION AS VALUE ADDING TO FARM PRODUCTS

It is clear from the discussion in Section 5.2 that product differentiation, and therefore changing the price elasticity of demand, is one of the solutions to the numerous problems that are facing agriculture.

In this regard, the relationship between the income elasticity of demand and the quantity of a product consumed needs to be kept in mind. From the homogeneity condition (see Equation 2.1), which states that the sum of the own price, cross-price and income elasticities of demand for a particular commodity is equal to zero, it can be derived that income elastic products tend to be price elastic. These products tend to be classified as so-called luxury products. Normally the income elasticity of demand is measured as the average for a specific product while ignoring the wide variety in quality and therefore prices within the product group. An increase in income within a population would normally lead to a more than proportionate increase in expenditure on higher quality products. Within a product group the income elasticity of demand therefore tends to be higher for the higher quality or differentiated part of the group than for the bulk or so-called commodity part of the group. For this reason economists sometimes make a distinction between the income elasticity of demand and the expenditure elasticity of demand. For a theoretical discussion of this concept see Ritson (1982). A clear indication of the impact of product differentiation on the quantity of products demanded can be found in Kleynhans and Liebenberg (1994).

But then, given the composition of the Western Cape society, what is the possible effect of product differentiation on the affordability and availability of food to the poor in society? It is clear from the discussion thus far that a part of the solution to the problems facing Western Cape agriculture lies in price stability and improved quality characteristics of agricultural products. What then of food security? The answer to this question is twofold. In the first instance it must be kept in mind that in all probability only a fraction of the produce of the Province can be differentiated through the proposed means. As, with the exception of beef, the Province is a net exporter of most of the agricultural products produced locally the net effect on food security will be zero. Second it could be argued that any region or Province that exports high value and value added agricultural products while importing cheap agricultural commodities is fortunate. Furthermore, the positive social effects for the Western Cape of an increase in the final demand for high value agricultural products can be clearly deduced from the analysis in Sections 4.4.1 and 4.4.2.

The question that now remains is how does one differentiate a product from the bulk of similar products? This question is especially relevant in circumstances where the product is perceived to be of low value and high bulk as in the case of most agricultural products. One possible solution is by adding information to the product.

It has been argued in Section 3.3.2 that, at the dawn of the information society, factors such as globalisation, technological developments and demographic changes result in a quest for identity amongst a significant part of the population of the information societies of the world. This reveals itself in various forms, amongst which are counter-urbanisation and an increased demand for *terroir*-based products. *Terroir*-based products represent an outspoken geographic, cultural, historical and knowledge identity and thus can potentially act as a symbol, a sign of communion, a marker of class and as an emblem. In supporting the development of *terroir*-based agricultural products it is not only all these facets that should be included, but also the assurance that traditional and technology-risk free (read GMO-free) products are supplied to consumers. However, it will be argued that a successful strategy requires that the Province should provide a system of "guarantees". First, so that the consumer will have confidence in such a system. Second, because private-sector provisions can lead to confusion amongst consumers. Finally, it is necessary to provide quality assurances to consumers. This role of the Provincial Government will be discussed in more detail in Section 5.6.3.

Before turning to examples and developing a specific framework for the Western Cape, it is necessary to investigate the relationships between *terrior*-based products and the concept of an African Renaissance.

5.6.1. From a farm problem to an African Renaissance

What has the farm problem, or rather the solution to the farm problem, got to do with the African Renaissance? In answering this question it is necessary to first determine what an African Renaissance means.

The European renaissance was a period of enlightenment; a reawakening of thought and consciousness, an enlightenment in the broadest sense of the word that included science, culture, art, politics and the general activities and freedoms of individuals. It is foreseen that the African Renaissance will follow the same route of reawakening of African thought and awareness, an awareness of the culture of Africa, it's history, art and science (Makgoba, 1999).

But who or what is African? When President Thabo Mbeki said, "I am an African" at his inauguration, it was not a meaningless statement. According to Makgoba *et al* (1999: 4) "very few … understood the foresight, the richness, the depth, the challenges and the impact encapsulated in these four words". The Australians, Israelis, British and Germans are debating the same question relating their respective identity. The chief advisor on school cirriculum in Great Britain, Nick Tate, even goes so far as to advocate "teaching Britishness in schools" (Makgoba *et al*, 1999:5).

In answering the question on who or what is an African, Kwaa Prah (1999: 38 – 42) puts heavy emphasis on the cultural definition of whom is African. At the same time he acknowledges that the African identity is not a closed phenomenon, but is continuously open to "diffusion, infusion and mixing". He also emphasises that "… the racial definition of an African has little meaning or value…". Makgoba (1999: 3) supports this inclusive definition that is consistent with the vision of a nonracial South Africa. Therefore, it is in this light that Thabo Mbeki proclaimed " I owe my being to the Khoi and the San … . I am formed of the migrants who left Europe to find a new home in our native land. … In my veins courses the blood of the Malay slaves who

came from the East. ... I am the grandchild of (the people of) ... Hintsha and Sekhukhune ... Cetshwayo and Mphephu ... Moshoeshoe and Ngungunyane... I come of those who were transported from India and China, ... Being part of all these people, and in the knowledge that none dare contest that assertion I shall claim that I am an African." (Mbeki, 1998: 31 – 32).

What is culture? Makgoba (1999: 3 – 4) cites Amilcar Cabral as saying that "(c)ulture is an essential element of the history of people. Culture is the product of history just as the flower is the product of a plant...." Makgoba continues by stating that "...(c)ulture in simple terms is everything that human beings make. It is what makes us human..." and "(c)ulture is determined by the environment, Africa in our case..."

What is more part of our history, what is more part of that which makes us human and distinguishes us from other cultures than the food that is eaten? Food has always been an important part of socialising in Africa, part of cultural activities[1]. Part of being human. From "boerewors" and "sosaties" at family meetings and "bobotie" and "geelrys" at funerals in the Afrikaner communities, "bokkoms" and snoek along the West Coast, the "briyani" and "akni" at weddings and the "sadaqu" at "boekah" during the "Ramadaan" in the Muslim community, to the slaughtering of cattle at the "ukubuyiswa" of an ancestor, the white goat at "bayatshayelelwa" and the "shwama" and "umvubo" at the initiation of a Xhosa boy, all are part of our humanity, our being from the continent of Africa.

South Africa seeks five broad policy objectives under the heading of an African renaissance (Stremlau, 1999: 102 – 103):

(a) The economic recovery of Africa.

(b) The establishment of political democracy throughout Africa.

(c) The end of neo-colonial relations between Africa and the world's economic powers.

(d) The mobilisation of the people of Africa to take their destiny into their own hands.

(e) Fast development of people-driven and people-centred economic growth and development.

---

[1] *See also the discussion in Section 3.3.2.5 on the relationship between food and identity.*

It is then in this context that terrior-based products can contribute to the move towards an African renaissance. As food is such an important part of historical and cultural heritage, the identification and promotion of specific products will contribute towards the reawakening of African thought and the awareness of cultural heritage. In other words, it will contribute to the mobilisation of the people of Africa to take their destiny into their own hands. Do not forget that the inclusive definition of what is African includes those Africans that were moved to other continents during their diaspora. Amongst those a thirst for their cultural heritage exists. This is a ready opportunity for binding those individuals into the vision of an African renaissance.

In addition it is foreseen that these products are usually grown by people with the knowledge of traditional production practices – those people in the rural areas. This will not only contribute to the economic recovery of those areas, but also to people-centred economic growth.

It is clear from this discussion that there is a direct correlation between the development of a system of *terrior*-based products and the achievement of the objectives of an African renaissance. Solving the farm problem through this means will also contribute towards a wider objective of the Government.

5.6.2. Examples of comparable systems

In South Africa and abroad the most well known example of a system of *terrior*-based products can be found in the wine industry. South Africans are well aware of the way that vintage, cultivars and regions of production in the wine industry are certified. With the rapid increase in the demand for natural wine in South Africa from 1940 to 1970, the interest in the vintage, cultivar and region of origin of the wine also increased. The government reacted to this demand by amending Act 25 of 1957 with Act 62 of 1972 in order to make provision for a system of certification. Various amendments and regulations followed the initial Act to make provision for extensions in the system. The first wines of origin were produced in 1973. Currently the effectiveness of the system is clear from the fact that the median of the prices of cultivar-certified wine is in the R200 – R250 per case price bracket compared to the less than R80 per case price bracket for uncertified wine (KWV, 1998: 18). For a

concise description of the South African wine of origin system see Burger and Saayman (1981: 496 – 513).

As the wine of origin system is well established in South Africa, and the advantages thereof are taken without serious debate, it is strange that a similar system has not been developed for other agricultural products. In the European Union (EU) a comparable system to that in the wine industry was developed for other agricultural products during the early '90's. In 1992 Council Regulations (EEC) No 2081/92 (EC, 1992a) and No 2082/92 (EC, 1992b) were accepted. According to EC (1998a) and EC (1998b) a total of 480 different products were registered through this framework by 1998. Products from France (20,8%) were the most prominent while Italy (19,8% of the products), Portugal (15,2%) and Greece (14,8%) are not far behind. In terms of different classes of products, producers of cheese took the most advantage of the system (28,3% of the products), followed by natural mineral and spring water (19,6%), fresh meat (15,5%) and fruit, vegetables and cereals (11,3%). Other products include essential oils, ciders and beers.

It is, however, important to note that a system will only be successful if the consumer perceives that the system provides valuable information. In a recent survey of European consumers conducted by the European Commission (EC, 1995) it was found that:
(a) The first things people generally look at when buying foodstuffs are:
  ➢ The product's appearance.
  ➢ The price of the product.
  ➢ The brand.
  ➢ The region or country of production/processing.
  ➢ A quality label.
(b) 76 Percent of European consumers choose food produced using traditional methods.
(c) Almost one out of two Europeans would have greater confidence in products if the European Union certified their origin or traditional means of production.

The system developed by the European Union makes provision for three classes of products, namely:

(a) *Protected Designation of Origin* (PDO). This term is used to describe foodstuffs that are produced, processed and prepared in a given geographical area using recognised know-how. In some regions, for example, cheese produced in a specific region with milk from a local herd could benefit from this label.

(b) *Protected Geographical Indication* (PGI). In this case the geographical link must occur in at least one of the stages of production, processing or preparation. In some regions, for example, meat products such as ham and sausages with a recognised reputation and prepared in a precise geographical zone according to local methods would fall into this category.

(c) *Certificate of Specific Character* (CSC or TSG). A product covered by this category can claim to be "Traditionally Speciality Guaranteed (TSG). This does not refer to the origin of the product, but rather to the traditional character of the product. Traditional character can be defined as either referring to composition or to means of production. An example is pastries prepared according to traditional methods.

Of the 480 products currently certified through this system in the European Union, 65 percent carries the PDO label, 34,4 percent the PGI label and 0,6 percent the TSG label (EC, 1998a and EC, 1998b). A communication campaign is currently under way to encourage producers and processors in the European Union to use these systems. At the same time a campaign has been launched to inform the 373 million consumers in the EU of the system and its advantages.

5.6.3. The potential role of the Government of the Western Cape Province

The Provincial Government can play a multiplicity of roles in enhancing the value of local agricultural produce. These roles can vary from regulating, through product promotion to creating a favourable facilitating framework. De Tavernier (2000: 7 – 8) argues that government can either follow a paternalistic or an autonomously directed approach. In the first the government argues that the consumer does not understand all the issues involved and has to be protected against his or her lack of knowledge. The second approach acknowledges that the consumer does have a choice. It follows that,

in conjunction with "negative" standards (minimum health requirements, labels of content), a positive approach can also be followed. This positive approach can consist of labels with additional information on the origin of a process or on specific production processes. The result is that the consumer can make a more informed choice. However, it is important that the consumer has confidence in the information on the label and considers that the information describes the value of the product. It follows that generic claims such as "grandma's recipe", "natural", "genuine" or "pure" will have no value if it is not substantiated in some way or evaluated against some norm. In a liberalised global trade environment the positive approach is probably the most appropriate for the Western Cape given the limitations on the Provincial Government.

It is important to note that an appropriate framework must adhere to the following principles. Based on the European example and the local "wine of origin" system it must be:

(a) Empowering and voluntary by nature. In a modern economy various institutions are available for producers and consumers to differentiate products. If this framework is not voluntary by nature producers will be forced to use only one institution. This will limit consumer choice and constrain the economy.

(b) Not exclusive, but must be open to any individual who wish to join[1]. If this principle is not adhered to, then the current system of patents and trademarks can fulfil the same role and a new system is not required. The reason why this is necessary will be discussed below.

(c) Protective of traditional specialities and unique Western Cape agricultural products against imitations, both locally and abroad. It has been argued in Section 3.3.2 that a market is developing for traditional specialities and unique *terroir* based products. Imitations of these products will not only erode consumer trust, but also erode the potential price premium.

(d) Fiscally neutral, i.e. it may not be a liability to the limited Provincial Treasury. As a result of the analysis in Section 4.3 it is clear that the chances are slim that

---

[1] *Important to note that non-exclusivity in this context does not imply no barriers to entry. Without any barriers of entry the uniqueness and specific characteristics of the product cannot be protected. It is proposed that quality controls, certain specified production practices, geographic location and even an annual and/or once-off membership fee will act as barriers of entrance. What non-exclusivity does mean is that any producer who complies with all these principles has the right to use the framework.*

the Treasury of the Western Cape Province can be moved to allocate additional funds for the implementation of this framework.

(e) Credible in a global context. As was shown by the example of the wine industry premiums on certified wine can only be realised if the local framework is internationally recognised.

(f) In line with similar systems abroad to ensure the maximum global recognition. The same argument as in (e) is applicable as well as the discussion below.

A question that may arise is why a new legislative framework is needed? Can the existing system of trademarks and patents combined with international agreements on intellectual property, such as TRIPS (Agreement on Trade-Related Aspects of Intellectual Property Rights) not fulfil the same purpose?

In order to register a patent it is necessary to prove that the article, process or concept to be registered:

(a) is unique;

(b) is not an imitation of another product, process or concept; and

(c) has not yet been manufactured, conceptualised or patented either locally or abroad.

It is therefore not possible to patent any local traditional specialities or unique Western Cape products. The registration of a trademark on the other hand is *per sé* an exclusive process and would not protect the uniqueness of local products against cheap imitations, albeit associated with a different trademark. It is therefore necessary to develop a tailor made system for the purpose at hand.

A potential problem that can be foreseen is one similar to the "horizon problem". According to Cook (2000) the horizon problem is generated when the residual claim on the net income generated by an asset is shorter than the productive life of that asset. It can be argued that a *terroir* product can be seen as an asset with a productive life longer than the economically active life of an individual producer. This, combined with the free-riding aspect of late entrants, can discourage producer investment in the establishment of *terroir* products. Indeed, Mendes (2000) reports that in France producers without heirs generally avoid the production of products (other than wine)

with specific geographic indications. However, practical experience shows that the benefits at producer level from the development of such a framework can be higher than the costs (including opportunity cost, transaction cost and perceived free rider cost). This is clearly the case in the wine of origin system as well as the very popular wine routes in the Western Cape. The latter is an example of a voluntary and non-exclusive partnership started by three producers that grew to 12 wine-routes (with, on average, 19 members each) in the Western Cape alone (see Nowers *et al*, 2000 for a detailed description of the dynamics of the Wine-routes of the Western Cape Province).

What the framework proposes to do is to lower the transaction costs associated with the establishment of *terroir*-based products through pre-empting legal action. Under the current system of trademarks it can be quite expensive in terms of time, money and damage to consumer perceptions to protect the uniqueness of a *terroir*-based product through legal action. According to De Sotho (2000) the lowering of transaction costs associated with assets through the development of pre-empting frameworks is one of the main differences between the institutions of developed and developing countries.

One possible misconception that needs to be removed is the role of the proposed framework in tariff negotiations. The proposed framework will not enable the Provincial Government to negotiate favourable tariffs for certain agricultural products. International trade negotiations, and therefore the negotiation of international import tariffs is, according to the Constitution (Act 108 of 1996), the sole prerogative of the National Government of South Africa. The Provincial Government can however create a favourable framework through which local producers and processors can take advantage of certain lower tariff levels for certain classes of products. For this to succeed the framework must receive international recognition.

A number of advantages flow from a system that is internationally recognised. The first is the fact, already mentioned, that certain products may qualify for lower import tariffs[1]. The second is that the appropriate European Union legislation makes

---

[1] *It was argued in Section 2.4, and supported by the analysis in Section 4.3.2, that one of the main variables determining the level of protection of farm products is the rural-urban income gap. As terrior-based products are usually of high value, the producers of such products would in all probability receive relatively less*

provision for products of origin from third countries. This would ensure that local products, consistent with a similar framework, would receive a premium on European markets. In the third instance the EU is currently launching a publicity campaign to inform their consumers of the characteristics and advantages of their system. The need for local producers and processors to launch expensive advertising campaigns will be limited. The opportunity therefore exists to "piggy-back" on the EU effort.

5.6.4. Salient aspects of the proposed legislative framework

If it is accepted that the Provincial Government does have a role to play in support of *terrior*-based products and that such a role is regulatory by nature, then it must be accepted that legislation is called for. At the basis in developing the legislation the relevant EU legislation (EC, 1992a and EC, 1992b) could serve as point of departure. In addition the legislative framework governing the wine of origin system in South Africa and abroad must be considered.

It is also apparent that a substantial market is developing for so-called organically produced or animal friendly products. Although the main emphasis is placed on *terrior*-based products, it will probably be wise to incorporate in the framework a system for the certification of organically produced products.

As there is a wide difference between the requirements for products where the specific region contributes to its unique characteristics, products with a specific traditional characteristic and biologically produced products, three separate Acts are proposed. In addition a fourth Act, regulating the establishment of an independent supervisory body is also necessary. While it is indicated in Table 5. 4 that there are certain joint principles to which they must adhere, the main differences between these laws are:

(a) The proposed legislation should be empowering by nature.

(b) The proposed legislation should not be exclusive, but inclusive. At the basis of this concept is the provision that only groups can apply for registration and any person is free to join the group.

---

support in the form of import protection. It follows that terrior-*based export products could receive certain advantages in this regard.*

(c) In order to limit the drain on the Provincial Treasury, the user-pays concept must be included.

(d) It is, however, apparent that an initial outlay will be required from the Provincial Treasury for the establishment of the framework.

(e) The establishment of an independent Board that will receive, evaluate and accept or reject applications and safeguard the process is necessary.

(f) The infrastructure of the Chief Directorate of Agriculture must support the Board in these processes. This will remove the risk of "ivory-tower building".

(g) A product specification must be prepared. This specification must include *inter alia* a description, quality standards, details of inspection structures and specific labelling requirements.

(h) Provision must be made for public participation through publication in the Provincial Gazette.

(i) Provision must be made for a right of appeal and the grounds on which an appeal may be lodged.

(j) Provision must be made for a register to be kept and certain information to be provided.

(k) Provision will have to be made for an inspection service to ensure quality standards for the participating products.

(l) In order to facilitate international and interprovincial trade, and to remain within the requirements of the Constitution of the RSA (Act 108 of 1996), provision must be made for products from outside the borders of the Province.

(m) Registered names must be protected.

(n) Certain aspects could be dealt with by regulation.

The characteristics of the framework as identified in this section have already been developed into Draft Bills and these have been published for public comment (see WP, 2000a; WP, 2000b; WP2000c; WP2000d). Although some of the technicalities may change, the most important parts of the legislative framework will probably hold true. Although not unanimous, considerable support and enthusiasm has been received from stakeholders in the agricultural community.

Table 5. 4:   The main differences between the three proposed Draft Bills

PRODUCTS OF ORIGIN	PRODUCTS OF SPECIFIC CHARACTER	ORGANICALLY PRODUCED PRODUCTS
Names may not be generic.	Names may be generic.	Names may be generic.
A clear link to a specific and demarcated region for the whole process (PDO) or a part of the process (PGI).	No geographical link necessary.	No geographical link necessary.
Orders are being made.	Certificates are issued.	Certificates are issued.
Organic production process not required.	Organic production process not required.	Organic production process.
Amendments to specifications follow the same route as a new application.	A producer may veto amendments.	A producer may veto amendments.

5.7. PRODUCER LEVIES AS SUPPLEMENTARY FINANCING OF THE TECHNOLOGY PROCESSES

Whereas the agricultural sector is increasingly being exposed to international competition, the past protection enjoyed by the South African agricultural sector is decreasing. This fact, the reasons for it and the limited chance for a turnaround in the situation have been discussed in Section 4.3. So far, the unique characteristics of the natural resources of the Western Cape Province have been relied upon to enhance the international competitiveness of the local agricultural sector. However, technological and managerial developments by the most important international competitors of the Western Cape have resulted in this competitive

advantage being systematically undermined (examples for the wheat industry can be found in Street *et al*, 1996, Troskie *et al*, 1994 and Edwards & Leibbrandt, 1998). One way to face this trend is by investing in technological and managerial development. A second is through developing virtual and actual technological, product and managerial networks. Consequently, it is essential to create a mechanism that will empower producers to make a bigger contribution themselves towards improving their competitive position.

If a statutory levy is introduced to fund research the implicit assumption that is made is that a market failure in the supply of agricultural technology exist and that public intervention is necessary to rectify this situation. This argument can hardly be sustained with a clear consciousness as the rapid development in technology (general and farming) was clearly discussed in Section 3.3.2.3. In addition the problem of low returns (see Section 2.3.2) can partly be ascribed to rapid technological development. However, a distinction must be made between technology where the benefits can be internalised and technology where this is not easily possible. The development of the former type of technology, that can be patented and the intellectual property protected, is usually funded by private capital while the latter is reserved for public funding. It is in the case of the public funded technology (public goods) that the public investment in South Africa is diminishing (see Section 4.3). It follows that the principle here is not that of market failure, but rather a case of government failure and that the levied funds should only be used for the development of public goods.

In evaluating the possible impact of such a system a neo-classical approach based on trade theory will be used. As it is necessary to gradually introduce certain concepts the initial step will be to develop a simplified model containing a single product in a closed economy. This model will gradually be expanded to include other regions and the world. Following this the concept of social welfare will be introduced before expanding the model to include various products. Finally the benefits of the levy will be introduced. Throughout the section wheat will be used as an example. In the concluding part certain deductions will be made that can be tested in the analytical framework to be developed in Chapter 6.

The imposition of a levy, voluntary or not, boils down to an additional expense to the farmer. Although a voluntary[1] levy is proposed, the implication is that all farmers in a specific region

---

[1] *In this context a voluntary levy means that it cannot be imposed unilaterally by the Provincial Government but only on request of the producers. Once so requested the Government can on certain conditions (to be*

will be levied if a large enough majority of producers in that region supports the imposition of the levy. The basic theory of the effect of a levy or a tax on agriculture is well documented in the agricultural economic literature. (See especially McCalla & Josling, 1985; but also Tweeten, 1989 and Sadoulet & De Janvry, 1995 for a comprehensive analysis of the theory.

5.7.1. The one product single country model

A single commodity, traded in the closed economy of a single country, as illustrated in Figure 5. 4, is taken as point of departure. Given a free market within the neo-classical approach as postulated, demand (D) and supply (S) are in equilibrium with quantity (Q) sold at price (P). The imposition of a levy[1] (t) implies that the cost of supply increases. Producers would therefore need a higher price to produce the same quantity, or inversely produce a lower quantity at the same price. The net effect is a move in the supply function from S to the left and upward to S'. A new equilibrium will be reached with quantity (Q') sold at price (P'). The loss in production would be equal to Q - Q' and the increase in price equal to P' – P = t given the assumption that there is a zero transaction cost involved for the producer. The magnitude of the production loss is dependent on the relative price elasticity of the supply and demand functions.

Within the framework of the neo-classical tradition it can be argued that the supply function is the sum of the marginal cost functions of individual firms. It follows that the area between the supply function (S) and the line Py is the producer surplus (price per unit – marginal cost per unit). In the same manner it can be argued that the demand function is the sum of the demand functions (utility functions) of individuals. In the case of consumers the area between the demand function (D) and the line Py is the consumer surplus (utility per unit – price per unit). The sum of these two areas (producer surplus and consumer surplus) is the surplus generated by this activity for the economy. With the introduction of the levy producer surplus change to the area between the supply function (S') and the line P'x and consumer surplus is now the area

---

discussed in Section 5.7.5) then introduce a statutory levy on the producers of a certain product in a specific region.

[1] For the sake of clarity only the cost (levy) will be introduced at this stage. The benefits (technology effects) will be introduced in Section 5.7.4.

between the demand function (D) and the line P'x. It follows that the net loss in economic surplus (social cost) by the introduction of a levy can be represented by the area xyz. (see Harrigan *et al*, 1992 for a more detailed description of this principle).
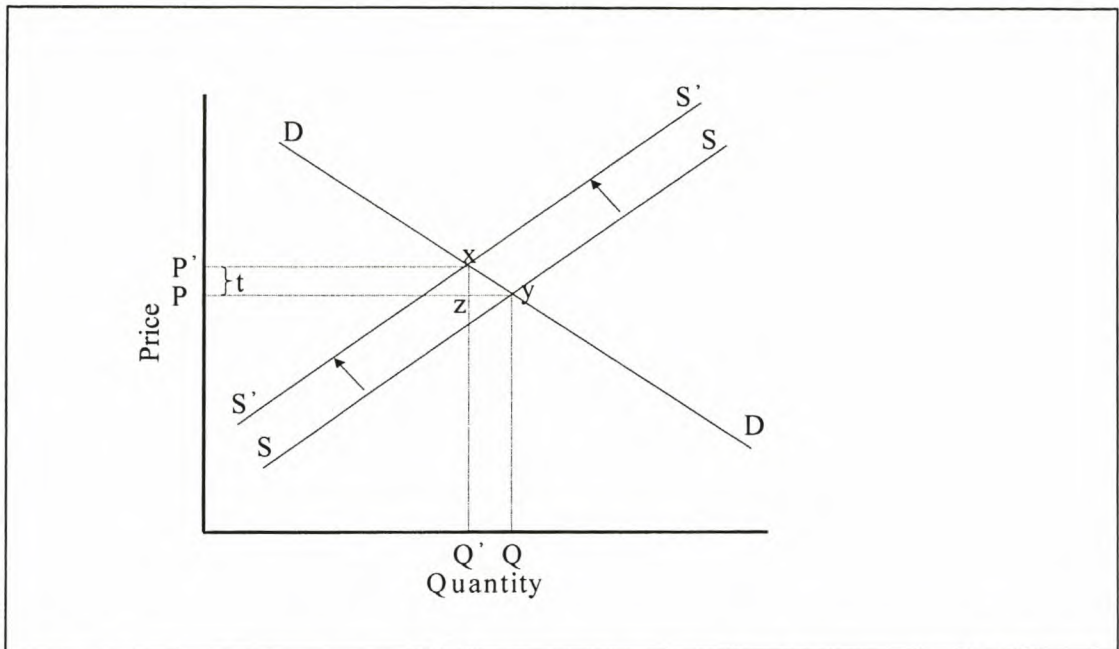
Figure 5. 4: The effect of the imposition of a levy on the supply of a single product in a closed economy.

One aspect should be mentioned at this stage. The final demand for wheat is in the form of bread, confectionery, gluten, etc and in some South African studies was researched as such (Niebuhr & Van Zyl, 1992; De Kock & Laubscher, 1992). Within this context the demand for wheat should therefore be classified as intermediary. As the demand for a commodity is dependent on such diverse factors as *inter alia* household income, prices of other substitutes or complements (cross elasticity of demand), etc. (Sadoulet & De Janvry, 1995: 33), the slope of the demand curve may vary quite substantially between the final and intermediate product (see also the discussion in Section 5.2). For this reason the focus of the study will fall on the intermediate product, wheat.

This classical single country model describes the (agricultural) situation before the economic liberation that was associated with the political transformation of 1994. Movement of products over the international borders was restricted and fixed prices

were the order of the day. However, all this changed after 1994 and it is therefore necessary to moderate the model.

5.7.2. Moderation of the single country assumption

In the previous section one of the assumptions was that the Western Cape is a closed economy. This is obviously not the case. Given the Constitution of the Republic of South Africa, as well as the worldwide disposition towards globalisation and trade deregulation, it will probably be even less so in the foreseeable future.

With specific reference to wheat, it was shown in Chapter 1 that South Africa produced a surplus in only four out of the ten years between the 1985/86 and 1998/99 seasons. The surplus of wheat produced in the Western Cape on the other hand averaged 88 percent of the provincial consumption over the same period. In no single season was a negative surplus experienced. Within the normal theoretical framework the Western Cape can therefore be classified as a surplus producer of wheat. It is also clear that the rest of South Africa, excluding the Western Cape, can be classified as a deficit producer of wheat. On average this region produced a deficit on consumption of 25 percent, ranging to as high as 62 percent.

With the assumption that the South African economy is closed, a typical two-country single product scenario is reached. Within this scenario the one "country" (Western Cape) is a net exporter of wheat while the other "country" (the rest of South Africa) is a net importer of wheat. As the "world" in this scenario consists of just two countries (Western Cape and the rest of South Africa), it is evident that both would have a typical so-called big country effect on the world market. In other words, a change in the demand or supply of either of the two countries would be reflected in the demand and supply of the world market. This situation is graphically represented in Figure 5. 5. It is also, for the moment, assumed that transport costs are equal to zero and that stockpiling does not take place.

In the typical two-country single product model the world price would be higher than the equilibrium price in the surplus producing country, but lower than the equilibrium in the deficit producing country. In this scenario the initial situation would be an

equilibrium of world supply $(S_s)^1$ and demand (D_s) resulting in quantity Q_s being sold at the world price of P. It is important to note that the slope (elasticity) of the world supply function (S_s) is the sum of the absolute values of the elasticities of the domestic demand and supply functions of the exporting countries. Similarly the elasticity of the world demand function (D_s) is the sum of the absolute values of the elasticities of the demand and supply function of the exporting country. It follows that S_s and D_s will per definition be more elastic than the supply function of the exporting country and the demand function of the importing country respectively. At this price the Western Cape wheat farmers would be willing to produce quantity Q_{cs} while consumer demand would be equal to quantity Q_{cd}. A surplus of $Q_{cs} - Q_{cd}$ would be available for export to the world market.
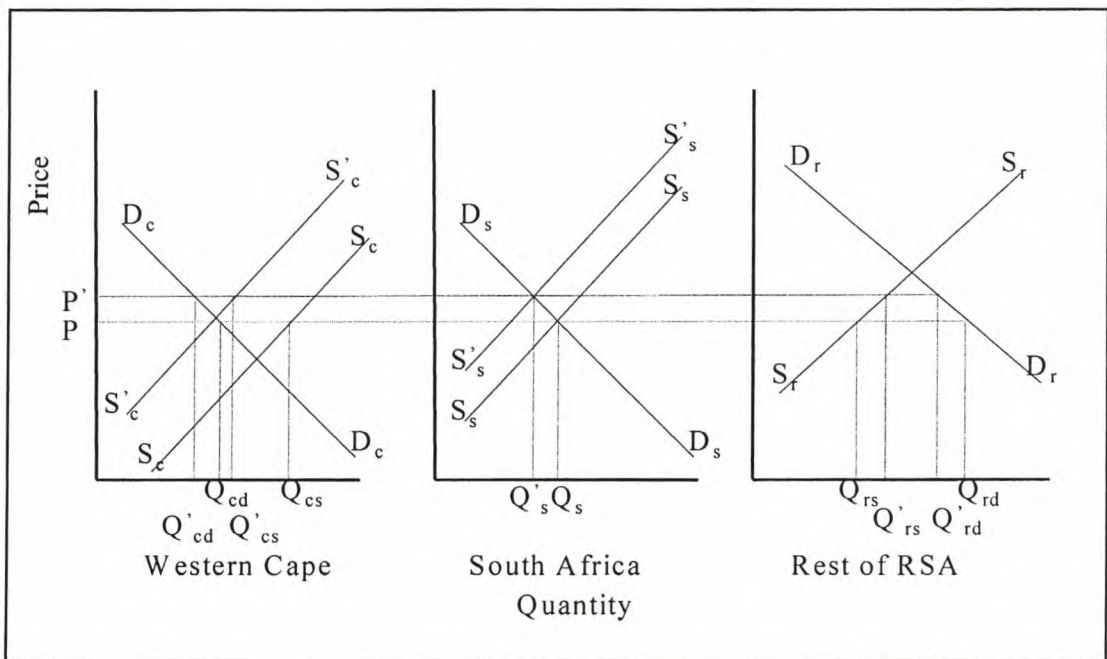
Figure 5. 5: Two-region model with South Africa defined as a closed economy.

In the other country, the Rest of South Africa, the farmers would at this price be willing to produce Q_{rs} and the demand would be equal to Q_{rd}. The quantity imported by the Rest of South Africa would be equal to $Q_{rd} - Q_{rs}$. As the modeled world

---

[1] *The notation used in this document may initially seem different from the norm. In order to prevent confusion at a later stage, the Western Cape is indicated with a $_c$ to prevent use of the notation $_w$ that will at a later stage be used to indicate the world market. The world market, being South Africa in this section, is noted by a $_s$ and the Rest of South Africa by a $_r$.*

currently consists of only two countries, $Q_{cs} - Q_{cd} = Q_{rd} - Q_{rs}$ for an equilibrium to exist.

A shock can now be introduced in the system through the imposition of a levy on wheat in the Western Cape. As in the case of the single country model the supply function of wheat in the Western Cape would move from S_c to S'_c. It is important to note that this movement can be equated to an increase of t (the per unit levy) in the marginal cost of individual producers. As the supply function is the aggregate of the marginal cost function of individual producers, the movement of the supply function S_c to S'_c would be equal to the per unit amount of the levy t. The Western Cape, having big country status, would therefore influence the world supply function to move from S_s to S'_s. A new equilibrium will be reached at quantity Q'_s sold at price P'. The increment $P' - P$ will depend on the relative slopes of S'_c, S'_s and D_c and will not necessarily be equal to the amount of the levy t.

The new equilibrium implies that Q'_{cs} is produced and Q'_{cd} are consumed in the Western Cape. The quantity $Q'_{cs} - Q'_{cd}$ is exported from the province. The loss in exports would be equal to $(Q_{cs} - Q_{cd}) - (Q'_{cs} - Q'_{cd})$ and the trade balance would be negatively influenced by the amount $P (Q_{cs} - Q_{cd}) - P' (Q'_{cs} - Q'_{cd})$. As this is an effective decline in the demand for a product produced in the Western Cape, it will imply a wider negative impact, measurable through macro-economic multipliers, on the economy through forward and backward linkages. The Rest of South Africa would experience an increase in the quantity supplied by their own farmers to Q'_{rs} but a decrease in demand to Q'_{rd}. The gain of the Rest of South Africa should be equal to $P (Q_{rd} - Q_{rs}) - P' (Q'_{rd} - Q'_{rs}) = P (Q_{cs} - Q_{cd}) - P' (Q'_{cs} - Q'_{cd})$ which is the loss of the Western Cape. Given that in effect a levy is imposed on the wheat farmers in the Western Cape, it is apparent that the Western Cape will be a net loser to the advantage of the Rest of South Africa.

It is important to take note that the theoretical effect described here is based on a supply shock and not on an export tax. The reason is that the levy increases the marginal cost of individual producers and therefore moves the supply function (S_c) of the exporting country to the left with the amount t. An export tax would not influence the marginal cost of producers (S_c would thus remain stationary) but would move the

world supply function (S_s) to the left equal to the amount of the levy (t). As the world supply function is the excess supply function of the exporting country, the equilibrium would have been reached at quantity Q'_s being sold a price of P + t for the importing country and at a price of P – t for the exporting country.

5.7.3. Introducing the real world

It was argued in the previous section that the "world" consist of just two "countries" operating in a closed economy. Both of these "countries" were in the position to significantly influence the "world" supply and demand functions. In the "real world" this will obviously not be the case as is confirmed by the data in Table 5. 5. It can therefore be assumed that in an extended model the Western Cape will have a marginal influence on the supply and demand in global perspective. The Western Cape thus represents a typical price-taker country within this scenario. Another assumption that can be made is that, given South Africa's commitments under the Marrakech Agreement, no quota barriers exist to either imports or exports.

The extended theoretical framework can graphically be portrayed as in Figure 5. 6. At the initial equilibrium quantity is globally traded at price P. At this price producers in the Western Cape produce Q_{cs} and Q_{cd} is consumed while $Q_{cs} - Q_{cd}$ is exported. The rest of South Africa produces Q_{rs} and consumes Q_{rd} and imports $Q_{rd} - Q_{rs}$. It is important to note that, as a free trade is postulated, $Q_{cs} - Q_{cd}$ does not necessarily equal $Q_{rd} - Q_{rs}$.

The introduction of a commodity levy on wheat in the Western Cape can, depending on the magnitude of the levy, move the supply function to either S'_c or S''_c. Because a move in the supply function of the Western Cape will have a marginal effect on the world supply, the Western Cape is a wheat price-taker in global context and free trade is postulated, this action will have no effect on either the supply or demand functions of wheat in the rest of South Africa. If the magnitude is of such an extent that the supply function moves to S'_c the Western Cape will remain a net exporter of wheat. As the price of wheat would remain constant at P (due to the extreme marginal effect in global context of Western Cape demand and supply), demand would remain

constant at Q_{cd}. The quantity of wheat exported from the province would shrink by $(Q_{cs} - Q_{cd}) - (Q'_{cs} - Q_{cd}) = Q_{cs} - Q'_{cs}$.

Table 5. 5: Global perspective on wheat production in the Western Cape and South Africa

Year	World Production 1000 t	Western Cape Production 1000 t	WC/World %	Rest of RSA Production 1000 t	Rest of RSA/World %
1985/86	499 580	706	0.14%	880	0.18%
1986/87	528 602	664	0.13%	1 585	0.30%
1987/88	504 959	821	0.16%	2 216	0.44%
1988/89	500 384	692	0.14%	2 798	0.56%
1989/90	538 327	597	0.11%	1 365	0.25%
1990/91	592 442	456	0.08%	1 210	0.20%
1991/92	546 855	457	0.08%	1 628	0.30%
1992/93	565 272	582	0.10%	688	0.12%
1993/94	564 480	698	0.12%	1 215	0.22%
1994/95	528 160	696	0.13%	1 077	0.20%
1995/96	544 315	806	0.15%	1 123	0.20%
1996/97	582 689	664	0.11%	1 986	0.34%
1997/98	612 380	550	0.09%	1 733	0.28%
1998/99	588 841	535	0.09%	1 667	0.28%

Source: FAO (1999)

Wheat Board (1997)

SAGIS (1999)

If it was assumed that this quantity of wheat was previously consumed in the rest of South Africa, this production loss would have to be substituted by imports from abroad. This is necessitated by the fact that the move in the supply function of the Western Cape would have no effect on either the supply or demand functions of the rest of South Africa. Although the gross cost in foreign exchange for South Africa is

therefore P ($Q_{cs} - Q'_{cs}$), the real picture will only emerge if the reduced imported factor costs are also included in the calculation.
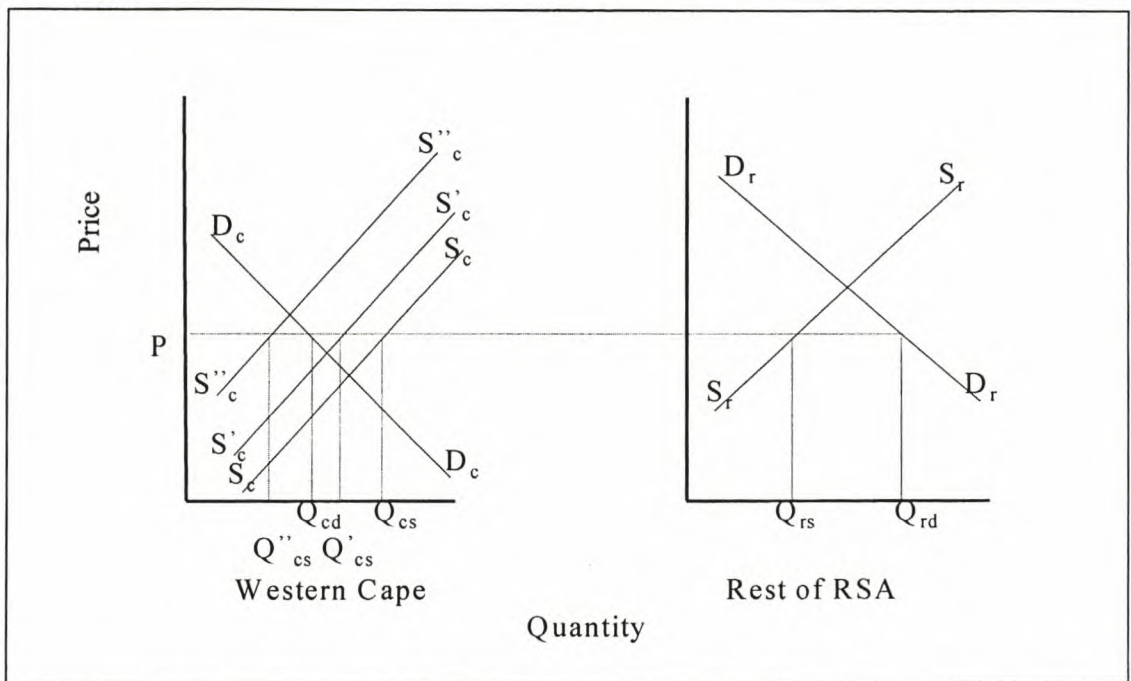
Figure 5. 6: Two-region model within the global economy.

The second scenario is where the levy is of such an extent that the supply function moves from S_c to S''_c. As the quantity supplied moves from Q_{cs} to Q''_{cs} , the Western Cape changes from a net exporter of wheat to a net importer. The model at the moment does not make provision for transport cost. The price of wheat and the quantity consumed therefore stays the same. The gross cost in foreign exchange (excluding provision for a decrease in imported factor cost) is equal to $Q_{cs} - Q''_{cs}$ of which $Q_{cs} - Q_{cd}$ will be carried by the rest of South Africa and $Q_{cd} - Q''_{cs}$ by the Western Cape. The threat of the Western Cape moving, over the short term, from a net exporter of wheat to a net importer is very real. Various studies have, for example, found the international competitiveness of the Western Cape wheat industry to be marginal (Street *et al*, 1996; Troskie *et al*, 1994 and De Kock & Laubscher, 1993).

It is necessary to mention again that the theoretical effect would have differed quite substantially if it was not a levy (influencing the marginal cost of farmers) but an export tax that has been proposed. In the case of an export tax the domestic supply function would have remained stationary while the price to local producers would have declined by P − t.

5.7.4. The theoretical effect of research

It is assumed in the normal theory on an agricultural commodity levy that the proceeds of the levy will be used for a purpose that is not necessarily related, or to the benefit of, the commodity in question. In the case of a voluntary levy, as is proposed in the Western Cape, the proceeds will be used for purposes that will be to the benefit of the industry. These purposes may include research, information, extension services, training, etc. But what will the benefits (and effects) of these activities be? Take research as an example.

Within the South African agricultural economics fraternity the literature on the returns to agricultural research is still in its infancy. The first results by Van Zyl and Thirtle (1996) indicate a 44 percent return on public sector investment on agricultural research, with the benefits concentrated in the field crop and horticultural sub-sectors. It is also interesting to note that an increasing shadow price was found over time for agricultural research and development, but that the shadow price for extension and education was declining over time. The reason for this may be found in the fact that the better educated farmers often applied certain production factors up to a level of negative marginality in their effort to achieve maximum physical production rather than maximum profit (Khatri *et al*, 1996: 287). In a more recent study it was found that research done by the Nietvoorbij Institute in the wine industry resulted in a rate of return of 61%. If the extension expenditure of the KWV is included in the calculation, a rate of return of 45 percent is achieved (Townsend and Van Zyl, 1997). The results of Van Zyl and Thirtle (1996) are therefore supported.

The rate of return on expenditure in agricultural research activities by the South African Agricultural Research Council (ARC) has recently been completed. It was found that the rate of return on wheat research varied between 28 percent and 34 percent for the period 1950 to 1995 (Thirtle *et al*, 1998:628). International studies, as indicated in Table 5. 6, have shown a wide spectrum of results. This wide spectrum may *inter alia* be traced back to differences in methodology, research efficiency, etc. In addition Thirtle *et al* (2000) and Townsend *et al* (1998) warns that the representation of technology as a smooth deterministic function over time is a mis-representation of data. It is also argued that the effect of managerial and institutional

development is often not included in the models. It follows that considerable work still need to be done in order to arrive at a true representation of the influence of technological development. However, although there remains doubt regarding the exact magnitude, the assumption can safely be made from these local and international studies that wheat research shows a substantial positive rate of return.

Table 5. 6: Returns on investment in wheat research: international results.

Reference	Year	Country	Period	Rate of Return (%)
Ardito-Barletta	1971	Mexico	1943-63	90
Eddleman	1977	USA	1978-85	46
Hertford *et al*	1977	Colombia	1927-76	11-12
Kislev and Hoffman	1978	Israel	1954-73	125-150
Pray	1980	Bangladesh	1961-77	30-35
Sundquist *et al*	1981	USA	1977	97
Yrarrazaval *et al*	1982	Chile	1949-77	21-28
Zentner	1982	Canada	1946-79	30-39
Nagy	1983	Pakistan	1967-81	58
Ambrosi and Cruz	1984	Brazil	1974-90	59-74
Furtan and Ulrich	1985	Canada	1950-83	29
Norton *et al*	1987	Peru	1981-2000	18-36
Evenson and da Cruz	1989	Brazil	1979-88	110
Byerlee	1990	Pakistan	1978-87	16-27

It is evident that positive commodity specific benefits may be derived from the imposition of a levy, and that there is some justification in diverting from the normal theory of commodity specific levies. The effect can be depicted as in Figure 5. 7. As producers will be able to operate more efficiently as a result of the enhanced technology created through for instance research, they will be willing to produce a larger quantity of the product at the same price. Conversely it can be said that they would be willing to produce the same quantity of the product at a lower price. The net effect is that the supply function would, given the long term effect of agricultural

research, eventually move to the right and downwards from $S^{'}$ to $S^{''1}$. A new equilibrium will be reached at quantity $Q^{''}$ sold at price $P^{''}$.
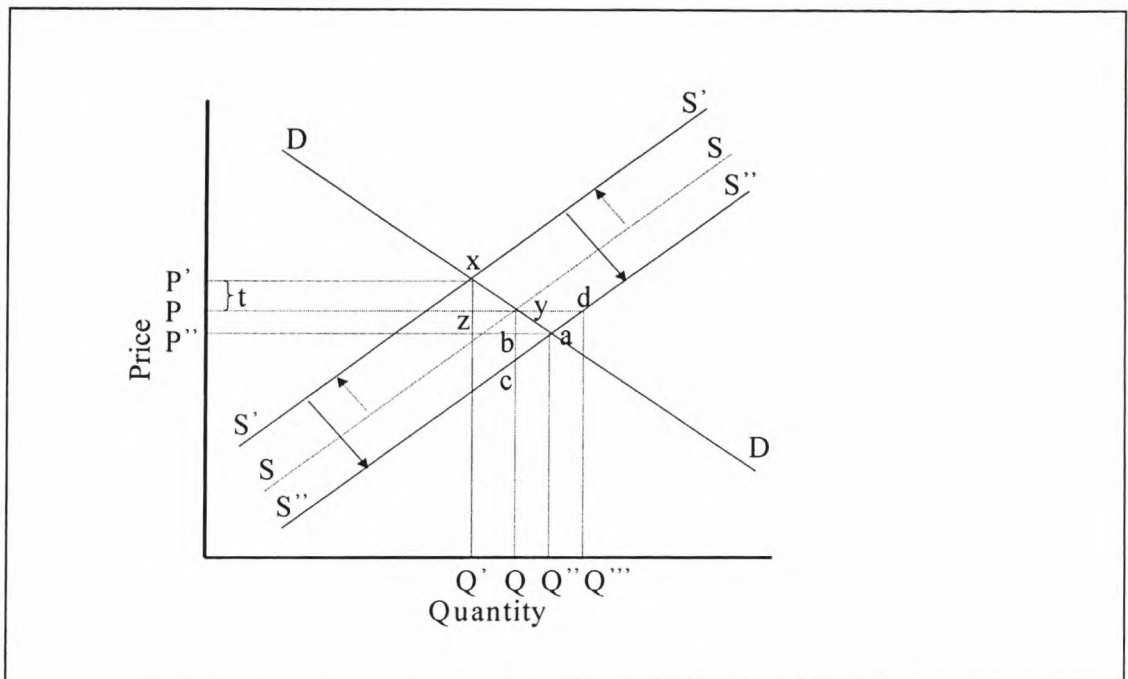
Figure 5. 7: The long-term effect of agricultural research on the supply of a single product in a closed economy.

The decrease in price, attributable to agricultural research, would therefore be equal to $P^{'} - P^{''}$, and the increase in the quantity produced be equal to $Q^{''} - Q^{'}$. The net effect of the imposition of a levy on the one hand and the utilisation thereof on the other hand would be $P - P^{''}$ for price and $Q^{''} - Q$ in the case of quantity. It is expected that this result will be positive over the longer term. A negative result would indicate that the negative impact of the levy is greater than the positive effect of the uses it is put to.

It is however appropriate to again introduce the concept of a difference between a general commodity levy and a specific commodity levy into the argument. As was argued in Section 5.7.3, the commodity specific use to which a levy is put may well lead to an eventual long-term advantage for the producers in the Western Cape. Depending on various factors, this may eventually lead to a shift in the supply function of the Western Cape wheat farmers to the right and downwards of the current supply function S_c, leading to a new equilibrium, a lower price, and increased consumption of

---

[1] *This is a similar line of argumentation as that used in Section 2.3.2 on the treadmill theory. Thus, these two arguments mutually support each other.*

the product. It is therefore evident that the producers paying the levy will carry the short-term costs of the levy. However, over the longer term the advantages will not only accrue to the producers, but also to consumers, who will have access to larger quantities of the product and at lower prices. This conclusion is supported by Voon (1994) who found that between 67 and 91 percent of the advantages of cost-reducing agricultural research will be consumer advantages.

It was argued in Section 5.7.1 that the social cost of the introduction of a levy can be represented by the area xyz. However, the same argument can be used to indicate that the long term social benefits of the levy can be represented by the sum of the area yac and the area to the left of line yc and between S and $S^{''}$. In the same way it can be argued that the social benefits accruing to consumers are equal to the area yab while the rest of the area are social benefits to producers.

Up to this point the implicit assumption in this section was that of a typical closed economy as discussed in Section 5.7.1. The implications of an open economy was discussed in Section 5.7.2 and it has been shown in Section 5.7.3 that South Africa (and the Western Cape) is a marginally small player on the global wheat field. It follows that the discussion to this stage must be adapted to make provision for the alleviation of the of the closed economy assumption. Due to the fact that the Western Cape is a small player the introduction of a levy will have a *de minimus* effect on the world price of wheat which will remain constant at P. At this price wheat farmers in the Western Cape who, due to research benefits, are operating on the supply function $S^{''}$ will be willing to produce quantity $Q^{'''}$. At this point the social benefits to the society will be equal to the sum of area ydc and the area to the left of line yc and between S and $S^{''}$. These benefits will all accrue to the producers. However, it must be mentioned that the sum of area yda and the area below line ad and between $Q^{''}$ and $Q^{'''}$ represents a potential, but not necessary, misallocation of resources if suitable substitutes do exist.

An interesting question that can be asked is what the relationship is between the elasticity of supply and the social benefits to be derived. The area of a triangle is ½ the perpendicular line times the base. It follows that the area of triangle ydc will be ½ line yc times line yd. Consequently, the more elastic a supply function, the bigger will

be the area of triangle ydc. The two main wheat production areas of the Western Cape is the Swartland and the Ruêns. According to Niebuhr and Van Zyl (1990) the long term price elasticity of supply in the Swartland is 0,70 while it is 0,54 in the Ruêns. The short term price elasticity of supply for these two regions are respectively 0,81 and 1,40[1]. If it is assumed that the technology developed as a result of the levy expenditure is scale neutral, then S will be parallel to $S^{''}$. It follows that the area formed by S, $S^{''}$ and yc can be ignored from the argument. It has already been explained that the short term supply function is a function of the marginal cost functions of individual producers while the long term supply function is a function of the average cost function of individual farmers. It follows that farmers in the Ruêns will receive relatively more benefits from research lowering the marginal cost of wheat production than is the case of farmers in the Swartland. Although farmers in the Swartland will receive more benefits from research focussing on marginal cost than on research lowering average cost, they could be advised to follow a more balanced approach than the farmers in the Ruêns. As it is proposed that farmers should decide amongst themselves on the use of the levy funds and due to the horizon problem and Arrow's impossibility theorem (see Section 2.4.1.4), it is recommended that farmers in these two regions should create separate levy funds for the two regions.

5.7.5. Salient aspects of the proposed legislative framework

From the previous discussion it is clear that a levy on certain farm products could be introduced in the Western Cape Province without transgressing the prohibition on inter-provincial trade barriers as stipulated in the Constitution of South Africa (Act 108 of 1996). It is also clear that if the proceeds of such a levy are used effectively, it may contribute towards countering the effects of the treadmill for the producers in the Western Cape.

---

[1] *The big differences between these elasticities can be explained as follow. Farmers in the Ruêns have more substitutes available due to the fact that the annual summer drought is less severe in this area than is the case in the Swartland. In addition valuable assets such as the multsters at Caledon and the canola processing plant at Swellendam add to potential alternatives that can be produced. It follows that over the short term cropping farmers in the Ruêns will be more responsive to wheat prices than the farmers in the Swartland where these alternatives is not available. This explains the difference between the short term elasticities of supply of the two regions. It is considerably more difficult to explain why, contrary to theory, the long term supply is relatively more inelastic than the short term supply function in both these regions. The only explanation that can be brought forward is that wheat production is a very important part of the rotational system in the Ruêns*

In developing such a legislative framework, the Commodity Levies Act (Act 127 of 1990) of New Zealand, as amended, may serve as a point of departure. As the objective of this framework will be to enable commodity producers to contribute towards research and development funding, a number of principles should form part of the framework. These principles include:

(a) It must be of an empowering nature.

(b) The majority of the people who potentially would have to pay the levy, in the case of a specific levy order, must support it.

(c) No unilateral introduction of levies by anybody other than the majority of the levees may be possible.

(d) Those who pay for a service must receive the benefits, and *vice versa*.

(e) Those who contribute must retain full control over the application of the funds.

(f) Funds must be applied for purposes where certain persons would have received unearned benefits (public goods), had statutory levies not been imposed.

(g) The allowable use of funds must be stipulated.

(h) The levies must lapse after a specified period, following which application for their continuance may be repeated.

(i) Disputes must be resolved in the least disruptive and most cost-effective way.

(j) It must be possible to introduce a levy per product or per area.

(k) Provision must be made for the exemption of payment by certain persons or groups of persons.

(l) The rendering of services should not be restricted to a particular body, but the full spectrum of provincial, national and international service providers may be contracted.

(m) Safeguards must be provided to prevent the development of large overhead and administrative costs or the development of "ivory towers".

(n) Safeguards must be in place to prevent the system being used as single channel marketing or pooling system, or otherwise as a non-tariff barrier to trade.

The characteristics of the framework as identified in this section have already been developed into a Draft Bill (see WP 1999).

---

while the farmers in the Swartland typically follow a monoculture production system. However, the results from the long term supply elasticities should be interpreted with care.

5.8. INCOME STABILISATION AS RISK MANAGEMENT STRATEGY

Risk is not a phenomenon that is unique to the agricultural sector of the economy. However, the agricultural sector is faced with a combination of risk variables that are very seldom found in the same blend in any other sector. This combination of risks associated with agriculture includes *inter alia* climatic or natural risk (drought, floods, rain at the wrong time, hail, wind, heat, fire, frost), market risk (changes in consumer preferences, price fluctuations, transport costs, over-supply), policy risk (changes in tariff regime, marketing arrangements, fiscal policy, trade policy), social risk (labour action, personal circumstances) and macro-economic environmental risk (changes in technology, farming practices, demography). It is true that some of these risks are insurable, albeit at a high cost, but it is equally true that other risk variables are not insurable. The effect of some risk variables is instantly recognisable (flood & fire damage), while the effect of others are only visible over the short to medium term (drought). It is even true that the effect of some other risk variables will only be visible over the medium to long term (changes in consumer preferences and technology). It is important to note that it is not only the farmers themselves that are affected by the effects of risk. It was conclusively shown in Section 4.4.2 that those affected most by changes in agricultural conditions are the rural poor. The impact of this combination of risk factors on the prices of agricultural products, and therefore the profitability of farming, has been debated in Section 2.3 and Section 5.2.

It follows that there is room for a system through which farmers can hedge themselves against these uninsurable risk variables, especially in the case of variables whose effects are not immediately visible and where structural adjustments are required from the farmer. In a number of countries (i.e. the EU and Japan) the government, through elaborate safety-net programmes, relegates the farmer to a passive role in this regard. In the case of South Africa, as member of the Cairns group, within a non-interventionist policy framework and where the chances of high levels of support are slim (see Section 4.3.3), farmers are required to fulfil a more active role. This does not mean that government has no role to play, but rather that government can create an environment wherein farmers can take responsibility for their own actions. One way of creating this environment is through developing a framework which farmers can use to make provision in "good" years for the "bad" years that will inevitably follow. Or, in other words, a framework used for income stabilisation.

It was argued in Section 5.2 that a mechanism is necessary for farmers to enable them to exit farming or to acquire the necessary skills to earn additional off-farm income. It was also argued that adequate tertiary and vocational skills training infrastructure do exist in South Africa and that the main constraint is the necessary funds to combat the financial and time opportunity cost associated with attending such courses. It is clear that an income stabilisation framework could largely contribute to solving this problem. As part of the debate on the desirability of an income stabilisation framework the argument has been brought forward that the current income averaging mechanism of the tax system allows for similar advantages (for a more detailed description of the argument see Nieuwoudt and Hill, 2001). However, although the tax averaging mechanism allows the equalisation of income tax, it does not provide incentives for building a cash reserve. Consequently, the objectives of retirement facilitation or skills acquirement are not achieved. Finally, as cash reserves are not available during unfavourable conditions the adverse impact on agribusiness is also not minimised.

In this section examples from three countries will be used. Following the examples, a possible framework based on the Canadian experience will be developed after which some outstanding issues will be discussed briefly.

5.8.1. Examples

Some of the salient aspects of the income stabilisation programmes in Canada, the United States of America and Australia are presented in Table 5. 7. From the experience of the three countries mentioned it is clear that an income stabilisation programme can form an effective part of a risk management strategy (Hum *et al*, 1995). This is true especially if it is used in conjunction with other strategies such as futures hedging, risk minimising farming strategies and crop insurance. It is therefore considered to be the preferred agricultural safety net strategy of the Canadian government (AAFC, 1998).

Table 5. 7:   **Salient aspects of income stabilisation programmes in three countries**

ASPECT	COUNTRY		
	CANADA	USA	AUSTRALIA
Name of programme	Net Income Stabilisation Account (NISA)	Adjusted Gross Revenue Insurance Plan (AGR) (Pilot limited to specific counties.)	Farm Management Deposits (FMD)
Nature	Government managed stabilisation scheme with deposits in banks.	Income stabilising privately underwritten insurance policy.	Scheme run by banks with government overseeing.
Government contribution/liability	Match deposits up to 3% of eligible net sales (ENS) and subsidise (3%) interest rate up to maximum of 20% of ENS.	Forfeit tax income.	Forfeit or delay tax income
Farmer contributions and tax	Post tax	Tax deductible	Pre tax
Nature of contribution	Savings and interest earned at subsidised rates.	Insurance premium calculated according to formula.	Savings and interest earned at bank rates.
Maximum contribution	3% of ENS are matchable; 20% of ENS at subsidised interest rate.	Calculated by a formula	No maximum
Account maximum	CAN$375 000	None	A$300 000
Participation	Voluntary	Voluntary	Voluntary

ASPECT	COUNTRY		
	CANADA	**USA**	**AUSTRALIA**
Eligibility	Must file income tax return that reports income from farming; must be actively involved in farming; special arrangements for "status indians".	Must: -file five consecutive tax forms; -be the same tax entity for seven years, -be a US citizen; -have multiple peril crop insurance. A list of other preconditions.	Must be a primary producer with annual income from other sources not more than A$50 000.
Withdrawal trigger	Gross income falls below the average of previous five years or net income falls below minimum income (CAN$10 000).	Gross income falls below 65, 75 or 80% (depending on specific policy) of insured income.	Any time. However if tax benefits are claimed, then farmer must prove that he/she is in "serious financial difficulties".
Maximum payments to farmer	Up to maximum amount in accounts	Insured income x coverage level (65, 75 or 80) x 75%.	Up to maximum amount in accounts
Voluntary closure	Yes – receive total amount of accounts plus accumulated interest.	Yes – receive no return.	Yes – receive total amount of accounts plus accumulated interest.

Source: AAFC (1999); AAFC (1998); AFFA (2000); FCIC (1999); USDA (1999b)

The advantage of a programme along the lines of the NISA (Canadian) and FMD (Australian) models is that a farmer can build a credit history with a financial institution of his or her choice. Especially in the case of new entrants into agriculture, where access to financing appears to be a major problem, this may be a fortuitous side effect. Of course, a farmer must receive an income before being able to participate in an income stabilisation programme, but recent evidence (Morokolo *et al*, 1999) suggests that among resource poor farmers a highly significant motivation to save is in order to provide for emergencies. This credit history will not result from the AGR (USA) scheme.

Another advantage of the NISA and FMD (but not the AGR) models is that farmers can use the funds accumulated as provision for retirement. Too often the son/daughter is expected to "buy" the farm from the parent, or to financially provide for the parent. The financial burden thus incurred often leads to the financial ruin of the farming business and can be a negative factor if a farmer wishes to leave the agricultural sector.

The cost of the programme may be of a major concern to government. A post-tax income savings model, such as NISA, where incentives other than tax incentives are to be used, may turn out to be quite expensive. In the case of the FMD scheme the government is willing to forfeit or delay some tax income. The AGR system, where an insurance policy is underwritten, is probably the cheapest from the perspective of government.

5.8.2. A possible income stabilisation framework for the Western Cape Province

As a signatory of the Marrakech Agreement, South Africa is committed to phased reductions in agricultural support. South Africa is also a member of the Cairns group, whose objective is to pressure developed countries into decreasing their levels of agricultural support. With this background it is appropriate to depart from the perspective of South Africa's international commitments and to ensure that such programmes fall within accepted guidelines.

The Marrakech Agreement lists certain government activities that are permissible, exempted from reduction commitments and not included in the calculation of the aggregate measurement of support (AMS). These are the so-called "green-box" measures described in Annex 2 to the agreement. Section 7 of this Annex makes specific reference to "Government financial participation in income insurance and income safety-net programmes" on the following conditions:

(a) Eligibility for government payments shall be determined by an (agricultural) income loss of more than 30 percent compared to the average over the previous three years or three of the previous five years if the year with the highest and the year with the lowest income is excluded from the calculation.

(b) The amount of such payments shall compensate for less than 70 percent of the income loss in the year in which the farmer receives the assistance.

(c) The amount of such payments shall relate only to income and not to the type, volume or factors of production or to domestic or international prices of agricultural produce.

(d) Where a producer receives payments from this programme and from government crop insurance programmes or disaster relieve in the same year, such payments shall be less than the 100 percent of the producer' loss (Marrakech Agreement, 1994).

In accordance with South Africa's international commitments it is clear that the trigger mechanism of a Western Cape programme should only be allowed to operate if farm income decreases by 30 percent. The implications of the prerequisite that payments shall compensate for less than 70 percent of the income loss is less clear. What is clear is that the full compensation is not allowed to come from the government part of the account. The balance of the Marrakech Agreement prerequisites will probably not produce any problems.

With this background in mind, a proposal for an income stabilisation programme, based on the Canadian example, could show the following characteristics:

Name: Western Cape Net Income Stabilisation Programme
                            (WISP)

Objective: A voluntary risk management strategy by carrying reserves

from one year to the next.

Who may participate?:	Any person, natural or legal, that earns an income from farming activities.
Contributions:	A farmer may contribute 3 percent of his eligible net sales (ENS). This will be matched by an equal contribution from the government of the Western Cape Province. Farmers are allowed to contribute additional amounts of up to 20 percent of his ENS to their account. This additional amount will not be matched by the government.
Interest rate:	Farmers will receive an interest rate bonus of 3 percent on all deposits in their WISP accounts.
Accounts:	Farmers are allowed to open a WISP account at a participating financial institution of their choice (Account 1). The Provincial Government will open a matching account at the official bank of the Province (Account 2).
Maximum limit of account:	The account balance is not allowed to exceed a limit of 1,5 times the ENS of the farmer, or a maximum amount of R1,5 million, whichever is the lowest.
Eligible net sales (ENS):	ENS is the net sales of all primary agricultural products. In other words the gross sales of agricultural products minus the gross purchases of agricultural products. Participants to the programme are limited to a maximum ENS of R1 million.
Withdrawal trigger:	If the gross margin (net sales plus agricultural contract work plus machine rental minus eligible expenses) of the current year falls 30 percent or more below the average gross margin of the previous three years (or three out of the past five years; highest and lowest excluded), withdrawals are authorised up to a maximum of the difference. Withdrawals are not allowed to exceed the account balance. 70 percent of withdrawals are from Account 2 and 30 percent from Account 1.
Interim withdrawals:	Interim withdrawals are allowed. However, interim

withdrawals are not allowed to exceed the account balance. If the interim withdrawals exceed the withdrawal trigger, the balance has to be paid back within 90 days of notification.

Voluntary closure: Voluntary closure of the accounts can take place after the farmer has participated for a minimum of three years. The balance of the accounts will be paid out in full. If the lump sum is repaid farmers are allowed to rejoin within one year. Otherwise, they will have to wait for three years before being allowed to rejoin the programme.

Mandatory closure: Mandatory closure of the accounts will take place when a farmer fails to:

(a) Submit his annual WISP application for two consecutive years.

(b) Submit his annual WISP application in the year of which he received an interim withdrawal.

(c) Repay an interim withdrawal overpayment within 90 days of notification.

The account balance will be paid out in a lump sum and farmers will not be allowed to rejoin for three years.

Service charge: A service charge, determined by the Minister, will be levied on all transactions.

Penalties: Penalties, to be determined by the Minister, will be levied on late submission of annual reports and late repayment of interim withdrawal overcharge.

In evaluating the financial implications of the programme on the treasury, a number of assumptions will have to be made. According to DASMI (1998) there are approximately 8 747 farming units in the Western Cape Province. To this can be added approximately 1 500 farmers from previously disadvantaged communities to bring the total number of farmers in the Western Cape on roughly 10 250.

Extrapolating the data from DASMI (1994) the gross income received from agricultural production in the Western Cape Province was approximately R9,8 billion

in 1998. Intermediate goods (seed, plants and feed) used in the production process amounted to R826 million in the same year. This would imply that the ENS in the province is approximately R9 billion or R885 334 per farmer.

Assuming that there is an eighty/twenty relationship in agriculture[1] this means that twenty percent of the farmers produce eighty percent of the value of production. This would mean that twenty percent of the farmers are responsible for R7,3 billion of the ENS or R3,5 million per farmer. The rules, however, limit the maximum ENS per farmer at R1 million. For this twenty percent of the farmers the maximum ENS would therefore be R2,05 billion. Add this to the ENS (R1,8 billion or R221 333 per farmer) of the remaining eighty percent of farmers and the ENS to be considered for the programme is approximately R3,8 billion.

The maximum matchable contribution, at 3 percent of the ENS, would be R115,9 million, leaving a voluntary contribution of R656,8 million to the farmers. The maximum interest bonus for which the government would be responsible is R6,9 million on the matchable contribution and R19,7 million on the voluntary contribution. If a conservative administrative cost of R300 000 is added, then the maximum exposure to the provincial treasury would have been R142,8 million in the 1998/99 financial year. This is approximately twice the current annual agricultural budget of the Western Cape Province (see Section 4.3.2.2.). If the national government accepted responsibility for half of this amount, then the provincial treasury would have been responsible for R71,5 million. However, it can with safety be assumed that farmers will not deposit the full amounts in the WISP accounts. With this background a number of scenarios can be developed (see Table 5. 8).

It is clear that matching the matchable part of the contribution is the largest (±85%) of the cost of the programme. If this expenditure could be replaced by another incentive, for instance allowing pre-tax deposits, the affordability as well as the attractiveness of the programme may be enhanced.

---

[1] *The eighty/twenty relationship is the conservative assumption for costing purposes. A different relationship (for instance seventy/thirty) would result in more farmers reaching the maximum ENS limit. The result is that a higher total ENS level would be reached, with higher matchable contributions (the largest part of the cost of the programme) required from the treasury.*

Table 5. 8: The financial implications of an income stabilisation programme on the Western Cape Treasury

ITEM	SCENARIO		
	I	II	III
ASSUMPTIONS			
% of Maximum matchable contribution	70%	50%	30%
% of Maximum voluntary contribution	50%	30%	10%
RESULTS			
Matchable contribution (R mil)	R81,1	R57,9	R34,7
Interest on matchable contribution (R mil)	R4,8	R3,5	R2,1
Interest on voluntary contribution (R mil)	R9,8	R5,9	R1,9
Administrative cost (R 000)	R300	R300	R300
TOTAL COST (R mil)	R96,2	R67,6	R39,1
PROVINCIAL SHARE (R mil)	R48,2	R33,9	R19,7

5.8.3. Issues to be resolved

It is clear from the example that an income stabilisation programme for the Western Cape, based on the Canadian example, can be a considerable liability for the Provincial Treasury. From the lessons learned in Section 4.3.3 it can be deduced that such high levels of expenditure is probably not feasible and that a programme along the lines of the Australian example should be considered[1]. However, the Australian programme, that uses tax incentives, is not within the Provincial prerogative. It follows that a strategic alliance should be formed with the National Department of Agriculture in developing an income stabilisation programme for not only the Province, but for the country as a whole. As part of the action plan of such an alliance the following questions should be addressed:

(a) First and foremost is an in-principle decision from government that an income stabilisation strategy should form part of the risk management strategy.

---

[1] *It is significant that Nieuwoudt and Hill (2001) have made a similar recommendation in a study commissioned by the National Government.*

(b) What can be learnt (opportunities, problems, success rate, rate of participation, advantages and disadvantages) from the experience of other countries (i.e. Canada, Australia and USA)?

(c) What is the best form of incentive? Pre-tax savings or post-tax savings with auxiliary incentives?

(d) What is the position of the Department of Finance / SARS?

(e) Who should receive the deposits/premiums? Government, banks (financial institutions) or insurance underwriters?

(f) What are the conditions for private institutions (banks, insurance underwriters) to participate?

(g) Should there be a maximum or minimum annual contribution and/or an effective total minimum or maximum?

(h) Who should be eligible to participate and who should be excluded?

(i) Are there any individuals/groups that should receive preferential treatment?

(j) Will this programme be to the advantage of emergent farmers?

(k) What is the nature of the withdrawal trigger to be used?

(l) Should there be a limit to the amount that a farmer can receive from the system?

(m) What are the WTO implications of such a programme?

(n) Resulting from the answers to the previous questions, is there a matrix of possible strategies?

(o) What is the legislative / institutional requirements of each?

(p) What are the costs, advantages and disadvantages of each?

5.9. MANAGING THE SUPPLY CHAIN

Vertical co-ordination between commercial and production activities and horizontal co-ordination between production activities have long been identified as causes for major concern for individual firms. These co-ordination problems are often grouped together under the term "transaction costs" (Soler & Tanguy, 1998). As a reaction against these set of problems marketing arrangements during the decades of the 1950's and 1960's was characterised by a trend towards fordist standardisation. This was due to demand increases, low levels of understanding, economies of scale and mass production. During the decades of the 1970's and 1980's economics of scope, customisation of products and consumer emphasis on quality and service led to product differentiation and variety. Since then the trend towards

differentiation continued, but accompanied with increasing prominence of reactivity and flexibility. As the demand for farm commodities in Europe was declining during this period, this led to lower commodity prices and a high level of uncertainty amongst producers (see also the discussion in Section 2.3.2). In this environment it was producers with the capacity to react quickly changes in consumer demand that reaped the benefits. It follows that the nature of competition changed from price-competition towards competition based on time from production to consumption as well as the time it takes to put new products on the market in reaction to consumer demand (Soler & Le Gal 1999).

These economic pressures led to the evolution of collaborative marketing ventures and to the encouragement of greater vertical and horizontal integration in the agri-food chains of many countries. To some such vertical collaborative arrangements (linkages, alliances, value-added chains and partnerships) are seen as a compromise between the extreme of neo-classical free markets and complete (monopolist) vertical integration. To others a less rigid way of market co-ordination are offered (Fearne, 1998: 214). It follows that agricultural competition in future would increasingly be between tightly aligned multi-sectoral and multi-national supply chains rather than between firms in the neo-classical market place using traditional price discovery systems (Boehlje & Doering, 1999). This deduction is substantiated by Hobbs *et al* (1998) as well as Rademakers and McKnight (1998) who are convinced that the international success of the Danish pork industry and the Dutch potato industry respectively are the result of effective supply chain arrangements.

Although supply chains are primarily concerned with the movement of goods and services, an important element of supply chain characteristics is the flow of information within the chain. With information is not only meant price information and information regarding consumer preferences, but also information regarding the nature and quality of the product itself (see also Section 3.3.2.5 regarding the increasing importance of this component of farm products). It follows that traceability of farm products, both in terms of consignment/food safety data and quality/whole farm information, are increasingly becoming important. The magnitude of this task becomes clear considered the number of ingredients necessary to make a simple steak and kidney pie or if the difficulties to get full farm records from the paddy fields of China or the communal areas of Africa are contemplated (Wilson & Clarke, 1998).

Is the pressure similar on all industries to move towards supply chains? Soler and Le Gal (1999) identified a number of characteristics that indicates supply chain pressures. These include:

(a) The higher the level of asset and information specifity, the greater the interest of vertical integration.

(b) The higher the level of uncertainty in terms of alternatives, information and control, the greater the interest of vertical integration.

(c) The weaker the legal and commercial structure concerning contracts, the greater the interest of vertical integration.

(d) The higher the perishability of the product, the greater the incentive for vertical integration.

(e) The higher the level of vertical integration, the better the transmission of information and the lower the effect of individual incentive.

Research regarding the dynamics and characteristics of supply chains in South Africa is still very limited. In their groundbreaking work Esterhuizen and Van Rooyen investigated the competitiveness of the different components of food chains in South Africa. The Relative Revealed Trade Advantage (RTA) technique, in which it is assumed that the competitiveness of products can be deduced by the trade performance of the industry, was used. The results for the wheat industry are presented in Table 5. 9. It was found that the maize, pineapple and apple chains are competitive while the meat, milk, sunflower and soybeans chains are not competitive. In the wheat, maize, pineapple and apple chains the competitiveness increases from primary to processed products indicating opportunities for value adding activities. In the case of all other food chains the opposite is true. The main problem with this technique is that it does not reveal *how* an industry acquired its competitive edge, what the reasons are for the non-competitiveness of an industry or how this situation can be rectified.

It was argued in Section 3.2.3 that excessive transaction costs are one of the reasons why agriculture cannot play its role as catalyst in Southern Africa. It was shown in this section that effective supply chains could circumvent this problem. However, due to the unique situation of large, oligopolist buyers on the one side and numerous small subsistence farmers on the other side, the relationships in developing agriculture is often quite difficult to manage. As a result of widespread illiteracy and the instability of agricultural production formal contracts quite often do not have the intended results. This is one of the reasons why Karaan

(1999: 684) maintain that excessive transaction costs favour vertically integrated and more specialised large firms in the mussel farming industry. Tregurtha and Vink (1999) investigated the potential role of trust in relationships of this nature in the barley supply chain. They found that institution-based trust, characteristic-based trust, process-based trust and a trust inducing business environment can circumvent some of the problems. Even more important is the fact that, although the process is complex and time consuming, extended trust relationships can be translated into improved competitive advantage at all levels of the supply chain.

Table 5. 9:   **Competitive advantage of the wheat supply chain in South Africa**

PRODUCT	RELATIVE REVEALED TRADE ADVANTAGE		COMPETITIVENESS
	1997	**1996**	
Wheat	-0,77	-1,73	-
Flour of wheat	1,60	2,52	+
Macaroni	-0,39	-0,63	-
Pastry	0,06	0,03	+
Bread	-0,11	-0,16	-
Breakfast cereals	-0,20	-0,43	-

Source: Esterhuizen & Van Rooyen (1999: 750)

Note: (+) indicates a positive competitive edge and (-) a negative competitive edge.

The importance of an integrated approach to competitiveness evaluation, or in other words, an analysis of the supply chain of an industry, has recently been realised in the agricultural fraternity of South Africa. For this reason Blignaut (1999) as well as Venter and Horsthemke (1999) argue that a supply chain approach should be used to enhance the competitiveness of the local dairy and sheep meat industries respectively. It follows that considerable efficiency gains in both commercial and developing agriculture can be reaped through a supply chain approach that reduce excessive transaction costs. However, before these benefits can be reaped numerous questions need to be answered. These questions include:

(a) What are the dynamics, relevant to the Western Cape, in the global development towards supply chains?

(b) Given its multi-sectoral and multi-national character, what are the social costs and benefits of this movement towards supply chains?

(c) Is it necessary to develop a new regulatory and policy framework (either in support or to curb) to make provision for this new environment?

(d) If yes, what would be the main characteristics of such a regulatory and policy framework?

(e) What is the nature and extent of appropriate support services (research, extension and training) that farmers and other role-players need in order to excel in this environment?

(f) What is an effective strategy to enhance the competitiveness of the wheat supply chain in the Western Cape Province?

5.10. CONCLUSION

The objective of this chapter was to identify a number of possible solutions for the structural problems facing the wheat industry in the Western Cape Province. At the outset it was argued that the solution would not be found in government intervention, as it was clearly indicated in the previous chapter that such intervention would not be forthcoming. It was argued that a solution would rather be found in changing the slope (elasticity) of the demand and supply functions for agricultural produce. In so doing the manifestations of the farm problem could be surmounted. The design of strategies to address this objective relied heavily on insights gained from the theoretical discussion in the previous three chapters.

The one solution contemplated grew from the logic that the supply function for farm produce is an aggregate of the marginal cost of different producers and different technological practices. It follows that if some producers could be enticed to revert their resources to other activities, those producers or practices with the highest marginal cost would be the first to be reverted. The net result would be a more elastic supply function for wheat in the Western Cape. The alternative uses for the natural resources considered include oilseeds, legume grain crops, fibre crops, horticultural crops and indigenous crops. However, alternative crops are not the only alternative uses for the natural resource to be considered. Other uses also contemplated were agri-tourism and counter-urbanisation.

A second solution considered found its roots in the fact that the supply function for a product such as wheat could be inelastic as a result of the limited alternative uses for the product. Or,

in other words, the supply function responds to the demand function that is the aggregate intermediate demand for a number of products. It follows that if the characteristics of the raw product (in this case wheat) could be changed, then a series of new demand functions could be serviced. Again, the result would be a more elastic supply function. The options considered ranged from durum wheat for pasta, white wheat for biscuits and feed grains for the inclusion in animal rations. One of the main limitations identified is that of finding appropriate cultivars for the conditions of the Western Cape.

Turning more to the demand side, but continuing with the argument that the demand function is actually the aggregate of the demand or utility functions of individual households, the possibility of differentiating wheat was considered. A value adding approach, through which information on the *terroir* in which the product was produced is added to the product, was proposed. It was suggested that products from a specific region, or products with specific characteristics or products produced according to organic principles, or any combination thereof, might fulfil this role. However, it is important that the consumer must have confidence in the information presented to him or her. The outlines of a legislative framework, which would result in a certified product, were therefore presented.

It must be acknowledged that not all producers would take advantage of the opportunities described above. It is, therefore, necessary to contemplate solutions for those producers that choose to remain the producers of commodities. As the only route to survival for commodity producers is through staying ahead of the treadmill, the development and availability of new technology is of the utmost importance. However, it was indicated in the previous chapter that the government contribution towards agricultural technology development is declining and is expected to remain low in the foreseeable future. It follows that mechanisms should be created through which farmers could contribute towards the development of that technology, especially in the case of technology with the characteristics of a public good. However, it is not clear that the province has the powers to introduce such a system or whether it would result in (unconstitutional) inter-provincial trade barriers. This question was investigated with the aid of trade theory and the conclusion arrived at was that such a system would not be to the detriment of inter-provincial trade. It was also concluded that considerable advantages, both for producers and consumers, could be generated through such a system if the producer funds were allocated with the right priorities. It is important to note that as a result of the relative price elasticity of supply in the Ruêns and the Swartland separate levy funds are

recommended for wheat producers in these two areas. Finally, the salient points of a legal framework were proposed.

Focussed on commodity producers, but possibly also to the advantage of those producers choosing one of the earlier options consideration was given to the possibilities of introducing a system that farmers could use in equalising their income. As price instability and, therefore, income instability is a problem endemic to the agricultural sector, such a system could counter one of the manifestations of the farm problem. Income stabilisation systems from three countries, Canada, USA and Australia, were evaluated. As the Province does not have the powers to change the tax laws, the Australian example could not be used to tailor-made a system for the Western Cape Province. The proposed system based on the Canadian example turned out to be prohibitively expensive for the Provincial Treasury. It was concluded that an appropriate solution should be sought in collaboration with the National Government. The basic questions to be answered during such a collaborative project were provided.

The last option considered is equally important to both commodity and value-added producers. This is by reducing transaction costs through an integrated evaluation of the supply chain of the industry. It was shown that considerable efficiency gains could be achieved through such an approach. However, as a first step numerous questions need to be answered.

It is clear from this chapter that options do exist for the Western Cape wheat industry through which the manifestations of the farm problem could be challenged. The question that still needs to be answered revolves around the possible impact of these solutions. This will be the objective of the next chapter. In Chapter 6 a model will be developed that will make it possible to quantify the impact of these solutions. The analysis done will be with the aid of scenarios based on the solutions presented in this chapter.

CHAPTER 6

ANALYTICAL EVALUATION OF THE FRAMEWORK OF SOLUTIONS

6.1. INTRODUCTION

In the introductory Chapter it was argued that structural imbalances exists in the wheat industry of the Western Cape, and the objective of this dissertation was stated to be the development of a strategy to rectify these imbalances. It was found in Chapter 2 that a number of the manifestations of the structural imbalances were not unique to the wheat industry of the Western Cape, but normally coincide with the secular decline of agriculture as a result of economic development of a country. In the literature this phenomenon has been dubbed the "farm problem" and, in attempts to rectify it's consequences, numerous forms of government intervention in agriculture have been designed. In the same chapter the reasons for the levels of government support or taxes as part of farm policy was investigated. It was concluded that underlying economic determinants are responsible for the nature of farm policy with pressure group activities only of more marginal importance.

In the next chapter it was found that agriculture has an important role to play in economic development. This is especially true when development proceeds from an agrarian society to an industrial society. However, economic development is not some final goal to be achieved, but can be seen as a moving target, and in the modern era it is evident that the "information society" is on the ascendance. In an information society information and knowledge, with technology as medium, will replace land, labour and capital as the primary sources of wealth, although agriculture still has an important role to play. This role lies not only in the provision of basic needs such as food, but also in the provision of tertiary needs such as identity. It follows that additional structural changes will be necessary for the effective fulfilment of this role.

The focus of Chapter 4 moved from the global to the local scene. It was found that the current structure of wheat farming in the Western Cape was as much, or even more, a result of political determinants than economic realities. These political determinants date back to the

establishment of the Dutch colony at the Cape. The resultant duality of South African agriculture led to more significant changes to the characteristics of the agrarian sector than is obvious at first glance. Although found that agriculture still has a significant role to play in the Western Cape as a vehicle towards redressing the imbalances of the past, the prospects for high levels of government protection for agriculture appear to be slim. It follows that the development of a strategy to address the structural problems of the Western Cape wheat industry should not rely exclusively on government protection.

In the previous chapter a framework of solutions was developed to address these structural imbalances of the wheat industry. These predominantly focussed on changing the slope of the supply and demand functions confronting farmers. It is reasoned that in this way the issues associated with the farm problem could be circumvented. However, some solutions were also provided for those farmers electing to remain commodity producers.

The objective of this chapter is to analyse the possible impact of this framework of solutions. In the first section a model will be developed with which this objective can be achieved. In the following section a number of scenarios, based on the knowledge gained to this point will be developed. Finally the results will be presented and evaluated.

6.2. DEVELOPMENT OF A SPATIAL MODEL

The usual (and often unknown) assumption in economic analyses is that the affected area is represented by a single point on a map. In agriculture, however, the geographic location and therefore distance to markets influence the farm-gate price. Together with the potential of the natural resource this has an often crucial influence on the profitability of the individual operation. Due to the complexity of the situation it is also necessary to include variables such as disaggregated markets, geographical origins and methods of cultivation. A decade or two ago a task like this would be almost impossible to achieve. Fortunately advances in technology, that contributed to this need for a disaggregated approach, also come to the aid of the analyst. It is by no means suggested that the model developed in this section is the only method available, but given the constraints in, and availability of, data and the specific problems to be researched it is the most appropriate for the circumstances.

As the market of final destination plays an important role in the price that can be realised at the farm gate due to transport costs, some markets for Western Cape wheat will be put into context before the model developed will be described.

6.2.1. Domestic market

Wheat produced in the Western Cape Province can be marketed either locally, in another metropolis within South- or Southern Africa, or abroad. The reason why this is necessary is because the Western Cape is a surplus producer of wheat while the rest of the country is normally a deficit producer of wheat. For the purposes of this analysis Cape Town was identified as the main local market, Gauteng as the main market within South Africa and the Far East (Japan) as the main export market.

As South Africa is a net importer of wheat in seven out of ten years (Wheat Board, 1997), domestic prices for wheat will be derived from the import parity price for wheat. Normally imported wheat for the Western Cape market will arrive through the Cape Town harbour while wheat imported for the Gauteng market will be unloaded in Durban. This is due to transport costs, as will become soon apparent. For the moment accept a free on board (FOB) price of US$ 140 per ton for Trigo Pan wheat (as reference) and a zero level of import tariff for the calculation of the price that farmers can expect at the silo gate[1] (see Table 6. 1). At US$20 per ton here are no differences between the shipping cost from Argentina to either Durban or Cape Town (IWC, 1994). Insurance for the sea journey amounts to US$0,60 (Renfreight, 1997) and the import tariff is postulated to be zero. It follows that the cost, insurance and freight (CIF) for imported wheat will be similar for Cape Town and Durban at US$ 160,6 per ton. At an exchange rate of R6,5 to the US$, this amounts to R1 043,8. According to Lewis (1997) the docking and discharge fees (payable in US$) are respectively US$5,56 per ton and US$5,22 per ton at both harbours. This brings the landed cost of imported wheat to R1 113,82 per ton. From here the wheat is transported to a miller. In the case of the Western Cape, with the mills at Malmesbury used as an example, the transport from harbour to mill will be R32,00 per ton (Lourens, 1997). The cost of

---

[1] *It is necessary to clarify the use of a silo-gate price. The farm-gate price is a variable that is dependent on the transport cost between the farm and the silo. As transport cost varies according to the distance traveled, this factor will be included as part of the spatial analysis.*

financing the whole exercise (R128,91) still has to be added, which brings the price at which a miller in the Western Cape can import wheat to R1 274,70. In the Case of Gauteng the same logic applies. Transport from Durban to Gauteng (Randburg) amounts to R105,00 (Lourens, 1997) which results in a higher financing cost (R137,12) and brings the total price for the miller on R1 355,90.

Table 6. 1: Silo gate price of wheat realised by Western Cape producers

ITEM	MARKET	
	Western Cape	Gauteng
Trigo Pan (FOB) ($)	140,0	140,0
Shipping ($)(+)	20,0	20,0
Insurance ($)(+)	0,6	0,6
Tariff ($)(+)	0,0	0,0
CIF ($)(=)	160,6	160,6
Exchange rate (R/$)	6,5	6,5
CIF (R)(=)	1 043,8	1 043,8
Docking costs ($)(+)	5,56	5,56
Discharge cost ($)(+)	5,22	5,22
Landed cost ($) (=)	171,36	171,36
Landed cost (R)(=)	1 113,82	1 113,82
Transport harbour to mill (R)(+)	32,0	105,0
Financing (R)(+)	128,91	137,12
Price at mill (R)(=)	1 274,7	1 355,9
Transport silo to mill (R)(-)	28,0	177,0
Silo price (R)(=)	1 246,7	1 178,9
Storage (W Cape)(R)(-)	65,0	65,0
Storage (Gaut) (R)(-)		40,0
Silo-gate price (R)(=)	1 181,7	1 073,9
% Difference		10,0

Source: Calculated with data obtained from Lourens (1997), IWC (1994), Renfreight (1997), Snyman (1997) and Lewis (1997)

Given *ceteris paribus* assumptions such as comparable quality and availability, the economically rational miller will be willing to pay a local farmer equal to or less than this calculated price at the mill. It follows that the transport cost from the silo to the mill must be subtracted from the miller's price. Take for the moment a transport cost of R28,00 per ton in the Western Cape and a cost of R177,00 per ton for the transport cost from a Western Cape silo to a mill in Gauteng[1] (Lourens, 1997). This brings the silo price in the Western Cape to R1 246,7 and R1 178,9 for wheat being transported locally or to Gauteng respectively. However, the farmer must also pay for the storage of the wheat in the silo (R65,00 per ton). An additional disadvantage for wheat being transported to Gauteng is that an additional R40 per ton must be paid for storage in a silo in Gauteng (Snyman, 1997). A farmer in the Western Cape can thus expect to receive R1 181,70 at the gate of the local silo for wheat that will be consumed in the Western Cape. However, if the wheat is destined for Gauteng he or she can only expect R1 073,90. It follows that the producer of locally consumed wheat will receive a price premium of ten percent.

In the example a FOB Trigo Pan price of US$140 for wheat was used. However, it could be expected that the international price of wheat would fluctuate. This expectation is collaborated by the information provided by Figure 6. 1. It is clear that the price of wheat shows considerable levels of annual fluctuation. However, on a monthly basis this fluctuation is even more pronounced. Over the period 1985 to 1994 the lowest monthly price for Trigo Pan wheat was US$70 (January 1991) and the highest was US$150 (December 1989). The range of price movements is US$80 per ton and the standard deviation 19,8. Due to the high correlation (0,98%) between the prices of the different grades and origins, it is almost immaterial which grade and origin combination is used to evaluate the volatility of wheat prices. It follows that it is important to analyse the sensitivity of the silo gate price for the FOB price of the benchmark. It can be expected that the level at which the import tariff is fixed will also be an important determinant of the silo gate price that farmers can expect. In Table 6. 2 the impact of these two variables (international FOB price of wheat and the level at which the import tariff is fixed) on the silo gate price of wheat is illustrated.

---

[1] *The actual transport costs from the different mills in the Western Cape to the respective markets will be used in the spatial analysis.*
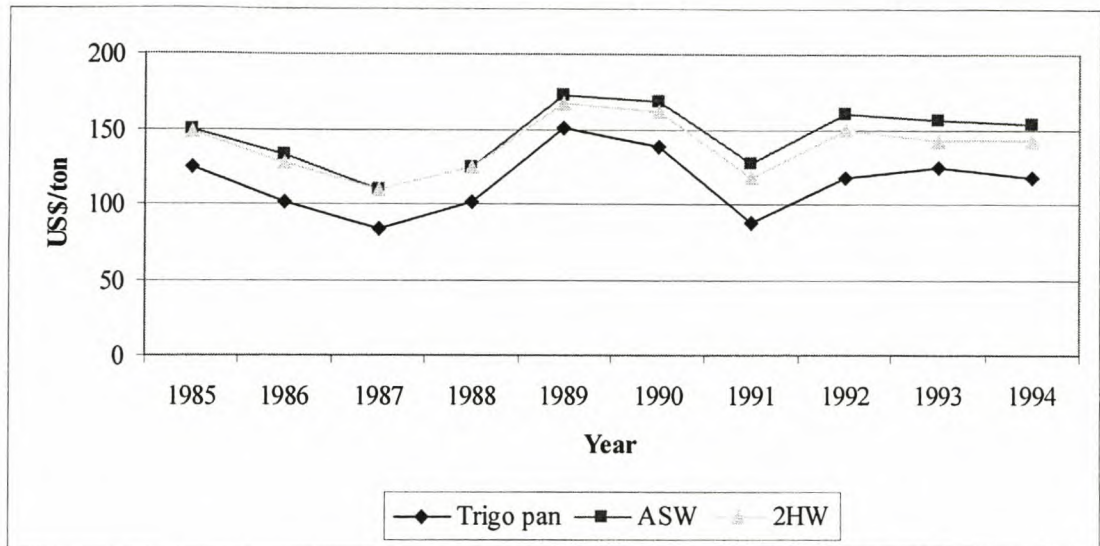
Figure 6. 1: Average annual price for selected grades of wheat

Source: IWC (1994) and IWC (1991)

It is clear that farmers could expect extreme fluctuations in the silo gate price. But, flowing from the discussion in Chapter 2, these extremes should not be a surprise at this stage.

Table 6. 2: Parametric analysis of the silo gate price of wheat at different import tariff levels and FOB prices

FOB	TARIFF LEVELS & MARKETS							
	0%		10%		20%		30%	
	W Cape	Gaut.	W Cape	Gaut.	W Cape	Gaut.	W Cape	Gaut.
$100	R891	R783	R964	R856	R1 036	R928	R1 108	R1 000
$120	R1 037	R929	R1 123	R1 015	R1 210	R1 102	R1 297	R1 189
$140	R1 182	R1 074	R1 283	R1 175	R1 384	R1 276	R1 485	R1 378
$160	R1 327	R1 219	R1 443	R1 335	R1 558	R1 451	R1 674	R1 566
$180	R1 472	R1 364	R1 602	R1 495	R1 732	R1 625	R1 863	R1 755
$200	R1 617	R1 510	R1 762	R1 654	R1 907	R1 799	R2 051	R1 943

Note: Calculated according to the method of Table 6. 1.

6.2.2. International market

Although South Africa is a net importer of wheat in only three out of ten years, the domestic price of wheat would change from import parity to export parity in those years. Almost more important is the fact that the "export" of Western Cape wheat is necessary even in production deficit years due to the transport cost differential between Cape Town/Durban and Gauteng. In such circumstances new markets must be found for some of the wheat produced in the Western Cape Province. With the Far East (Japan) as an example, the calculation of the silo gate price that producers in the Western Cape should expect under these conditions can be done in a manner similar to that in Section 6.2.1, and is presented in Table 6. 3.

Table 6. 3: Silo gate price of exported wheat realised by Western Cape producers

| ITEM	AMOUNT
CIF ($): East	$140,00
Shipping ($) (-)	$20,00
Insurance ($) (-)	$0,58
FOB: Cape Town ($) (=)	$119,42
Exchange rate (R/$)	R 6,50
FOB (R) (=)	R 776,25
Docking ($) (-)	$5,56
Loading cost ($) (-)	$5,22
Price at quay ($) (=)	$108,64
Price at quay (R) (=)	R 706,18
Transport from silo to harbour (R) (-)	R 32,00
Silo-price (R) (=)	R 674,18
Storage (R) (-)	R 65,00
Financing (R) (-)	R 102,38
Silo gate price (R) (=)	R 506,80

Source: Calculated with data obtained from Lourens (1997), IWC (1994), Renfreight (1997), Snyman (1997) and Lewis (1997)

The intermediate consumer (miller) in the country of destination would have the option of either buying Western Cape wheat or wheat from some other origin, given the *ceteris paribus* conditions. If it is accepted that the going rate for wheat at the harbour of destination is US$ 140 per ton (CIF), then the shipping (US$20) (IWC, 1994) and insurance (US$0,58) (Renfreight, 1997) must be subtracted. The result is a FOB price in Cape Town harbour of US$119,42 per ton. At an exchange rate of R6,5 to the US$, this price translates into R775,25 per ton. If the docking cost of US$5,56 per ton and loading cost of US$5,22 per ton is subtracted (Lewis, 1997), the price at the quay is US$108,64 (R706,18) per ton. If the transport of R32,00 per ton (Lourens, 1997) from the silo to the harbour is subtracted, then the price at the silo is R674,18. Subtract the financing cost (R102,38 per ton) and storage (R65,00 per ton) (Snyman, 1997), and the price the farmer can expect at the gate of the silo is R506,80 per ton.

The same argument relating to the volatility of the price of wheat necessitates a parametric analysis, this time combined with a fluctuating exchange rate (see Table 6. 4).

Table 6. 4: Parametric analysis of the silo gate price of exported wheat at changing international prices and the Rand/Dollar exchange rate

Change in exchange rate	Price					
	$100	$120	$140	$160	$180	$200
30%	R164,89	R245,27	R325,66	R406,05	R486,44	R566,82
20%	R202,30	R294,17	R386,04	R477,91	R569,78	R661,65
10%	R239,71	R343,07	R446,42	R549,78	R653,13	R756,49
0%	R277,12	R391,96	R506,80	R621,64	R736,48	R851,32
-10%	R314,54	R440,86	R567,18	R693,50	R819,83	R946,15
-20%	R351,95	R489,76	R627,56	R765,37	R903,17	R1 040,98
-30%	R389,36	R538,65	R687,94	R837,23	R986,52	R1 135,81
-40%	R426,77	R587,55	R748,32	R909,10	R1 069,87	R1 230,64
-50%	R464,19	R636,44	R808,70	R980,96	R1 153,22	R1 325,48
-60%	R501,60	R685,34	R869,08	R1 052,82	R1 236,57	R1 420,31

Note: Calculated according to the method of Table 6. 3.

In comparing the data in Table 6. 4 with those in Table 6. 2, it appears that the price differential is smaller in the case of exported wheat (R574,2 per ton) than is the case in domestically marketed wheat (R726,00) if the change in the exchange rate and the tariff level is penned at zero respectively. However, due to the fact that the price for exported wheat is generally lower than domestically marketed wheat the percentage differential is higher (207% compared to 81%). It follows that those producers forced to export are at a clear disadvantage *vis a vis* those with local markets.

6.2.3. Transport cost

In the development of a spatial model the transport cost from the farm gate to the silo and from the silo to the final destination must be considered. In transporting wheat from the farm gate to the silo three categories of farms can be identified. The first category is those farms within or equal to a radius of fifteen kilometres from the nearest silo. The second category is farms situated less than or equal to thirty kilometres, but more than fifteen kilometres from the nearest silo. The last category is farms situated more than thirty kilometres from the nearest silo. It was further assumed, based on Finrec (1996) results, that a truck with a capacity of eight tons was used in the transport of the wheat from the farm to the silo. Based on these assumptions the transport costs from farm-gate to silo would, according to Mentz and Nqaba (1997) amount to:

(a) Radius less than or equal to fifteen km: R6,92 a ton

(b) Radius more than fifteen, but less or equal to thirty km: R17,31 a ton

(c) Radius more than thirty km: R34,62 a ton

For the purposes of the model the second part of transport costs, namely the points where the Western Cape produced wheat leaves the agricultural distribution channels are:

(a) the mills in the Paarl for wheat consumed in the local market,

(b) Rustenburg via Beaufort-West for wheat consumed in Gauteng,

(c) and the Cape Town Harbour[1] in the case of wheat being exported.

---

[1] *Although the harbours of Saldanha and Mosselbay are clear alternatives for the Cape Town harbour, the current capacity and infrastructure of these harbours is not conductive for the wholesale export of wheat.*

In this case it was assumed that transportation by rail would be the most cost-effective method of transportation. Due to the competitive nature of the transport sector role-players were unwilling to make known their rates. This problem was circumvented by making certain assumptions. The results were tested on relevant role-players until reliable transport costs were arrived at from each silo to the respective destinations. Due to the confidentiality of the results the data cannot be presented here, but were included in the model by replacing the transport costs presented in Table 6. 1 and Table 6. 3 with the relevant vector.

6.2.4. Agricultural potential for rainfed wheat production in the Western Cape Province

It was already mentioned that one of the basic underlying assumptions often made in analytical work is that an area such as the Western Cape can be represented as a single point on a map. This oversimplification is often compounded by the further assumption that the production potential of an area is undifferentiated. The inclusion of the potential for wheat production in a model would largely enhance the usefulness of such a model. If the production potential could be combined with the spatial dispersion of such potential, the value of such a model increases exponentially. In this case it was possible to combine the spatial model with a Geographic Information System (GIS) model to achieve the necessary resolution.

The most important factors determining the production potential for rainfed wheat include soil characteristics, annual rainfall, the distribution of such rainfall through the year and minimum and maximum temperatures. Combining the spatial distribution of these variables with the agronomic requirements of a crop such as wheat will result in a map of potential yield (see Attachment A). The GIS model, and the combination of the GIS model with the agronomic requirements is the result of work done by Wallace (2000).

It is important to note that this map represents an indication of the <u>potential</u> for wheat production and not the actual yields achieved. The reason is twofold. In the first

---

Especially in the case of Saldanha the dust resulting from the export of iron ore from Sishen prevents food export.

instance the necessary data to monitor the actual yields are not available. In addition the map will only be used to identify the actual location of four classes of land, namely high, medium and low potential as well as areas unsuitable for rainfed wheat production. Through a process of consultation with experts more realistic levels of actual yields were identified in defining the yield classes used in the spatial model (see Table 6. 5).

Table 6. 5: Yield classes used in the spatial model

YIELD-CLASS	YIELD (t/ha)		
	Average	Lower limit	Upper limit
Unsuitable		0	<1
Low potential	1,5	1	<2
Medium potential	2,5	2	<3
High potential	3,5	3	

A second important and implicit assumption in the GIS model is that no wheat under irrigation is included in the model. The reasons for this omission is threefold:

(a) The opportunity cost of irrigation water precludes the economically rational irrigation of wheat in the Western Cape Province.

(b) The expected increase in the cost of irrigation water limits it's use on wheat.

(c) The limited sources of water in the Western Cape and the increasing pressure for water to be used in urban areas precludes the irrigation of wheat.

It follows that on both micro as well as macro level the rational decision will be to refrain from cultivating wheat on irrigated land. Where wheat is irrigated in the Western Cape at present, it is usually with "surplus" water in the off-season on irrigation schemes where water prices are lower than their shadow value.

In a recent study by Pretorius (2000) the optimal permanent crop use of the natural resources in the Western Cape was evaluated with the aid of a GIS based linear programming model. The hypothesis that irrigated areas will not be used for wheat production was corroborated by this research. Following this line of reasoning to its full conclusion, the area currently classified as "temporary dryland" in the Land Cover

Database (WNNR, 1997) was used as a "cookie cutter" on the GIS model to eliminate those potential wheat producing areas that are currently irrigated or planted with permanent crops. See Attachment B for a map of the Land Cover Database and the template used as "cookie cutter".

According to the GIS model there is approximately 3,5 million hectares in the Western Cape Province that is suitable for the production of wheat under rainfed conditions. After irrigated areas and land planted with permanent crops were removed, 1,45 million hectares remained for analysis. Of this area 26,1 percent can be classified as high potential for the production of wheat, 43,8 percent of medium potential and 30,1 percent as low potential. A not unexpected coincidence is that the area with a high potential tends to be closer to the Cape Metropole. However, a significant part of this high potential land is currently under perennial crops such as vineyards and deciduous fruit, and the diversion of such land to wheat production cannot be expected. The flip side of the coin is that those areas with the lowest potential tend to be the greatest distance from the Cape metropole. It follows that these farms suffer from a dual disadvantage: low potential and high transport costs. This dual disadvantage was previously masked by the pan-territorial price regime maintained under the Control Board regulations. An interesting observation is that four of the silos in the Western Cape are situated in areas that are apparently unsuitable for the production of wheat.

6.2.5. Combining the different aspects of the model

The components of the model, namely the price of wheat, transport cost and potential for rainfed wheat production were combined in a matrix in a Excel-worksheet in such a way that the parameters could be changed with a minimum of effort. As the aim is to identify the profitability of wheat production in different localities, cost of production (based on Combud (1999) and Finrec (1996) results) was included in the matrix for each specific locality and class of yield potential. Although a wide variety of production systems exist, the model was initially based on a wheat monoculture.

Although the model has various strong points in that it is based on the spatial distribution and production potential of units of 20 hectares (smaller than the average cropping field in the Western Cape), these advantages also result in certain limitations.

The first is that it is not a sophisticated optimisation model such as that developed by *inter alia* Howcroft and Ortmann (1990), Nowers and Van Zyl (1991), Louw and Van Schalkwyk (1997) and Pretorius (2000). However, in any modelling exercise there is usually a trade-off between detail and complexity. The size of the matrix of a linear programming model is usually equal to the number of activities powered by the number of variables. In this case, focussing on units of 20 hectares each, the number of production units in the potential wheat producing areas of the Western Cape would alone amount to 175 000 rows in a LP matrix. It follows that the result would be a matrix of unmanageable size and the typical "black box" effect. Rather than duplicating previous research it was decided to focus on a model that allows a higher resolution. Second, it does not allow for endogenous price formation for each individual unit. Again, deriving an unique supply and demand function for each production unit would contribute result in a matrix of unmanageable size. Third and for the same reasons as mentioned, it does not allow for substitution between alternative uses of the natural resources. As a result the analysis that can be done with the aid of the model is limited. However, if the data is interpreted with caution a useful indication of changes in profitability can be derived.

6.3. SCENARIO DEVELOPMENT

It is clear that a wide range of variables influence the profitability of wheat production in the Western Cape Province. It can be assumed that structural changes to the industry will not occur overnight, but will be gradual. It follows that the development of different scenarios, through which specific changes can be gradually introduced, will be a useful technique in evaluating the farm-level profitability of wheat production.

A scenario[1] describes a certain set of conditions and assumptions which are not necessarily avowed to be a true statement of reality, but are more often than not the perimeters of a number of "what if" questions. It follows that the assumptions on which a scenario is based are often as important as the results of the scenario itself. A scenario seldom reflects a "final

---

[1] *The concept of a "scenario" originated in the performing arts where the term was used to describe the physical and emotional environment in which a specific act would be performed. In the definition of the term was included the scenery (décor) of that part of the play; from there the origin of the word scenario. Understanding the origins of the term "scenario" will lead to an understanding of the application of the concept in agricultural economics research.*

answer" or the "ultimate truth" but can be seen as a contribution towards the better understanding of the whole. Through a process of successive scenarios a progressive reflection of the impact of a number of assumptions on a subject can be created.

It is necessary to clarify one of the assumptions that will be made during the development of the scenarios. This assumption is that marginal areas will be the first to be converted from wheat production if an alternative use for natural resources becomes available. It can be argued that the higher quality resources will be the first to be converted to high value uses. In the Western Cape this is indeed the case where most of the production areas with high potential is currently planted with permanent crops such as vineyards and deciduous tree orchards. This is especially true if the analysis is focussed on individual farms. However, it has been argued that very little alternative uses for the current cropping areas are available. In addition those areas that are suitable for high value crops has already been removed from the GIS model with the aid of the Land Use Database. Finally, on a regional basis farmers in marginal areas will be the first to experience financial difficulties and would therefore be the first to foreclose or consider alternative uses for the natural resource, albeit associated with a decline in personal living standards. Recent experience show that marginal farms were the first to be converted to pastures in the cropping areas of the summer rainfall areas. In the Western Cape annual survey data for the period 1988 to 1999 (WCDOA, 1999a and WCDOA, 1999b) of the cropping areas in the Swartland and the Ruêns confirms this trend. Rotational systems were adopted in marginal areas while monoculture wheat production was still the norm in the high potential wheat producing areas.

In this section the assumptions of the first scenario will be a reflection of current conditions. The objective of developing a *status quo* scenario is to establish some sort of norm against which the impact of the other scenarios can be evaluated. Following the first scenario certain of the assumptions will be changed in order to reflect the possible impact of the framework of solutions developed in Chapter 5.

6.3.1. The *status quo*

For the purpose of the development of the scenarios it is assumed that no tariff protection exist for the wheat industry. It is also assumed that the exchange rate for

the Rand is R6,50 for one United States Dollar. These two assumptions will remain constant for all the scenarios.

The international price of wheat is assumed to be US$120 per ton, FOB, at the Gulf of Mexico. Although the Trigo Pan price of wheat is normally used as reference price for South African wheat, very little wheat is imported from Argentina, while the imports usually originate in the USA and Canada. For this reason the Gulf price is a more accurate indication of the competitiveness of the local industry. The model has been adapted to make provision for the difference in transport costs.

The Combud (1999) enterprise budgets have been used to determine the cost of production for wheat at the different localities. Finally, it is assumed that 40 percent of the wheat is consumed locally, 20 percent is transported to Gauteng for consumption there and 40 percent is exported. This is then the basic assumptions for Scenario I (see Table 6. 6 for a summary of scenario assumptions).

Table 6. 6:   Assumptions on which scenarios are based

ASSUMPTIONS	SCENARIO						
	I	II	III	IV	V	VI	VII
Level of tariff protection	0%	0%	0%	0%	0%	0%	0%
FOB price of wheat*	$120	$120	$120	$120	$120	$100	$120
Levy on wheat (R/ton)	R0	R0	R0	R10	R10	R0	R10
Change in production cost	0%	0%	0%	0%	-20%	0%	-20%
Change in exchange rate	0%	0%	0%	0%	0%	0%	0%
% Locally consumed	40%	60%	60%	40%	40%	40%	60%
% Consumed in Gauteng	20%	20%	20%	20%	20%	20%	20%
% Consumed abroad	40%	20%	20%	40%	40%	40%	20%
% Price premium	0%	0%	100%	0%	0%	0%	100%
% Of crop with price premium	0%	0%	10%	0%	0%	0%	10%

*   US$/ton, Gulf of Mexico

6.3.2. The impact of alternative uses for the natural resources

In Sections 5.3 to 5.5 a number of alternative uses for the natural resources currently used for wheat production in the Western Cape were identified. If it is postulated that approximately 50 000 hectares currently used for wheat production can be reallocated to other uses, the result would be a reduction of approximately 100 000 tons in the production of wheat. This is with the assumption that lower and medium potential land would be the first to be reallocated. This postulation is not unattainable. It was argued in Section 5.4 that approximately 30 000 tons of durum wheat is imported annually and that the conservatively calculated demand for feed grain could be 470 500 ton wheat, 223 000 ton barley or 220 500 ton triticale.

The result would be that the surplus of wheat produced would decline from the annual average of 315 000 tons to approximately 215 000 tons. As exported wheat is the relatively least competitive, it can be argued that the reduction would be from the exported wheat. Following this line of reasoning the same set of assumptions is used for Scenario II with the exception that 60 percent of the wheat is consumed locally and only 20 percent is exported.

6.3.3. The impact of value adding

The argument in Section 5.6 was that adding information to the specific crop could differentiate farm produce. The result would be differentiated supply and demand functions for the product under discussion. The example used was *terrior*-based products with a specific geographical, cultural and historical identity. Included in this category are so-called organically produced farm products.

In Scenario III the same assumptions as in Scenario II are used. In addition it is argued that 10 percent of the wheat crop could get a price premium of approximately 100 percent above the normal undifferentiated crop. This assumption is not unattainable if the price premium for *terrior*-based wine as well as the price premium of up to 200 percent in Denmark for organically produced wheat is considered (see Offerman & Nieberg, 1999: 519). Due to the fact that fewer chemicals are generally used in the production of wheat in low-yielding areas, it is assumed that marginal land

will be the first to be converted to organic production. Also to be considered is the fact that the less efficient land and practices will have the highest marginal cost and will be the first to be converted.

6.3.4. A research levy on wheat

It was indicated in Section 4.3 that the amount of money being spent on agricultural research is declining. It was also indicated that, due to the changes in the underlying economic variables, the chances are small that this set of conditions could be inverted, at a time when international advances in technology are eroding the resource based competitiveness strategy of the South African agricultural sector.

As a solution a voluntary producers' levy on farm products was suggested in Section 5.7. It was maintained that, due to the relative price elasticity of the supply and demand functions for farm products and due to the free-market environment for agricultural produce in South Africa, a levy would not influence the consumer price of farm produce. However, it would increase the cost of production. A levy of R10 per ton for wheat would currently be equal to approximately one percent of the silo-gate price. Introduced on the wheat currently being produced in the Western Cape, it would amount to approximately R6,5 million that is available for research. The magnitude of this amount must be put into perspective. According to the ARC (2000) the average operating expenditures of the Grain Crops Institute at Bethlehem amounted to R7,5 million per annum over the period 1992 to 1998. This was for research in the whole of South Africa, and not only the Western Cape. It follows that the funds collected through this levy could go a long way towards ensuring new and efficient technology for the Western Cape wheat industry.

In Scenario IV the impact of such a levy on the profitability of wheat production over the short term is evaluated. All other assumptions are similar to that of Scenario I with the only exception that the cost of wheat production is increased by R10,00 (the amount of the levy). In Scenario V a longer view perspective is adopted. In this scenario it is reasoned that the levy would be spent on research and that the research would lead to a reduction of 20 percent in the cost of wheat production. As was indicated in Section 5.7 this assumption is not unimaginable. Considerable efficiency

gains can also be achieved through research into supply chain arrangements (see Section 5.9). The rest of the assumptions of Scenario V are the same as in Scenario IV.

6.3.5. The effect of income stabilisation on the profitability of wheat production

Agriculture is prone to a magnitude of different forms of risk; *inter alia* climatic or natural risk, market risk, price risk, policy risk, social risk, macro-economic and environmental risk. In evaluating the possible negative impact of an element of risk on farming, a price decline is used as an example for the development of Scenario VI. In order to get an indication of the potential negative effect of a price decline on profitability, it is assumed that the international price of wheat declines from $120 to $100 in a specific year. All other assumptions are similar to that of Scenario I.

6.3.6. The possible impact of the framework of solutions

In the first six scenarios the possible impact of the different solutions were evaluated one at a time. However, it is worthwhile to consider the possible impact on the profitability of wheat production if all the different scenarios are combined. This is the objective of Scenario VII.

The assumptions of Scenario VII are the same as in Scenario I with the following exceptions. A R10 per ton levy is introduced on wheat, which results in a twenty percent lower cost of production. Due to the fact that a significant proportion of land has been relocated from the production of wheat to other applications, 60 percent of the wheat produced is consumed locally while only 20 percent is exported. In addition value-adding activities result in the fact that 10 percent of the local wheat crop gets a price premium of 100%. Due to income stabilisation the international price of wheat is assumed to remain constant at $120 per ton.

6.4. RESULTS

The model developed in Section 6.2 was used to evaluate the scenarios as described in Section 6.3. The spatial results of the scenarios are available in Attachment C and summaries of the main characteristics are presented in Table 6. 7, Table 6. 8, Table 6. 9 and Table 6. 10.

Table 6. 7: **Profitability of wheat production as a result of the different scenarios (area).**

MARGIN	SCENARIO						
	I	II	III	IV	V	VI	VII
	AREA (1000 HA)						
NEGATIVE MARGIN:							
Positive gross, negative net	64,3	145,2	332,5	92,7	285,8	509,7	10,6
Negative gross	332,5	187,2	0,0	332,5	46,6	544,4	0,0
Total negative	**396,8**	**332,4**	**332,5**	**425,2**	**332,5**	**1 054,1**	**10,6**
POSITIVE MARGIN:							
>R200/ton	0,0	398,5	1 003,0	0,0	389,5	0,0	1 116,0
R100 - R200/ton	398,6	649,6	114,6	397,6	591,2	0,0	15,0
<R100/ton	654,7	69,5	0,0	605,4	130,5	395,6	306,4
Total positive	**1 053,3**	**1 117,6**	**1 117,6**	**1 003,0**	**1 111,3**	**395,6**	**1 437,4**
TOTAL AREA	**1 450,1**	**1 450,0**	**1 450,1**	**1 428,2**	**1 443,8**	**1 449,7**	**1 448,0**

With the assumptions used to describe the *status quo* in Scenario I it is apparent that wheat can be profitably produced on 1,05 million hectares (72,6% of the area) in the Western Cape Province. However, the profitability levels on the majority of this area (0,65 million hectares or 45,1% of the area) are relatively low at below R100 per ton. No wheat can be produced in the highly profitable over R200 per ton price bracket. The production of wheat is unprofitable on more than 0,396 million hectares (27,4%) of the area in the Western Cape Province that is suitable for rainfed wheat production.

The objective of Scenario II was to evaluate the possible impact of alternative uses, as identified in Sections 5.3 to 5.5, for the natural resource. It was assumed that the local production of wheat would decline by approximately 100 000 tons, resulting in less being "exported" from the province. The result would be higher average prices for the remaining wheat.

Table 6. 8:   **Profitability of wheat production as a result of the different scenarios (percentage).**

MARGIN	SCENARIO						
	I	II	III	IV	V	VI	VII
	AREA (%)						
NEGATIVE MARGIN:							
Positive gross, negative net	4,4%	10,0%	22,9%	6,5%	19,8%	35,2%	0,7%
Negative gross	22,9%	12,9%	0,0%	23,3%	3,2%	37,6%	0,0%
Total negative	**27,4%**	**22,9%**	**22,9%**	**29,8%**	**23,0%**	**72,7%**	**0,7%**
POSITIVE MARGIN:							
>R200/ton	0,0%	27,5%	69,2%	0,0%	27,0%	0,0%	77,1%
R100 - R200/ton	27,5%	44,8%	7,9%	27,8%	41,0%	0,0%	1,0%
<R100/ton	45,1%	4,8%	0,0%	42,4%	9,0%	27,3%	21,2%
Total positive	**72,6%**	**77,1%**	**77,1%**	**70,2%**	**77,0%**	**27,3%**	**99,3%**
TOTAL AREA	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

The result of the assumptions of Scenario II is that the area where wheat could be profitably produced would increase by 64 000 hectares (6,1%) to 1,12 million hectares. More significant is the fact that 398 500 hectares (27,5%) of the area now falls in the highly profitable R200 per ton bracket. This should be compared to the decline by 64 400 hectares (16,2%) of the area with a negative profitability margin. It is clear from the results of this scenario that wheat production in a large area of the Western Cape would still remain unprofitable and that the most notable effect could be found in the increase of the profitability of areas where wheat production was profitable in the base scenario.

Table 6. 9:   **Change from the base scenario (area).**

MARGIN	SCENARIO						
	I	II	III	IV	V	VI	VII
	AREA (1000 HA)						
NEGATIVE MARGIN:							
Positive gross, negative net	NA	80,9	268,2	28,4	221,5	445,4	-53,7
Negative gross	NA	-145,3	-332,5	0,0	-285,8	212,0	-332,5
Total negative	**NA**	**-64,4**	**-64,3**	**28,4**	**-64,3**	**657,3**	**-386,2**
POSITIVE MARGIN:							
>R200/ton	NA	398,5	1 003,0	0,0	389,5	0,0	1 116,0
R100 - R200/ton	NA	251,0	-284,0	-1,0	192,6	-398,6	-383,6
<R100/ton	NA	-585,2	-654,7	-49,3	-524,2	-259,1	-348,3
Total positive	**NA**	**64,3**	**64,3**	**-50,3**	**58,0**	**-657,7**	**384,1**

Scenario III is an extension of the assumptions used in Scenario II. It is argued that information could be an effective means of adding value to an agricultural product; wheat in this case. Specific emphasis is put on *terrior*-based and organically produced farm products. What is significant from the results of this scenario is the fact that more than one million hectares (69,2%) of the wheat producing areas of the Western Cape now falls in the high profitability category (a net margin of more than R200 per ton). Also important is the fact that the area with the lowest profitability rating (a negative gross margin) is now zero. The results of this scenario may be somewhat misleading as the land that would probably be the first to be converted to organic production is that in the outlying and least profitable areas. The model could not capture this effect.

Table 6. 10:   Percentage change from the base scenario.

MARGIN	SCENARIO						
	I	II	III	IV	V	VI	VII
	AREA (%)						
NEGATIVE MARGIN:							
Positive gross, negative net	NA	125,8%	417,1%	44,2%	344,6%	692,8%	-83,6%
Negative gross	NA	-43,7%	-100,0%	0,0%	-86,0%	63,8%	-100,0%
Total negative	**NA**	**-16,2%**	**-16,2%**	**7,2%**	**-16,2%**	**165,7%**	**-97,3%**
POSITIVE MARGIN:							
>R200/ton	NA	—	—	—	—	—	—
R100 - R200/ton	NA	63,0%	-71,3%	-0,3%	48,3%	-100,0%	-96,2%
<R100/ton	NA	-89,4%	-100,0%	-7,5%	-80,1%	-39,6%	-53,2%
Total positive	**NA**	**6,1%**	**6,1%**	**-4,8%**	**5,5%**	**-62,4%**	**36,5%**

Note: The indicator "—" is used in the cases where division by zero took place.

The objective of Scenarios IV and V was to evaluate the possible effect of the introduction of a research levy on the wheat industry of the Western Cape Province. If the results of Scenario IV (where the short-term effect of the introduction of the levy is evaluated) are compared with the base scenario, it is clear that 28 400 hectares (2,0% of the total area) shifts from marginally profitable to marginally unprofitable. The rest of the area, to a large extent, remains on the same level of profitability. However, over the longer term the area with a negative margin declines by 64 300 hectares (16,2%) and 389 500 hectares (27,0% of the total area) is elevated to the most profitable category (a margin of greater than R200 per ton). The area in the second most profitable category (a margin of between R100 and R200 per ton) increased to more than 591 200 hectares. As was predicted in Section 5.7 the long-term benefits of a research levy outstrips the short-term costs.

The impact of income instability (in this case price instability) is evaluated with the aid of Scenario VI. A 16,7 percent decrease in the price of wheat ($20 per ton) resulted in a 165,7 percent increase to 1,05 million hectares (72,7% of the total area) in the area with unprofitable wheat production compared to the base scenario. Only 395 600 hectares (27,3% of the total area) remained with the potential of profitable wheat production; and that in the lowest profitability class (a margin of less than R100 per ton). The possible impact of price instability on the profitability of wheat production in the Western Cape is clearly illustrated by this scenario.

The final scenario was used to evaluate the possible combined effect of the different remedies. The results of this final scenario shows that wheat could be profitably produced on 1,4 million hectares (99,3% of the total area) of the Western Cape Province. Only 10 600 hectares (0,7% of the total area) remain where the production of wheat is unprofitable. More significant is the fact that more than 1,1 million hectares (77,1% of the total area) can be classified as highly profitable at a margin of greater than R200 per ton.

6.5. CONCLUSION

It was shown in previous chapters that, although the problems experienced by the local industry are not unique and farm policy in the rest of the world is often targeted at the alleviation of these problems, the fiscal cost of such farm policy programmes precludes its use in the Western Cape. It was argued that an empowering strategy would lead to the optimum results. The objective of this Chapter was to quantitatively and spatially evaluate the possible impact of the solutions, identified in Chapter 5, to the structural imbalances of the wheat industry of the Western Cape Province.

In achieving this objective a spatial model was developed that makes provision for different markets for the locally produced wheat and the transport cost from different farms to areas of intermediate storage as well as to the final market. Also included in the model is the yield potential of wheat in different localities as well as the cost and income associated with the spatially distributed localities.

With the aid of this model seven scenarios, based on the strategy developed in Chapter 5, were developed and evaluated. The first scenario represented the *status quo*. In the second

scenario alternative uses for the natural resource were introduced and in the third scenario the differentiation of wheat was evaluated. Scenarios Four and Five respectively focussed on the short and long-term implications of the introduction of a research levy. In Scenario Six the impact of price instability as a representative form of risk was evaluated. The final scenario was used to evaluate the combined impact of the different components of the strategy.

It was found that each of the components of the strategy would substantially contribute to a more profitable wheat industry for the Western Cape. The combined effect of the strategy would result in a 97 percent decrease in the area where wheat production is unprofitable under the base scenario. Profitable production of wheat would be possible on 99,3 percent of the total area that is suitable for rainfed wheat production. On more than 1,1 million hectares (77,1% of the total area) the production of wheat would be highly profitable at a margin of more than R200 per ton.

CHAPTER 7

CONCLUSIONS

7.1. CONCLUSIONS AND SUMMARY

The objective of this dissertation was to investigate the structural imbalances in the wheat industry of the Western Cape Province and, with cognisance of the interaction between the industry and the rest of the economy as well as with government, to develop an effective strategy for the industry.   It was found that along the route of economic development agriculture would face a number of well-documented problems.   These include price instability, the treadmill problem and asset fixity. One of the basic causes of these problems is the relative price elasticities of demand and supply. Various solutions, known under the rubric of the "farm problem", have been implemented in the past as a remedy for these characteristics. It is unfortunate that a number of these policy measures have contributed to the problem rather than to their solution.   This is especially the case where the policy measures introduced by developed countries have been to the detriment of developing countries.

Turning to the domain of political economy theory, the propensity of politicians to provide the necessary support to agriculture has been investigated.   Three "schools" or "approaches" namely welfare economics, public choice theory and politician – voter interaction were discussed. It has been argued in the literature that the politician – voter interaction approach is not new as such, but only a branch of the pressure group approach (see for instance Brooks, 1995 and Olper, 1998).   This argument may be taken a step further to include the welfare maximisation approach. The concept of the relative movement of *per capita* income between land and labour owners as a determinant of support (De Gorter & Tsur, 1991; Swinnen, 1994) shows similarities with the Pigouian concept of economic welfare (Pigou, 1932: 10 – 18).   In addition it can be argued that the relative movement of *per capita* income between land and labour owners in developed economies would imply a Pareto worsening, and that some form of compensation along the lines of the Hicks-Kaldor criterion would be called for.   With reference to the pressure group approach the concept of defending the *status quo ante* (see

Hagedorn *et al*, 1990: 15 – 23) and the concept of the "tyranny of the *status quo*" (Becker, 1983: 382) show the same underlying principle.

It is interesting that the initial work using Becker-type models also shows a distinct similarity to the concept of economic welfare. However, in later work proponents of the pressure group approach were forced to return to the so-called x-factor; non-economic "other goods" (see for instance Becker, 1985 and Bullock, 1994) that include such vague concepts as "altruism", "envy" and "guilt".

The real difference between the pressure group and politician – voter interaction approaches is not that similar variables are included in analysis, but certain pressure group variables, such as deadweight costs, altruism and group efficiency are excluded. Although some of the variables are similar, the basic point of departure is different. Where the politician – voter interaction approach departs from the tenet that both politicians and voters are fully informed rent-seeking entrepreneurs, the pressure group approach see politicians in a passive or clearinghouse role.

It is interesting to note the cycle that is observed in the evolution of the theory. A monetary approach reaches a stage where it is necessary to include the x-factor or, non-monetary variables. However, due to the vagueness and unmeasurability of the x-factor it becomes necessary to branch into a new monetary approach that at some time again necessitates the inclusion of the x-factor.

The implications for the wheat industry, as well as the agricultural sector, of the Western Cape Province are clear. The traditional wisdom has it that in searching for a Pareto optimal state, or at least a second-best solution, pressure group activities may play an important role. This is seen as important due to the difficulties, as indicated by Arrow's impossibility theorem, in transforming individual preferences into political preference functions. However, numerous examples have shown that pressure group activities may only play a marginal role in influencing the final outcome. The underlying structural characteristics of the national and provincial economies may be a more important determinant.

Although the normal path of the economic development of a country, with few exceptions, leads to a secular decline of the agricultural sector, this sector still plays a significant role as

catalyst in the development process. Ignoring this role of the agricultural sector by focussing on industrial support and infant industry policy programmes is usually to the detriment of the wealth and economic growth of the country or region concerned. Increased productivity and, therefore, lower production costs of food in the agricultural sector of a developing nation may lead to the readily availability of food and foreign exchange earnings. The resulting higher levels of rural income will lead to both public and private capital formation and will result in the development of a rural market for the industrial sector. The expansion of the industrial sector will lead to new job opportunities for which the agricultural sector is supposed to release labour. Due to the unique income elasticity of demand in developing countries, this in turn will again lead to increased demand for agricultural products, and therefore the start of a new cycle or, in other words, an upward spiral of economic growth. It is therefore clear that productivity in the agricultural sector can play an important catalytic role.

In spite of the existing resource potential and the scope for efficiency increases in the agricultural sector of most Southern African countries, some of these countries are amongst the poorest of the poor in global terms, with a significant percentage of the population facing food insecurity. The reason for this delayed development can be found in a nexus of circumstances ranging from inconsistent domestic policy through adverse trade regimes and inappropriate technology to problems encountered in the management of a highly complex development process. It follows that the development of the right policy, institutional, human and physical environment in Southern Africa can create the situation where agriculture can act as catalyst in the economic transformation of the region.

In this transition from the status of a developing to a developed economy, agriculture will be one of the most important sectors of the economy, albeit in an environment of secular decline. Farmers will operate in an environment where no government subsidised safety net is available and the trading of farm produce becomes more important to provide for cash needs (both household and for the farming operation). At the same time agriculture will remain an important source of public and private capital and labour will be abundant, resulting in a relatively low capital to land ratio and capital to labour ratio. Although farm sizes will still be relatively small due to managerial considerations, it can be expected that farm sizes will increase over time with a corresponding decline in the number of farms.

The dawn of the 21st century has seen the development of the industrialised economies into a new phase, called variously the information economy, post-industrial society, post-fordism, informatised industrial society, knowledge society and learning society. What these approaches have in common is that the new environment will result in changes at the core of society with information and knowledge replacing land, labour and capital as the sources of the creation of wealth. It is therefore appropriate to call this new phase the information society.

The structure of agriculture in an information society will depend on a number of key trends. Although agriculture will remain an important part of society, this importance will be more than just the provision of nutrition. Agricultural products can acquire significant heritage and cultural value, especially if they are connected with a specific *terroir*. However, the main market for *terroir*-based products over the short term will probably be in the current "wealthy north" where population growth is stagnating, ruralisation takes place and the population is ageing. Considering the declining population growth rates in most countries, these trends may also become visible towards the second half of the 21st century. These products with a distinct niche character will not only be exploited by the traditional family farmer, but can also be targeted by agribusiness. At the same time rapid technological development combined with the ascendancy of multinational organisations and global supply chains will result in fordist agricultural commodities whose prices will remain under pressure. The combined effect of the exploitation of *terroir*-based products and fordist commodities may result in agricultural policy focussed on distribution according to need rather than the current distribution according to merits.

The characteristics of agriculture in an information society will probably show a widening schism between agriculture as business and farming as a style of life. Due to a new range of "value-added" *terroir*-based products, the number of inferior agricultural commodity products will increase and more emphasis will be put on the "content" of the product than the price in information society countries.

Treadmill technologies will however still be important for the average commodity-producing farmer. Increased agricultural productivity, and therefore lower production costs of agricultural produce, is an integral part of the agriculture and employment based development strategy. Increased levels of agricultural productivity is of the utmost importance for

development, especially in developing countries, regions and communities with limited lateral expansion possibilities for agricultural production. Agriculture should thus play its full role in providing food, contributing to creating a market for industrial products, in providing private and public capital formation and in earning foreign exchange. This catalytic role must be supported by the creation of the relevant physical and human infrastructure.

The information society agriculture that will develop in the near future will probably show a number of characteristics that are important in developing solutions for the Western Cape wheat industry. The first is the possible ascendancy of multi-national and multi-sectoral farming enterprises. This has implications for the type of technology that will be used as well as possibilities for the exploitation of ecological niches. The resulting market niches that may develop for *terroir*-based products may hold opportunities for the smaller family-type farm. However, the bigger farm may also take advantage of these products. A clear trend towards ruralisation may hold certain implications for the rural to urban income gap (especially if the domestic rural areas can effectively be globally marketed as a preferred destination), and therefore for levels of agricultural support.

The structure of the agricultural sector in the Western Cape Province was shaped as a result of political rather than economic pressures. This is true from the earliest days of the Dutch settlement at the Cape when the provision of passing ships was the sole reason for the existence of the settlement. Apart from the fact that the local process of colonisation differed substantially from that in other parts of the world, undue emphasis was placed on the production of wheat. This emphasis was often to the detriment of the development of other farming activities and gave rise to a culture of wheat production in certain areas of the Western Cape. The system of protection of wheat farming started with the Dutch settlement and continued well into the British era. This protectionism was again maintained for the largest part of the 20$^{\text{th}}$ century.

Starting at the end of the 19$^{\text{th}}$ century, but gaining momentum during the 20$^{\text{th}}$, the racial policy of South Africa resulted in a unique dualistic structure in the South African agricultural sector. The commercial or white part of this sector developed along the lines of secular decline, as is the case in most developed economy agricultural sectors of the world. The subsistence or black part of the sector stagnated at the level common in most developing countries of the world.

By the time of the political transition of 1994 it had already become clear that the farm lobby had lost its political dominance. However, the political transition of 1994 represented a real catharsis in the way politicians perceived agriculture. Whereas politicians in the old regime perceived the sector as developed, the new parliamentarians largely see the sector as that of a developing country. Analysing the characteristics of this "new" agricultural sector from a political economy perspective and then specifically at provincial level, it is clear that farmers in the Province cannot expect large remittances from government. They would have to develop their own systems of surviving in a turbulent world.

However, it was also shown in Chapter 4 that the Western Cape agriculture could still play the role envisaged by Cochrane, Mellor and Johnston. Agriculture can contribute substantially to the provision of food, markets, foreign exchange and the formation of private and public capital. Growth in this sector will also lead to significant economic redistribution from higher income urban households to lower income rural households.

In Chapter 5 a number of possible solutions contributing to a strategy for the wheat industry in the Western Cape Province were identified. At the outset it was argued that the solution would not be found in government intervention, as it was clearly deduced in Chapter 4 that such intervention would not be forthcoming. It was argued that a solution would rather be found in changing the slope (elasticity) of the demand and supply functions for agricultural produce. In so doing the manifestations of the farm problem could be surmounted.

The one solution contemplated grew from the logic that the supply function for farm produce is an aggregate of the marginal cost of different producers and different technological practices. It follows that if some producers could be enticed to revert their resources to other activities, those producers or practices with the highest marginal cost would be the first to be reverted. The net result would be a more elastic supply function for wheat in the Western Cape. The alternative uses for the natural resources considered include oilseeds, legume grain crops, fibre crops, horticultural crops and indigenous crops. However, alternative crops are not the only alternative uses for the natural resource to be considered. Other uses also contemplated were agri-tourism and counter-urbanisation (life-style farming).

A second solution considered found its roots in the fact that the supply function for a product such as wheat could be inelastic as a result of the limited alternative uses for the product. It

follows that if the characteristics of the raw product (in this case wheat) could be changed, then a series of new demand functions could be serviced. Again, the result would be a more elastic supply function. The options considered ranged from durum wheat for pasta, white wheat for biscuits and feed grains for inclusion in animal rations. One of the main limitations identified is that of appropriate cultivars for the conditions of the Western Cape. This is probably the result of the former policy regime.

Turning more to the demand side, but continuing with the argument that the demand function is actually the aggregate of the demand or utility functions of individual households, the possibility of differentiating wheat was considered. A value adding approach, through which information on the *terrior* in which the product was produced is added to the product, was proposed. It was suggested that products from a specific region, or products with specific characteristics or products produced according to organic principles, or any combination thereof might fulfil this role. However, it is important that the consumer must have confidence in the information presented to him or her. The outlines of a legislative framework, which would result in a certified product, were therefore presented.

It must be acknowledged that not all producers would take advantage of the opportunities described above. It is, therefore, necessary to contemplate solutions for those producers that choose to remain the producers of commodities. As the only route to survival for commodity producers is through staying ahead of the treadmill, the development and availability of new technology is important. However, it was indicated in the previous chapter that the government contribution towards agricultural technology development is declining and is expected to remain low in the foreseeable future. It follows that a mechanism should be created through which farmers could contribute towards the development of that technology, especially in the case of technology with the characteristics of a public good. But, does the province have the powers to introduce such a system or will it result in inter-provincial trade barriers and thus be unconstitutional? This question was investigated with the aid of trade theory and the answer arrived at was that such a system would not be to the detriment of inter-provincial trade. It was also concluded that considerable advantages, both for producers and consumers, could be generated through such a system if the producer funds were allocated with the right priorities. Finally, the salient points of a legal framework were proposed.

Focussed on commodity producers, but potentially equally to the advantage of those producers choosing one of the earlier options, consideration was given to the possibilities of introducing a system that farmers could use in equalising their income. As price instability and, therefore, income instability is endemic to the agricultural sector, such a system could counter one of the manifestations of the farm problem. Income stabilisation systems from three countries, Canada, USA and Australia, were evaluated. As the Province does not have the powers to change the tax laws, the Australian example could not be used to tailor-made a system for the Western Cape Province. The proposed system based on the Canadian example turned out to be prohibitively expensive for the Provincial Treasury. It was concluded that an appropriate solution should be sought in collaboration with the National Government. The basic questions to be answered during such a collaborative project were provided.

The last option considered is equally important to both commodity and value-added producers. This is by reducing transaction costs through an integrated evaluation of the supply chain of the wheat industry. It was shown that considerable efficiency gains could be achieved through such an approach. However, as a first step numerous questions need to be answered.

The objective of Chapter 6 was to quantitatively and spatially evaluate the possible impact of the set of solutions on the structural imbalances of the wheat industry of the Western Cape Province. In achieving this objective a spatial model was developed that makes provision for different markets for the locally produced wheat and the transport cost from different farms to areas of intermediate storage as well as to the final market. Also included in the model is the yield potential of wheat in different localities as well as the cost and income associated with the spatially distributed localities.

With the aid of this model seven scenarios, based on the strategy developed in Chapter 5, were developed and evaluated. The first scenario represented the *status quo*. In the second scenario alternative uses for the natural resource were introduced and in the third scenario the differentiation of wheat was evaluated. Scenarios Four and Five focussed on respectively the short and long-term implications of the introduction of a research levy. In Scenario Six the impact of price instability as a representative from of risk was evaluated. The final scenario was used to evaluate the combined impact of the different components of the strategy.

It was found that each of the components of the strategy would substantially contribute to a more profitable wheat industry for the Western Cape. The combined effect of the strategy would result in a 97 percent decrease in the area where wheat production is unprofitable under the base scenario. Profitable production of wheat would be possible on 99,3 percent of the total area that is suitable for rainfed wheat production. On more than 1,1 million hectares (77,1% of the total area) the production of wheat would be highly profitable at a net margin of more than R200 per ton.

7.2. REVISITING THE RESEARCH PROBLEM AND HYPOTHESES

It was argued in the introductory chapter that the Western Cape wheat industry is an important part of the rural, provincial and national economy. However, it was also clear that, resulting from environmental changes, the industry suffers from serious problems regarding international competitiveness, quality characteristics and the ability to adapt to a new policy environment. For this reason the research problem was presented as follows:

"Within the framework of structural imbalances, the interaction between agriculture and the rest of the economy and the probability and nature of government intervention in the provincial agricultural sector, what is an effective strategy that will lead to a meaningful role for agriculture in the traditional wheat farming areas of the Western Cape Province?"

From this problem the following sub-problems were identified:
(a) What is the origin, nature, extent of and prospects for the structural imbalances in the Western Cape wheat industry?
(b) What is the origin, nature, extent of and prospects for the interaction between agriculture and the rest of the economy of the Western Cape Province?
(c) What is the probability, nature and extent of desired government intervention in alleviating the problems of the Western Cape wheat industry?
(d) What is the nature of a strategy that will ensure a relevant role for agriculture in the traditional wheat farming areas of the Western Cape Province?

Each of these sub-problems was investigated in this dissertation. As part of the investigation the theory behind the sub-problem was analysed before the local conditions pertaining to the sub-problem were explored. In each case the investigation was concluded by a quantitative

analysis. Due to the fact that the theory and the local variables influencing the sub-problems are interwoven, it was not possible to successively evaluate each in turn, but rather as a combination. It is now appropriate to discuss the hypotheses to each of the sub-problems in turn and to accept or reject each.

7.2.1. The origins of the structural imbalances.

In the first sub-problem it was stated that the origins of the structural imbalances can be found in the interaction between policy, technological and demand factors and are not unique to the specific industry.

It was found that a concept known as the farm problem provides an explanation for the instability of wheat prices, downward pressure on wheat prices as well as the sluggish adaptation to environmental change experienced in the wheat industry. It became apparent that this problem is not unique to the wheat industry of the Western Cape, but is endemic to agriculture in the rest of the world as well as to the other industries of the Western Cape agricultural sector. In order to combat this problem a whole range of policy measures, from input control to output and trade control, have been developed around the globe.

What is relatively unique to South African agriculture, but not only to the Western Cape wheat industry, is the circumstances that gave rise to the current dual structure of the domestic agricultural sector. In order to fully understand this phenomenon, it is necessary to take cognisance of the fact that the sole reason for the Dutch settlement of the Cape in 1652 was to provide passing ships with farm produce. This resulted in specific measures, later upheld under British rule, that gave rise to the "wheat culture" of the Western Cape.

With the discovery of diamonds in South Africa the domestic agricultural sector gave the first steps towards commercialisation. However, due to competition from non-white farmers certain measures were lobbied for at the end of the 19th Century to protect white farmers. These measures were expanded in the 20th Century and gave rise to the particular duality along ethnic lines of the South African agricultural sector. It follows that the structural problems of the wheat industry are not solely the result of

factors unique to the industry or to South Africa, but are more the result of political, policy, technological and demand factors.

7.2.2. The role of agriculture in economic development.

It was hypothesised that agriculture is a natural catalyst for economic development through the provision of food, foreign exchange, manpower, and capital formation as well as a market for industrial produce.

It was found that agriculture is able to play an important role in economic development. Increased productivity, and therefore lower production cost of food in the agricultural sector of a developing nation may lead to the readily availability of food and foreign exchange earnings. The resulting higher levels of rural income will lead to both public and private capital formation and will result in the development of a rural market for the industrial sector. The expansion of the industrial sector will lead to new job opportunities for which the agricultural sector is supposed to release labour. Due to the unique income elasticity of demand in developing countries, this in turn will again lead to increased demand for agricultural products, and therefore the start of a new cycle or, in other words, an upwards spiral of economic growth. It is therefore clear that productivity in the agricultural sector can play an important catalytic role.

It was also found that, although the potential exists, agriculture has not contributed to the fullest extent of its capacity in Southern Africa. The reasons can be found in inconsistent domestic policy, adverse trade regimes, inappropriate technology and problems encountered in the management of development.

In the Western Cape, quantification of the forward and backward linkages of agriculture shows that the sector contributes to the creation of job opportunities, economic growth, capital formation and towards a more economically equal society. It is also apparent that growth in the sector, through for instance enhanced exports, will lead to the transfer of wealth from the more affluent to the poorer sections of society as well as from urban to rural areas.

Finally, it was established that in the next phase of economic development, towards information societies, agriculture would still fulfil the functions previously mentioned. However, a new and more esoteric role relating to identity could be added to this list in an information society. From this discussion it follows that an answer to the second sub-problem could be provided.

7.2.3. Government intervention in alleviating structural problems.

Given the important role of agriculture as described in the previous section, intuition would lead one to expect that government would play an important role in alleviating the structural problems of the Western Cape wheat industry. However, contrary to this intuitive expectation it was hypothesised that, in alleviating the problems of the Western Cape wheat industry, government intervention will be largely limited to creating a favourable enabling environment.

From a theoretical perspective welfare economics, public choice and politician – voter interaction were explored. The traditional wisdom has it that in searching for a Pareto-optimal state, or at least a second-best solution, pressure group activities may play an important role. This is seen as important due to the difficulties, as indicated by Arrow's impossibility theorem, in transforming individual preferences into political preference functions. However, numerous examples have shown that pressure group activities may only play a marginal role in influencing the final outcome. The underlying structural characteristics of the national and provincial economies may be a more important determinant.

By the time of the political transition of 1994 it had already become clear that the farm lobby had lost its political dominance. However, the political transition of 1994 represented a real catharsis in the way politicians perceived agriculture. Whereas politicians in the old regime perceived the sector as developed, the new parliamentarians see the sector more in terms of its developing country characteristics. Analysing the characteristics of this "new" agricultural sector from a political economy perspective, and then specifically at provincial level, it is clear that farmers in the Province cannot expect large remittances from government. They would have to develop their own systems of surviving in a turbulent world.

7.2.4. Development of a strategy

In the last sub-problem it was stated that a strategy for the wheat industry of the Western Cape will take the global, social, policy, natural and consumer environment into account and both the strategy and the industry will be self-reliant. The absence of government intervention is a deduction from the previous sub-problem and will not be discussed further.

It was argued that a solution would be found in changing the slope (elasticity) of the demand and supply functions for agricultural produce. In so doing the manifestations of the farm problem could be surmounted. The full reasoning that led to this conclusion and the different strategies will not be repeated here. Suffice to say that the elements of the strategy contemplated were:

(a) Alternative crops

(b) Agri-tourism and counter-urbanisation

(c) Alternative uses for wheat

(d) Differentiated wheat (i.e. *terrior*-based and organic products)

(e) Technology development

(f) Income stabilisation

(g) Supply chain management.

A spatial model was developed to evaluate the possible impact on the profitability of wheat production and on the economy of the Western Cape,. This model took into consideration the yield potential for wheat, the gross and net margin of wheat production, spatial dispersion, transport costs and also made provision for different intermediate markets. With the elements of the strategy converged in a number of scenarios, the impact of the strategy on the profitability of wheat production in the Western Cape was evaluated with the aid of the spatial model.

It was found that each of the components of the strategy would substantially contribute to a more profitable wheat industry for the Western Cape. The combined effect of the strategy would result in a 97 percent decrease in the area where wheat production is unprofitable under the base scenario. Profitable production of wheat would be possible on 99,3 percent of the total area that is suitable for rainfed wheat production.

The production of wheat would be highly profitable at a margin of more than R200 per ton on more than 1,1 million hectares (77,1% of the total area).

It follows that, while taking the global, social, policy, natural and consumer environment into account and without relying on government, a strategy could be developed that will rectify the structural problems of the Western Cape wheat industry. An answer to the last sub problem has thus been provided.

7.3. AREAS FOR FURTHER RESEARCH

It is seldom possible in a dissertation to answer all possible questions without transgressing the boundaries of the research. This is no exception. Following from the insights gained during this research a number of topics worth additional research can be identified.

It was argued in this dissertation that technological development is a contributing factor towards downward pressure on the prices of farm commodities. However, farmers have to be the first to adopt new technology in order to stay ahead on the global treadmill. It was also maintained that the domestic agricultural sector could not expect significant increases in government investment in the development of new technology. Although little, the provincial government is making funds available for the development of new agricultural technology in the Western Cape. From this line of reasoning the following question arises. How can the Provincial government ensure maximum returns on its investment in agricultural technology? Closely related, the same question can be asked on behalf of farmers in the Western Cape. The answer to this question should not only focus on organisational matters, but should also examine the relative costs and benefits of developing own technology *versus* acquiring new technology and adapting it to local conditions. Also relevant are matters relating to the appropriateness of technology and, in an information society, of becoming part of a "supply chain" of technology.

The concept of supply chains leads to the second research problem. It was maintained that in the industrialised or fordist part of information society competition would take place between supply chains rather than between individual firms. In the same vein it was proposed that negotiated contracts would to a certain extent usurp the role of the traditional marketplace in

intermediate agricultural supply. This statement leads to a series of questions on supply chains:

(a) What are the dynamics, relevant to the Western Cape, in the global development towards supply chains?

(b) Given its multi-sectoral and multi-national character, what are the social costs and benefits of this movement towards supply chains?

(c) Is it necessary to develop a new regulatory and policy framework (either in support or to curb) to make provision for this new environment?

(d) If yes, what would be the main characteristics of such a regulatory and policy framework?

(e) What is the nature and extent of appropriate support services (research, extension and training) that farmers and other role-players need in order to excel in this environment?

Third, it was reasoned that, due to the resistance to fordist agricultural products, a market is developing for farm products with a clear geographical, historical, cultural and knowledge identity, the so-called *terrior*-based product. What is still necessary is an in-depth investigation into the specific requirements for and characteristics of such a multi-faceted identity for the product to be perceived as a *terrior*-based product. It is also necessary to develop a clearer picture of the nature and extent of the domestic and international market for *terrior*-based products as well as appropriate marketing arrangements. The answer to the latter would probably draw on the research regarding supply chains. Possible supply responses could be designed based on the answers to questions regarding the specific nature of *terrior*-based products and the demand for such products. Finally, it would be possible to refine the strategy, paying special attention to support services such as research, extension and training.

Agri-tourism, as a specific subset of *terrior*-based products, constitutes the fourth possible research problem. Although agri-tourism differs from most other farm products in the sense that the consumer is brought to the product instead of the product being brought to the consumer, a similar set of questions to that regarding *terrior*-based products needs to be answered.

Fifth, and with specific emphasis on the knowledge and historical identity of *terrior*-based products, follows organically produced products. In this case the following questions remain:

(a) What is the nature and characteristics of domestic and international demand for organic products?

(b) How profitable is organic compared to conventional production, especially if the period of conversion is included?

(c) What are the main factors inhibiting supply?

(d) Is there a role for government to play and, if yes, what are the research, extension and training needs?

REFERENCES

AAFC (1999)   *Agri-Food Policy in Canada*. Agriculture and Agri-Food Canada, http://aceis.agr.ca/policy/epad/english/pubs/adhoc/98040.

AAFC (1998)   *Net Income Stabilisation Account: 1998 Stabilisation (tax) year*. Agriculture and Agri-Food Canada, http://aceis.agr.ca/nisa/n9608e.html.

Act 108 (1996)   *The Constitution of the Republic of South Africa*. Parliament of the Republic of South Africa, Cape Town.

Act 200 (1993)   *The Constitution of the Republic of South Africa*. Parliament of the Republic of South Africa, Cape Town.

Act 127 (1990)   *Agricultural Commodity Levies Act* as amended. Parliament of New Zealand, Wellington, New Zealand.

AFFA (2000)   *Farm Management Deposit Scheme*. Agriculture, Fisheries and Forestry – Australia, http://www.affa.gov.au/rural/fmds.

Adelman, I (1999)   *Fallacies in Development Theory and their Implications for Policy*. Working Paper No. 887, Department of Agricultural and Resource Economics and Policy, University of California at Berkely.

Alston, J & Carter, C (1991) Causes and Consequences of Farm Policy. *Contemporary Policy Issues*, 9: 107 – 121.

Alston, LJ & Gillespie, W (1988)   Resource Co-ordination and Transaction Costs: A framework for analysing the firm/market boundary. *Journal of Economic Behaviour and Organisation*, 10 (1): 1 – 28.

Alston, LJ & Hatton, TJ (1991)   The Earnings Gap Between Agricultural and Manufacturing Laborers. *The Journal of Economic History*, 51 (1): 83 – 99.

Ambrosi, I & Cruz, ER (1984)   *Taxas de retorno dos recursos aplicados em pesuisa no Centro Nacional de Pesquisa de Trigo*. Passo Fondo, EMBRAPA, Brazil.

Anderson, JR (1996)   On Getting Agricultural Growth in Sub-Saharan and South Africa. *Agrekon*, 35 (4): 204 – 210.

Anderson, K (1995)   Lobbying Incentives and the Pattern of Protection in Rich and Poor Countries. *Economic Development and Cultural Change*, 43 (2): 401 – 423.

Anderson, K & Hayami, Y (1986)   *The Political Economy of Agricultural Protection: East Asia in International Perspective*. Allen and Unwin, Sydney.

Anderson, K & Tyers, R (1991)   *Global Effects of Liberalizing Trade in Farm Products*. Thames Essay no. 55. Harvester Wheatsheaf, New York.

Andrews, MS & Rausser, GC (1986)   Some Political Economy Aspects of Macroeconomic Linkages with Agriculture. *American Journal of Agricultural Economics*, 68 (2): 413 – 417.

Ardito-Barletta, N (1975)   *Costs and benefits of agricultural research in Mexico*. Unpublished Ph.D. thesis, University of Chicago, Illinois.

Arkcoll, DB (1998)   Crop Diversification in the Western Cape. In: DLWK (1998)   *'n Perspektief op die Koringbedryf in die Wes-Kaap Provinsie*. Departement van Landbou: Wes-Kaap, Elsenburg.

Arrow, KJ (1984)   *Collected Papers of Kenneth J Arrow (Volume1): Social Choice and Justice*. Basil Blackwell, Oxford.

Azzam, AM & Britel, A (1992)   An Economic Analysis of a Cross-market Subsidy Scheme for Morocco's Food Grain Sector. *Journal of Economic Studies*, 19 (5): 55 – 72.

Bale, MD & Lutz, E (1981)   Price Distortions in Agriculture and Their Effects: An International Comparison. *American Journal of Agricultural Economics*, 63 (1): 8 – 22.

Barber, S (1999)   Washington 'no angel' in Farm Feud. *Business Day*, 2 December 1999, Johannesburg.

Barker, J (1989)   *Agricultural Marketing*. Oxford University Press, Oxford, UK.

Barzel, Y (1985)   Transaction Costs: Are They Just Costs? *Journal of Institutional and Theoretical Economics*, 141: 4 – 16.

Becker, GS (1983)   A Theory of Competition among Pressure Groups for Political Influence. *The Quarterly Journal of Economics*, 98 (3): 371 – 400.

Bentham, J (1789)   *An Introduction to the Principles of Morals and Legislation*.   The copy used was edited, with an introduction, by Wilfred Harrison and published in 1948 by Basil Blackwell, Oxford.

Berning, C & Troskie, DP (2000)   The Next Round of WTO Negotiations: Impact on the Western Cape Economy. *Agrekon*, 39 (2): forthcoming.

Besanko, JT, Dranove, D & Shanley, M (1996)   *The Economics of Strategy*. John Wiley and Sons, New York.

Bessière, J (1998)   Local Development and Heritage: Traditional Food and Cuisine as Tourist Attractions in Rural Areas. *Sociologia Ruralis*, 38 (1): 21 – 34.

Beus, CE & Dunlap, RE (1994)   Endorsement of Agrarian Ideology and Adherence to Agricultural Paradigms. *Rural Sociology*, 59 (3): 462 – 484.

Binswanger, HP (1994)   Agricultural and Rural Development: Painfull Lessons. *Agrekon*, 33 (4): 165 – 174.

Binswanger, H & Scandizzo, P (1983)   *Patterns of Agricultural Protection*.   World Bank Report ARU 15, Washington.

Black, PA & Dollery, BE (1992)   Market Failure and Government Failure.   In: Black, PA & Dollery, BE (eds) (1992)   *Leading Issues in South African Microeconomics: Selected Readings*.   Southern Book Publishers, Halfway House.

Blignaut, CS (1999)   Analysing Competitive Advantage in the South African Dairy Industry: An Integrated Approach. *Agrekon*, 38 (4): 693 – 706.

Bloomberg, F (2000)   Quick Growth is Forecast for Africa in 2000.   *Business Report*, 11 January 2000, Times Media, Johannesburg.

Boehlje, M & Doering, O (1999)   Market Performance and Price Discovery Issues in an Industrialised Agriculture.   *Agricultural Outlook Forum 1999*, ers@jan.mannlib.cornell.edu.

Bohm, P (1987)   *Social Efficiency: A Concise Introduction to Welfare Economics*. Macmillan, London.

Bonnen, JT & Schweikhardt, DB (1998)   The future of U.S. Agricultural Policy: Reflections on the Disappearance of the "Farm Problem". *Review of Agricultural Economics*, 20 (1): 2 – 36.

Bonnen, JT & Schweikhardt, DB (1998b)   Getting from Economic Analysis to Policy Advice. *Review of Agricultural Economics*, 20 (2): 584 – 600.

Bosman, JD (1997)   *Notas vir die Tegnologie Werkwinkel*.   Departement van Landbou: Wes-Kaap, Elsenburg.

Brand, SS & Tomlinson, FR (1966) Die Plek van die Landbou in die Suid-Afrikaanse Volkshuishouding. *South African Journal of Economics*, 34 (1): 26 – 49.

Brooks, J (1995) The Economic Polity of Farm Policy: Comment. *Journal of Agricultural Economics*, 46 (3):398 – 402.

Browne, WP & Paik, WK (1994) Farmers and the U.S. Congress: Rethinking basic Institutional Assumptions about Agricultural Policy. *Agricultural Economics*, 11: 125 – 141.

Bullock, DS (1996) Cooperative Game Theory and the Measurement of Political Power. *American Journal of Agricultural Economics*, 78 (3): 745 – 752.

Bullock, DS (1994) The Countercyclicity of Government Transfers: A Political Pressure Group Approach. *Review of Agricultural Economics*, 16 (1): 93 – 102.

Bullock, DS (1992) Objectives and Constraints of Government Policy: The Countercyclisity of Transfers to Agriculture. *American Journal of Agricultural Economics*, 74 (3): 617 – 629.

Bundy, C (1979) *The Rise and Fall of the South African Peasantry*. Heinemann, London.

Burger, JD & Saayman, D (1981) Die Suid-Afrikaanse Stelsel vir Wyne van Oorsprong. In: Burger, JD & Deist, J (eds) *Wingerdbou in Suid-Afrika*. Trio-Rand, N'dabeni.

Byerlee, D (1990) *Technical change and returns to wheat breeding research in Pakistan's Punjab in the Post-Green Revolution period*. PARC/CIMMYT paper 90-7, Islamabad.

Carruthers, I & Kydd, J (1997)   The Development and Direction of Agricultural Development Economics: Requiem or Resurrection? *Journal of Agricultural Economics*, 48 (2):223 – 238.

Castells, M (1998)   *End of Millennium*. Blackwell Publishers, Massachusetts, USA.

Castells, M (1997)   *The Power of Identity*. Blackwell Publishers, Massachusetts, USA.

Castells, M (1996)   *The Rise of the Network Society*. Blackwell Publishers, Massachusetts, USA.

Cheung, SNS (1969)   Transaction Costs, Risk Aversion and the Choice of Contractual Arrangements. *The Journal of Law and Economics*, 12 (1): 23 – 42.

Cirillo, R (1979)   *The Economics of Vilfredo Pareto*. Frank Cass, London.

Cleaver, KM & Donovan, WG (1995)   *Agriculture, Poverty and Policy Reform in Sub Saharan Africa*. World Bank Discussion Papers: African Technical Department Series No.280, The World Bank, Washington, DC.

Cochrane, WW (1992)   *The Development of American Agriculture*. University of Minnesota Press, Minneapolis.

Cochrane, WW (1963)   *Agriculture and Economic Growth*. Agricultural Economic Research Report No. 28. Economic Research Service, United States Department of Agriculture.

Cochrane, WW (1958)   *Farm Price, Myth and Reality*. University of Minnesota Press, St. Paul, USA.

Coetzee, GK & Vink, N (1996)   The Efficiency and Outreach of Rural Financial Institutions in South Africa. *Agrekon*, 35 (4): 256 – 260.

Cohen, JE (1999)   The Bright Side of the Plague. *The New York Review of Books*, 4 March 1999: 26 – 28.

Combud (1999)   *Combud enterprise budgets*.   Department of Agriculture: Western Cape, Elsenburg.

Cook, M (2000)   New business organisational models for Agribusiness; The new generation "co-operatives".   *Invited paper presented at the 39th annual conference of AEASA*. Sun City.

Crommelynck, A, Kola, J & Swinnen, JFM (1998)   *Determinants of Agricultural Protection in Finland (1931 – 1990)*.   Policy Research Group Working Paper No. 14, Katholieke Universiteit Leuven, Belgium.

CSS (1997)   *Income and Expenditure of Households, Statistical Release P0111.1 to 9*. Central Statistical Service, Pretoria.

CSS (1995)   *Provincial Statistics, Report No. 00-90-01 to 09*.   Central Statistical Service, Pretoria.

CSS (1994)   *Household Census, Statistical Database*. Central Statistical Service, Pretoria.

CSS (1993)   *South African Labour Statistics (1993)*. Central Statistical Service, Pretoria.

CSS (1993b)   *Census of Agriculture (1993), Report No. 11-02-01*.   Central Statistical Service, Pretoria.

CSS (1991)   *Population Census (1991), Report No. 03-01-08*. Central Statistical Service, Pretoria.

Dahms, FA (1995)   'Dying Villages', 'Counterurbanization' and the Urban Field – a Canadian Perspective. *Journal of Rural Studies*, 11 (1): 21 – 33.

Dalecki, MG & Coughenour, CM (1992)   Agrarianism in American Society. *Rural Sociology*, 57(1): 48 – 64.

DASMI (1998)   *Abstract of Agricultural Statistics*. Directorate Agricultural Statistics and Management Information, National Department of Agriculture, Pretoria.

DASMI (1994)   *Production Accounts*. Directorate Agricultural Statistics and Management Information, National Department of Agriculture, Pretoria.

De Gorter, H & Tsur, Y (1991)   Explaining Price Policy Bias in Agriculture: The Calculus of Support-Maximizing Politicians. *American Journal of Agricultural Economics*, 73 (4): 1244 – 1254.

De Gorter, H & Swinnen, JFM (1995)   The Economic Polity of Farm Policy: Reply. *Journal of Agricultural Economics*, 46 (3): 403 – 414.

De Gorter, H & Swinnen, JFM (1994)   The Economic Polity of Farm Policy. *Journal of Agricultural Economics*, 45 (3): 312 – 326.

De Kock, JHW & Laubscher, J (1993)   Die relatiewe mededingendheid van die Suid-Afrikaanse koringbedryf met betrekking tot die internasionale koringmark. *Agrekon*, 32 (1).

De Kock, JHW & Laubscher, J (1992)   Die markpotensiaal vir koring en koringprodukte in Suid-Afrika. *Agrekon*, 31 (3).

Delgado, CL (1999)   Sources of Growth in Smallholder Agriculture in Sub-Saharan Africa: The Role of Vertical Integration of Smallholders with Processor and Marketers of High Value-Added Items. *Agrekon*, 38 (Special Issue): 165 – 189.

Denis, G (1999)   *Genetically Modified Grains – Information from the United States*. International Grains Council, London.

Department of Finance (1998)   *Provincial Budget Allocations*. National Department of Finance, Pretoria.

DeRosa, DA (1996)   The Uruguay Round Agreement on Agriculture and the International Trade of Sub Saharan Africa. *Agrekon*, 35 (2): 76 – 90.

De Soto, H (2000)   *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else*. Bantam Press, London.

De Tavernier, J (2000)   Voedsel en Ethiek. Paper presented at the *Gezond Voedsel: Genese en dynamiek van een crisis* Symposium. Faculteit Landbouwkundige en Toegepaste Biologische Wetenskappen, KU Leuven, Leuven.

Diaz-Bonilla, E & Robinson, S (1998)   Globalisation, Trade Reform and the Developing Countries. *IFPRI Essays*, Washington DC: 21 – 29.

DOA (1995)   *Witskrif oor Landbou*. Departement van Landbou, Pretoria.

DOA (1998)   *Agricultural Policy in South Africa: A Discussion Document*. Department of Agriculture, Pretoria.

Downs, A (1957)   *An Economic Theory of Democracy*. Harper and Row, New York.

Drury, R & Tweeten, L (1997)   Have Farmers Lost Their Uniqueness? *Review of Agricultural Economics*, 19 (1): 58 – 90.

DSI (2000)   *Abstract of Agricultural Statistics*. Directorate Statistical Information, National Department of Agriculture, Pretoria.

Duke, P (1996)   Viking Settlements of North America. In: Bahn, PG (1996) *The Story of Archaeology: The 100 Great Discoveries*. Weidenfeld and Nicolson, London.

Du Plessis, AJ (1933)   *Die Geskiedenis van die Graankultuur in Suid-Afrika, 1652 – 1752*. Annale van die Universiteit van Stellenbosch, Jaarprogram 11, Reeks B, Afdeling 1.

EC (1998a)   *The first registered denominations*. European Commission, Brussels, Belgium.

EC (1998b)   *Addendum 2/98*. European Commission, Brussels, Belgium.

EC (1995)   *Survey of European Consumers*. European Commission, Brussels, Belgium.

EC (1992a)   Council Regulation (EEC) No 2081/92 on the protection of geographical indications and designation of origin for agricultural products and foodstuffs. *Official Journal of the European Communities*, 24 July 1992. European Commission, Brussels, Belgium.

EC (1992b)   Council Regulation (EEC) No 2082/92 on certificates of specific character for agricultural products and foodstuffs. *Official Journal of the European Communities*, 24 July 1992. European Commission, Brussels, Belgium.

Eckert, JB, Liebenberg, GF & Troskie, DP (1997a)   *Compiling an Agricultural SAM for the Western Cape*. Western Cape Department of Agriculture, Elsenburg.

Eckert, JB, Liebenberg, GF & Troskie, DP (1997b)   *The Macroeconomics of Western Cape Agriculture: Analysis with a Social Accounting Matrix*. Western Cape Department of Agriculture, Elsenburg.

Eckert, JB & van Seventer, DEN (1995)   *Agriculture and the economy in the Western Cape: Analysis with an Extended, Multi-Regional Input-Output Model*. Center for Policy Analysis, Development Bank of Southern Africa, Midrand.

Economist (2000)   In the Heart of Darkness. *The Economist*, 7 December 2000: 12 – 13.

Economist (1999a)   European Farming: Against the Grain. *The Economist*, 20 February 1999: 30 – 31.

Economist (1999b)   Poland's Pig-headed Farmers. *The Economist*, 20 February 1999: 31.

Economist (1999c)   Why small EU countries vote big. *The Economist*, 30 January 1999: 35.

Economist (1998)   European Farm Budget: Has the CAP Peaked? *The Economist*, 17 October 1998: 35.

Eddleman, BR (1977)   *Impacts of reduced federal expenditures for agricultural research and education*. IR-6 Information Report 60, Mississippi State University.

Edwards, L & Leibbrandt, M (1998) Domestic Wheat Demand in a Deregulated Environment: Modeling the importance of Quality Characteristics. *Agrekon*, 37 (3): 232 – 254.

Ehrentraut, A (1996)   Globalization and the Representation of Rurality: Alpine Open-Air Museums in Advanced Industrial Societies. *Sociologia Ruralis*, 36 (1): 4 – 26.

Ejupu, AEC, Makhura, M & Kirsten, J (19990   Food Security in a Commercialising Rural Economy: Initial Findings from a Case Study of Two Districts in Uganda. *Paper presented at the 37th AEASA-Conference*, Langebaan, South Africa.

Elliot, MB (1991)   *An Economic Analysis of the Market for Carbohydrates in South Africa with Specific Reference to White Maize*. Unpublished PhD Dissertation, University of Pretoria, Pretoria.

ELOI (1993)   *Die Vestiging van 'n Voergraanbedryf in die Wes-Kaap ter vervanging van Mielies as Energiebron*. Elsenburg Landbou-Ontwikkelingsinstituut, Elsenburg.

Esterhuizen, D & van Rooyen, CJ (1999)   How Competitive is Agribusiness in the South African Food Commodity Chain? *Agrekon*, 38 (4): 744 – 754.

Evans, D & Edstrom, J (1993)　　*Trade Policy Reform and Tropical Beverages: the Fallacy of Composition in Policy Advice*. Discussion Paper 326, Institute of Development Studies, University of Sussex, United Kingdom.

Evenson, RE & da Cruz, E (1989)　*The Economic Impacts of the PROCISUR Program: an International Study*. Economic Growth Centre, Yale University, New Haven, Connecticut.

Falcon, WP (2000)　　Globalizing Germplasm: Barriers, Benefits and Boundaries. *Paper Presented at the 24th Conference of the International Association of Agricultural Economists*, Berlin, Germany.

FAO (2000)　　*Agriculture: Towards 2015/30*. Technical Interim Report, Food and Agricultural Organization of the United Nations, Rome.

FAO (1999)　　*Food and Agricultural Organisation of the United Nations Database*. http://www.fao.org.

FCIC (1999)　　*Adjusted Gross Revenue Pilot Insurance Policy*. Federal Crop Insurance Corporation, Washington, DC.

Fearne, A (1998)　　The Evolution of Partnerships in the Meat Supply Chain: Insights from the British Beef Industry. *Supply Chain Management*, 3 (4): 214 – 231.

Fényes, TI, van Rooyen, CJ & Vink, N (1990)　　Reassessment of the Land Acts of 1913 and 1936. *Development Southern Africa*, 7 (October; Special Issue): 583 – 589.

FFC (2000)　　*Preliminary Recommendations for 2001: A Costed Norms Approach for the Division of Revenue*. Financial and Fiscal Commission, Pretoria.

Financial Mail (1999)　　Germany Makes a Date with its Destiny and Destination. *Financial Mail*, 19 March 1999.

Finrec (1996)   *Results of Finrec studygroups*. Department of Agriculture: Western Cape, Elsenburg.

Function Committee (1996) *Appropriate appropriations for Provincial Departments of Agriculture*. National Department of Agriculture, Pretoria.

Furtan, W & Ulrich, A (1985)   *An investigation into the rates of return from the Canadian Crop Breeding Program*. Crop Production Research Evaluation, Annex 15. Program Evaluation Division, Agriculture Canada, Ottawa, Ontario.

Galbraith, JK & Black, JD (1938) The Maintenance of Agricultural Production During the Depression: The Explanations Reviewed. *Journal of Political Economy* 46: 305 – 323.

Garcia, RJ & Randall, A (1994) A Cost Function Analysis to Estimate the Effects of Fertilizer Policy on the Supply of Wheat and Corn. *Review of Agricultural Economics*, 16 (2): 215 – 230.

Gide, C & Rist, C (1915) *A History of Economic Doctrines from the Time of the Physiocrats to the Present Day*. George G. Harrap & Company Ltd, London.

Gorn, P, Herrimann, R & Schalk, B (1993) The Pattern of Protection for food crops and cash crops in Developing Countries. *European Review of Agricultural Economics*, 20 (3): 291 – 314.

Groenewald, JA, Sartorius von Bach, HJ & Machethe, CL (1992) Government and Agriculture in the New South Africa: Political Viewpoints. *Agrekon*, 31 (2): 94 – 97.

Hadley, D, Shankar, B & Thirtle, C (1999) Was South African Agriculture Over-Capitalised in the Apartheid Era? *Contributed paper presented at the 37th Annual Conference of AEASA*, Club Mykonos, Langebaan, South Africa.

Hagedorn, K, Vink, N & van Zyl, J (1990)   The Impact of Institutional Particularities on Agricultural Policy.   Paper read at the *Development Society Conference*, Johannesburg.

Haniotis, T, Baffes, J & Ames GCW (1988) The Demand and Supply of U.S. Agricultural Exports: The Case of Wheat, Corn, and Soybeans. *Southern Journal of Agricultural Economics*, December 1988.

Harrigan, J, Loader, R & Thirtle, C (1992)   *Agricultural Price Policy: Government and the Market*.   Training Materials for Agricultural Planning (31), FAO, Rome.

Hartell, GH & Swinnen, JFM (1998)   Trends in Agricultural Price and Trade Policy Instruments Since 1990 in Central European Countries.   *World Economy*, 21 (2): 261 – 279.

Harvey, D (1990)   *The Condition of Postmodernity: An enquiry into the Origins of Cultural Change*. Blackwell Publishers Inc., Massachusetts.

Hedley, DD (1998)   Global challenges: Local Issues. *Agrekon* 37 (4): 363 – 374.

Hertford, R; Ardila, J; Rocha, A & Trujillo, G (1977)   Productivity of agricultural research in Colombia. In: Arndt, TM; Dalrymple, DG & Ruttan VW (Eds). *Resource Allocation and Productivity in National and International Research*. University of Minnesota Press, Mineapolis, Minnesota.

Hicks, JR (1939)   The Foundation of Welfare Economics. *Economic Journal*, 49: 696 – 712.

Hill, B (ed) 1996)   Income Statistics for the Agricultural Household Sector. *Proceedings of the Eurostat Seminar*, Luxemburg.

Hobbs, JE, Kerr, WA & Klein, KK (1998)   Creating International Competitiveness through Supply Chain Management: Danish Pork.   *Supply Chain Management*, 3 (2): 68 – 78.

Hoffman, L, Ash, M, Tung, FL & Dyck, J (1995)   A Comparison of Structural Change in Canadian and U.S. Grain Farming. *Canadian Journal of Agricultural Economics*, Special Issue: 145 – 163.

Holloway, R (2000)   Mass Immigration may help stop the greying of Europe and Japan. *The Star*, Johannesburg, 11 January 2000: 11.

Holzaphel, J (1997)   "Eva" se spore aan Weskus gekry. *Die Burger*, 15 Augustus 1997: 1.

Horn, MJ (1995)   *The Political Economy of Public Administration: Institutional Choice in the Public Sector*.   Cambridge University Press, Cambridge, UK.

Howcroft, J & Ortmann, GF (1990) Developing of a Regional Programming Model for Simulating the South African Wheat Industry, with special consideration to risk. *Agrekon*, 29 (4): 394 – 399.

Hum, D, Kraft, D & Simpson, W (1991)   *A Framework to Analyze Income Support and Income Stabilization Policies in Canadian Agriculture*.   Technical Paper 3/95, Industry and Policy Analysis Division, Policy Branch, Agriculture Canada.

Irvine, GN (1971)   Durum wheat and Pasta Products.   In Pomeranz, Y (Ed).   *Wheat Chemistry and Technology*.   American Association of Cerial Chemists, St Paul, Minnesota.)

Ito, Y (1989)   Information Studies Today.   In: Schenk, M & Donnerstag, J (Eds) (1989) *Medienokonomie*, Munchen.

Ivanova, N, Lingard, J, Buckwell, A & Burrell, A (1995)   Impact of Changes in Agricultural Policy on the Agro-food Chain in Bulgaria.   *European Review of Agricultural Economics*, 22 (3): 354 – 371.

IWC (1994)   *World Grain Statistics*. International Wheat Council, London, UK.

IWC (1991) *World Grain Statistics*. International Wheat Council, London, UK.

Jervell, AM (1999) Changing Patterns of Family Farming and Pluriactivity. *Sociologia Ruralis*, 39 (1): 100 – 116.

Jessop, B (1991) Fordism and Post-Fordism; A Critical Reformulation. *Lancaster Regionalism Group*, Working Paper 41/1991.

Johansson, P-O (1991) *An Introduction to Modern Welfare Economics*. Cambridge University Press, Cambridge.

Johnson, DG (1950) The nature of the Supply Function for Agricultural Products. *American Economic Review*, 40: 539 – 564.

Johnson, GL (1997) Doing Policy Work. In: Schmid, A (ed) (1997) *Beyond Agriculture and Economics: Management, Investment, Policy and Methodology*. Michigan State University Press, East Lansing.

Johnson, GL (1986) *Research Methodology for Economists: Philosophy and Practice*. Macmillan Publishing Company, New York.

Johnson, GL (1969) Stress on Production Economics. In: Fox, A & Johnson, DG (eds) (1969) *Readings in the Economics of Agriculture*. George Allen & Unwin Ltd, London.

Johnson, GL (1958) Supply Function – Some Facts and Notions. In: Heady, EO, Diesslin, HG, Jensen, HR & Johnson, GL (eds) (1958) *Agricultural Adjustments Problems in a Growing Economy*. Iowa State College Press, Ames.

Johnston, BF & Mellor, JW (1961) The Role of Agriculture in Economic Development. *American Economic Review*, 51 (4): 566 – 593.

Jouve, DF (1987) Quenelles Plant. In: Bartholomai, A (Ed). *Food factories: Processes, Equipment, Costs*. VCH, Weinheim, Germany.

Kaldor, N (1939)   Welfare Propositions of Economics and Interpersonal Comparisons of Utility. *Economic Journal*, 49: 549 – 552.

Kaltoft, P (1999)   Values about Nature in Organic Farming Practice and Knowledge. *Sociologia Ruralis*, 39 (1): 39 – 53.

Karaan, ASM (1999)   Bridging the Small-Big Divide: A Transaction Cost Approach to Enterprise Modelling for Mussel Mariculture in Saldanha Bay. *Agrekon* 38 (4): 680 – 692.

Khatri, Y; Schimmelpfenning, D; Thirtle, C & van Zyl, J (1996)   Refining returns to research and development in South African commercial agriculture. *Agrekon* 35 (4).

Kingwell, R (1994)   Effects of Tactical Responses and Risk Aversion on Farm Wheat Supply. *Review of Marketing and Agricultural Economics*, 62 (1): 29 – 42.

Kirkham, A (1995)   Personal interview. Product Manager, Priory Produce, Huntingdon, UK.

Kirsten, JK & Vink, N (1999)   *Agricultural Policy in SA in the 1990s*. Unpublished report, University of Stellenbosch, Stellenbosch.

Kislev, Y & Hoffman, M (1987)   Research and productivity in wheat in Israel. *Journal of Development Studies*, 14.

Kleynhans, TE (1991)   *Toepassing van Stelseldenke op Ontwikkelingsteorie*. Unpublished Ph.D. dissertation, University of Stellenbosch, Stellenbosch.

Kleynhans, TE & Liebenberg, GF (1994)   Projections of Food Self-Sufficiency in South Africa. *Agrifutura Bulletin*, 1 (2): 18 – 40.

Kleynhans, TE & Vink, N (1998)   The Agricultural Potential of SADC. *Agrekon*, 37 (4): 375 – 397.

Kohls, RL & Uhl, JN (1980) *Marketing of Agricultural Products*. Macmillan, New York.

Krueger, A, Schiff, M & Valdes, A (1988)   Agricultural Incentives in Developing Countries: Measuring the Effect of Sectoral and Economywide Policies. *World Bank Economic Review*, 2 (3): 255 – 271.

Kwaa Prah, K (1999)   African Renaissance or Warlordism? In: Makgoba, WM (ed) (1999) *African Renaissance: The New Struggle*. Mafube Publishing, Sandton.

Laubscher, J (1996)   The Social Environment. In: Spies, PH (ed) (1996) *Agrifutura 1995/96*. Agrifutura Project, Department of Agricultural Economics, University of Stellenbosch.

Leisinger, KM (2000)   The "Political Economy" of Agricultural Biotechnology for the Developing World. *Paper Presented at the 24th Conference of the International Association of Agricultural Economists*, Berlin, Germany.

Leppan, HD (1931)   *Agricultural Policy in South Africa*. The Central News Agency (Ltd), Johannesburg.

Lewis, A (1997)   *Persoonlike mededeling*. Bemarker, Portnet, Kaapstad.

Liebenberg, GF & Groenewald, JA (1997)   *Demand and Supply Elasticities of Agricultural Products: A Compilation of South African Estimates*. Unpublished Research Report, ARC (DIA), Pretoria.

Lindblom, CE (1977)   *Politics and Markets: The World's Political-Economic Systems*. Basic Books Publishers, New York.

Lipsey, RG (1979)   *An Introduction to Positive Economics (Fifth Edition)*. Weidenfeld & Nicholson, London.

Lipsey, RG, Steiner, PO & Purvis, DO (1987)   *Economics (Eighth Edition)*. Harper & Row Publishers, New York.

Little, IMD (1950)   *A Critique of Welfare Economics*. Clarendon Press, Oxford.

Loubser, MM (1990)   *Income elasticities of the Demand for Consumer Goods and Services*. Research Report No. 175, Bureau of Market Research, University of South Africa, Pretoria.

Lourens, C (1997)   *Persoonlike mededeling*. Bemarkingsamptenaar (massavrag), Spoornet, Bellville.

Louw, DB & van Schalkwyk, HD (1997)   The True Value of Irrigation Water in the Olifants River Basin: Western Cape. *Agrekon*, 36 (4): 551 – 560.

Louw, PK (1948)   *Landbou en Veeteeld in die Kaapkolonie (1795 – 1806)*. Unpublished MA (history) thesis, University of Stellenbosch, Stellenbosch.

Lynne, MC (1991)   Land Reform in the Tribal Areas of South Africa. *Agrekon*, 30 (4): 295 – 297.

Lynne, MC, Ortmann, GF & Le Roux, EA (1991)   Settlement of Commercial Farmers on Trust Land: Promoting Land Rental and Accounting for Risk in Farm Plans. *Agrekon*, 30 (3): 106 – 108.

Lyon, D (1988)   *The Information Society: Issues and Illusions*. Cambridge University Press, Cambridge.

Makgoba, MW (1999)   *The foundations of the African Renaissance are located in the ruins of Carthage – "Carthage delenda eat"*. Lecture at the University of Stellenbosch, July 1999.

Makgoba, WM, Shope, T & Mazwai, T (1999)   Introduction. In: Makgoba, WM (ed) (1999) *African Renaissance: The New Struggle*. Mafube Publishing, Sandton.

Malim, R (1999)
What must Farmers in Europe do to Survive? *Proceedings of the 12th International Farm Management Congress*, Durban, South Africa.

Manzini, M (1987)
Pasta Plant. In: Bartholomai, A (Ed). *Food factories: Processes, Equipment, Costs*. VCH, Weinheim, Germany.

Marais, G (1998)
Personal interview. *Chair of the Genetics Department*. University of Stellenbosch, Stellenbosch.

Maré, F (1998)
Toekenning aan die LNR. *LNR*, Pretoria.

Marrakech-Agreement (1994)
Agreement on Agriculture. World Trade Organisation, Geneva.

Morokolo, B, Coetzee, GK & Makhura, M (1999)
Savings Behaviour and –motivation of Resource Poor Farmers: A Case study in the Moretele District of the North West Province. *Paper presented at the 37th AEASA-Conference*, Langebaan, South Africa.

Mbeki, T (1998)
Africa, The Time Has Come. Mafube Publishing, Sandton.

McCalla, AF & JoslingTE (1985)
Agricultural Policies and World Markets. MacMillan Publishing Company, New York.

McDonald, S (1998)
On Social Accounting Matrices and Economic Models. *South African Journal of Economics*, (forthcoming).

McDonald, S, Kirsten, JF & van Zyl, J (1997)
A Social Accounting Matrix for Modelling Agricultural Policy Reforms in South Africa. *Agrekon*, 36 (4): 513 – 532.

McGuirk, AM & Mundlak, Y (1992)
The Transition of Punjab Agriculture: A Choice of Technique Approach. *American Journal of Agricultural Economics*, 74 (1) 132 – 143.

Meadow (1993)   Company data. *Meadow Feed Manufacturers*, Paarl.

Mellor, JW (1986)   Agriculture on the Road to Industrialisation. In: Lewis, JP & Kallab, V (eds) (1986) *Developing Strategies Reconsidered, U.S.-Third World Policy Perspectives No.5*. Transaction Books for the Overseas Development Council, New Brunswick.

Mellor, JW & Johnston, BF (1984)   The World Food Equation: Interrelations Among Developmnt, Employment, and Food Consumption. *Journal of Economic Literature*, 22 (2): 531 – 574.

Mendes, EJ (2000)   *Products of Origin: Report on overseas visit* (forthcoming). Chief Directorate: Agriculture, Elsenburg.

Mentz, JCN & Nqaba, XD (1997)   *Guide to Machinery Costs*. Kwazulu-Natal Department of Agriculture, Cedara.

Miles, I & Robins, K (1994) Making Sense of Information. In: Robins, K (ed) (1994) *Understanding Information Business, Technology and Geography*. Belhaven Press, London.

Moore, M (1996)   Koring beter gemelk. *Die Ploegvoor*. Herfs 1996. Suid-Afrikaanse Landbou-Unie, Pretoria.

Morokolo, B, Coetzee, GK & Makhura, M (1999)   Savings Behaviour and –motivation of Resource Poor Farmers: A Case study in the Moretele District of the North West Province. *Paper presented at the 37th AEASA-Conference*, Langebaan, South Africa.

Myburgh, AS, Troskie, DP, Bosman, FW & Balie, G (1996)   *Afskaling van Owerheidsbetrokkenheid in die landbou van Nieu-Seeland en Australië*. Unpublished report, Farm Management Association of South Africa, Elsenburg.

Nagy, J (1983)   Estimating the yield advantage of high-yielding wheat and maize: the use of Pakistani on-farm yield constraints data. *Pakistan Journal of Applied Economics*, 93.

NAMC (1998)   *Deregulation in Terms of the Marketing of Agricultural Products Act, Act 47 of 1996, as Amended*. National Agricultural Marketing Council, Pretoria.

Napier, R (1998)   How are Leading Farmers around the World Responding to Global Agribusiness Trends? Contributed paper presented at the *International Food And Agribusiness Management Association Congress*, Punta del Este, Uruguay.

Ngqangweni, S, Kirsten, J & Delgado, C (1999)   Exploring Growth Linkages in South African Smallholder Farming Areas. *Paper presented at the 37th AEASA-Conference*, Langebaan, South Africa.

Niebuhr, HG & van Zyl, J (1992)   Die Vraag na Brood in Suid-Afrika, 1984 – 90: 'n Streeksbenadering. *Agrekon*, 31 (3): 128 – 135.

Niebuhr, HG & van Zyl, J (1990)   'n Ekonomiese Ontleding van die Aanbod van Koring in Suid-Afrika: 'n Streeksbenadering. *Agrekon*, 29 (4): 324 – 334.

Nieuwoudt, WL (1989)   *The effect of increased real earnings in agriculture on the farm household*. Unpublished DBSA/University of Natal Research Report, Pietermaritzburg.

Nieuwoudt, WL & Hill, J (2001)   An Economic Evaluation of Adopting an Income Equilisation Deposit Scheme in the Commercial Farm Sector. *Agrekon*, 40 (1) (forthcoming).

North, DC (1991)   Institutions. *Journal of Economic Perspectives*, 5 (1): 97 – 112.

North, R (2000)   Scared to death: The Anatomy of the Food Scare Phenomenon. Paper presented at the *Gezond Voedsel: Genese en dynamiek van een crisis*

Symposium. Faculteit Landbouwkundige en Toegepaste Biologische Wetenskappen, KU Leuven, Leuven.

Norton, GW; Ganoza, VG & Pomareda, C (1987) Potential benefits of agricultural research and extension in Peru. *American Journal of Agricultural Economics*, 69.

Nowers, RJ, de Villiers, EB & Myburgh, AS (2000) The Contribution of Wine Routes in the Western Cape of South Africa towards a Sustainable Agritourism Industry: Some Lessons and Experiences. *Proceedings of the first IAERT Conference on Agritourism and Rural Tourism*, Perugia, Italy.

Nowers, RJ & van Zyl, J (1991) 'n Ekonomiese Evaluering van Herstruktureringsmoontlikhede in die Swartland. *Agrekon*, 30 (2): 53 – 60.

Ntangsi, J (1992) Agricultural Policy and Structural Adjustment in Cameroon. *Proceedings of the 21st International Conference of Agricultural Economists*, Tokyo, Japan.

Nyanzunda, TEL, & Mudimu, GD (1999) A Study of Problems faced by Agribusiness versus Non Agribusiness Exporters in Zimbabwe. *Paper presented at the 37th AEASA-Conference*, Langebaan, South Africa.

Nygård, B & Storstad, O (1998) De-globalization of Food Markets? Consumer Perseptions of Safe Food: The Case of Norway. *Sociologia Ruralis*, 38 (1): 35 – 53.

Offermann, F & Nieberg, H (2000) *Economic Performance of Organic Farms in Europe*. University of Hohenheim, Germany.

Offermann, F & Nieberg, H (1999) Profitability of Organic Farming in Europe. *Proceedings of the 12th International Farm Management Congress*, Durban, South Africa.

Offutt, S, Smith, KR & Ballenger, N (1998) Have Farmers Lost their Uniqueness? Comment. *Review of Agricultural Economics*, 20 (1): 203 – 205.

Olper, A (1998) Political economy determinants of Agricultural Protection Levels in EU member states: An empirical investigation. *European Review of Agricultural Economics*, 25 (4): 463 – 487.

Olson, M (1985) Space, Agriculture and Organisation. *American Journal of Agricultural Economics*, 67 (5): 928 – 937.

Olson, M (1965) *The Logic of Collective Action, Public Goods and the Theory of Groups*. Harvard University Press, Cambridge.

Papotto, G (1987) Precooked Lasagna Plant. In: Bartholomai, A (Ed). *Food factories: Processes, Equipment, Costs*. VCH, Weinheim, Germany.

Peltzman, S (1976) Toward a More General Theory of Regulation. *Journal of Law and Economics*, 19: 211 – 240.

Phororo, H (1996) The Supply of Wool in Lesotho. *Agrekon*, 35 (1): 20 – 28.

Pigou, AC (1932) *The Economics of Welfare*. Macmillan, London.

Piesse, J, van Zyl, J, Thirtle, C & Sartorius von Bach, HJ (1996) Agricultural efficiency in South Africa's former homelands: Measurement and implications. *Development Southern Africa*, 13 (3): 399 – 413.

Pittendrigh, P (2000) IT – Ontploffing in Oorsese Verdienste. *Finansies & Tegniek*, 14 Januarie 2000: 10 – 11.

Polson, RA & Shumway, CR (1992) Production Relationships in South Central Agriculture. *Southern Journal of Agricultural Economics*, December 1992.

Pray, C (1980) The economics of agricultural research in Bangladesh. *Bangladesh Journal of Agricultural Economics*, 2.

Pretorius, CE (2000)   *Development of a Saptial Decision Support System to Optimise Agricultural Resource Use in the Western Cape*. Unpublished M.Sc. Agric (Agricultural Economics) thesis, University of Stellenbosch, Stellenbosch.

PSC (1994)   *Proposals for the Restructuring and Departmentalisation of the Public Service*. Public Service Commission, Pretoria.

Rademakers, MFL & McKnight, PJ (1998)   Concentration and inter-firm Co-operation within the Dutch Potato Supply Chain. *Supply Chain Management*, 3 (4): 203 – 213.

Rausser, GC (1982)   Political Economic Markets: PERTs and PESTs in Food and Agriculture. *American Journal of Agricultural Economics*, 64 (5): 821 – 833.

Rausser, GC, Chalfant, JA, Love, HA & Stamoulis, KG (1986)   Macroeconomic Linkages, Taxes and Subsidies in the U.S. Agricultural Sector. *American Journal of Agricultural Economics*, 68 (2): 399 – 412.

Ray, C (1998)   Culture, Intellectual Property and Territorial Rural Development. *Sociologia Ruralis*, 38 (1): 3 – 20.

Renfreight (1997)   *Persoonlike mededeling*. Bemarkingsafdeling van Renfreight, Kaapstad.

Ritson, C (1982)   *Agricultural Economics: Principles and Policy*. Granada, London.

Robert, PC (1999)   Precision Agriculture: An Information Revolution in Agriculture. *Agricultural Outlook Forum*, USDA.

Rosegrant, MW, Ringler, C & Paisner, MS (2000)   Agricultural Research, Technology and World Food Markets. *Paper Presented at the 24th Conference of the International Association of Agricultural Economists*, Berlin, Germany.

Rostow, WW (1960)   *Stages of Economic Growth*. University Press, Cambridge.

RSG (2000)   Aktualiteitsprogram. *Monitor, Radio Sonder Grense*, 22 Februarie 2000.

Rutherford, M (1996)   *Institutions in Economics: The Old and the New Institutionalism*. Cambridge University Press, Cambridge.

Rwelamira, JK & Kleynhans, TE (1996)   *SADC Agricultural Potential Assessment: Country Profiles*. Development Paper 124, Development Bank of Southern Africa, Midrand.

Sadoulet, E & de Janvry, A (1995)   *Quantitative Development Policy Analysis*. The Johns Hopkins University Press, Baltimore, Maryland.

SAGIS (1999)   *South African Grain Information Service Database*. http://www.sagis.org.za

Sarvate, S (2000)   Time to Pay for Stolen Brains. *WOZA Forum*. http://www.woza.co.za, 6 January 2000.

Schienstock, vG, Bechmann, G & Frederichs, G (1999)   *Information Society, Work and the Generation of New Forms of Social Exclusion – The Theoretical Approach*. ITAS, TA-Datenbank-Nachrichten, 1(8).

Scitovsky, A (1941)   A Note on Welfare Propositions in Economics. *Review of Economic Studies*, 9 (4): 77 – 88.

Schreuder, JHD (1948)   *Die Geskiedenis van ons Graanbou (1752 – 1795)*. Unpublished MA Thesis (history), University of Stellenbosch, Stellenbosch.

Schultz, TW (1945)   *Agriculture in an Unstable Economy*. New York, McGraw Hill.

Scott, WA (1933)   *The Development of Economics*. C. Appleton-Century Company Incorporated, New York.

Scrimgeour, FG & Pasour Jr, EC (1996)   A Public Choice Perspective on Agricultural Policy Reform: Implications of the New Zealand Experience. *American Journal of Agricultural Economics*, 78 (2): 257 – 267.

Sen, AK (1997)   *On Economic Inequality*. Clarendon Press, Oxford.

Sen, AK (1982)   *Choice, Welfare and Measurement*. Basil Blackwell, Oxford.

Sen, AK (1970)   *Collective Choise and Social Welfare*. Holden – Day Inc, San Francisco.

Sim, JTR (1952)   *300 Years of Grain Growing in South Africa*. Farming in South Africa, 27.

Smale, M (2000)   Economic Incentives for Conserving Crop Genetic Diversity on Farms: Issues and Evidence. *Paper Presented at the 24th Conference of the International Association of Agricultural Economists*, Berlin, Germany.

Smit, M & van Zyl, J (1998) Aanpassings op plaasvlak. In: DLWK (1998). *'n Perspektief op die Koringbedryf in die Wes-Kaap Provinsie*. Interne verslag, Departement van Landbou: Wes-Kaap, Elsenburg.

Snyman, AJ (1997)   *Persoonlike mededeling*. Besturende Direkteur, Kaap Graanbeurs, Paarl.

Soler, LG & Le Gal, J (1999)*Supply Chain Management in Agriculture*. Seminar hosted by the Department of Agricultural Economics, University of Stellenbosch, 6 – 7 May 1999.

Soler, LG & Tanguy, H (1998)   Coordination Between Production and Commercial Planning: Organisational and Modelling Issues. *International Transactions in Operational Research*, 5 (3): 171 – 188.

Spencer, SC & Badiane, O (1994)   Agriculture and Economic Recovery in African Countries. In: Peters, GH & Hedley, DD (eds) (1994). *Agricultural Competitiveness: Market Forces and Policy Choice*. Proceedings of the Twenty Second International Conference of Agricultural Economists, Harare, Zimbabwe.

Spies, PH (1998)   The Technological Environment.   In: Spies, PH (ed) (1998) *Agrifutura 1997/98*. Agrifutura Project, Department of Agricultural Economics, University of Stellenbosch.

Spies, PH (1998b)   The Economic Environment. In: Spies, PH (ed) (1998) *Agrifutura 1997/98*. Agrifutura Project, Department of Agricultural Economics, University of Stellenbosch.

Spies, PH (1998c)   The Methodology of Environmental Scanning. In: Spies, PH (ed) (1998) *Agrifutura 1997/98*. Agrifutura Project, Department of Agricultural Economics, University of Stellenbosch.

Spies, PH (1981)   Enkele bydraes van Studies in Welvaart-Ekonomie tot Owerheidsbesluitneming. *Buro vir Ekonomiese Ondersoek*, April 1981.

Street, K; Kleynhans, TE & Vink, N (1996) *Die mededingendheid van koring en gars produksie in die Wes-Kaap*. Verslag van 'n ondersoek gedoen op versoek van die Tegniese Komitee van die Wintergraan Produsente-organisasie en die Departement van Landbou: Wes-Kaap, Departement van Landbou-Ekonomie, Universiteit van Stellenbosch, Stellenbosch.

Stremlau, J (1999)   African Renaissance and International Relations. In: Makgoba, MW (ed) (1999) *African Renaissance: The New Struggle*. Mafube Publishing Ltd, Sandton.

Sugden, R (1981)   *The Political Economy of Public Choice: An Introduction to Welfare Economics*. Martin Robertson, Oxford.

Sundquist, B; Cheng, C & Norton, GW (1981) Measuring returns to research expenditures for corn, wheat and soybeans. In Burns, DP (Ed). *Evaluation and Planning of Forestry Research*. General Technical Report NE-GTR-111, Northeastern Forest Experiment Station, USDA Forest Service, Broomall, Pennsylvania.

Swinnen, JFM (2000) *Personal communication*. Chair of the Department of Agricultural Economics, Katholieke Universiteit Leuven, Belgium.

Swinnen, JFM (1998) Economic Transition and the Distribution of Policy Rents: The case of the Wheat-Flour-Bread Chain in Bulgaria. *European Review of Agricultural Economics*, 25 (2): 243 – 258.

Swinnen, JFM (ed) (1997) *Political Economy of Agrarian Reform in Central and Eastern Europe*. Ashgate, Aldershot, U.K.

Swinnen, JFM (1996) Endogenous Price and Trade Policy Developments in Central European Agriculture. *European Review of Agricultural Economics*, 23 (2): 133 – 160.

Swinnen, JFM (1994) A Positive Theory of Agricultural Protection. *American Journal of Agricultural Economics*, 76 (1): 1 – 14.

Swinnen, JFM & de Gorter, H (1998) Endogenous Commodity Policies and the Social Benefits from Public Research Expenditures. *American Journal of Agricultural Economics*, 80 (1): 107 – 115.

Swinnen, JFM & de Gorter, H (1997) *Agricultural Protection and Economic Development: An Econometric Study of the Determinants of Agricultural Protection in Belgium since the 19th Century*. Policy Research Group Working Paper No. 8, Katholieke Universiteit Leuven, Belgium.

Swinnen, JFM & de Gorter, H (1993)   Why Small Groups and Low Income Sectors obtain Subsidies: the "Altruistic" Side of a "Self-Interested" Government. *Economics and Politics*, 5 (3): 285 – 293.

Swinnen, JFM & van der Zee, A (1993)   The Political Economy of Agricultural Policies: A Survey. *European Review of Agricultural Economics*, 20 (3): 261 – 290.

Taslim, MA (1994)   An Analysis of Population Growth, Green Revolution and Terms of Trade in the Presence of Cropsharing in Agriculture. *Agricultural Economics*, 11 (1): 19 – 28.

Terreblanche, SJ (1998)   Empowerment in Context: The Struggle for Hegemony in South Africa. In: Kirsten, J, van Zyl, J & Vink, N (1998). *The Agricultural Democratisation of South Africa*. Africa Institute for Policy Analysis and Economic Integration (IAPA), Cape Town.

Thirtle, C, Balcombe, K, Bailey, A, Morrison, J & Rapsomanikis, G (2000)   Stochastic Biases in Disembodied Technical Change within South African Agriculture. *Paper presented at the 38th AEASA Conference*, Sun City.

Thirtle, C, Townsend, R & van Zyl, J (2000) Induced Innovation, Policy and Technology: An Error Correction Model. In: Thirtle, C, van Zyl, J & Vink, N (2000). *South African Agriculture at the Crossroads*. Macmillan Press, London.

Thirtle, C, Townsend, RF, Amadi, J, Lusigi, A & van Zyl, J (1998)   The Rate of Return on Expenditures of the South African Agricultural Research Council (ARC). *Agrekon*, 37 (4): 621 – 631.

Thomsen, FL & Foote, RJ (1952)   *Agricultural Prices*. McGraw-Hill, New York.

Tomek, WG & Robinson, KL (1987)   *Agricultural Product Prices*. Cornell University Press, Ithaca.

Townsend, RF (1997)　　*Policy Distortions & Agricultural Performance in the South African Economy*. Discussion Paper No. 138, Development Bank of South Africa, Halfway House, South Africa.

Townsend, RF, Khatri, Y & Thirtle, C (1998)　　Biases of Technical Change in South African Agriculture: A Cost Function Approach. *Journal of Studies in Economy and Econometrics*, 22 (2): 15 – 27.

Townsend, R & van Zyl, J (1997)　　Estimation of the rate of return to the wine grape research and technology development expenditures in South Africa. *Department of Agricultural Economics, Extension and Rural Development*, University of Pretoria, Pretoria.

Tregurtha, NL & Vink, N (1999)　　Trust and Supply Chain Relationships: A South African Case Study. *Agrekon*, 38 (4): 755 – 765.

Troskie, DP (1998)　　Suid-Afrika as deel van die internasionale speelveld. In: DLWK (1998). *'n Perspektief op die Koringbedryf in die Wes-Kaap Provinsie*. Interne verslag, Departement van Landbou: Wes-Kaap, Elsenburg.

Troskie, DP; Reid, GW; de Jager, A & Louw, DB (1994) Kleingraanprognose.　　*Agrifutura Bulletin*. 1 (2).

Tweeten, L (1989)　　*Farm Policy Analysis*. Westview Press, Boulder.

UN (2000)　　*Replacement Migration: Is it a solution to declining and ageing populations?* Department of Economic and Social Affairs, United Nations, New York, http://www.un.org.

UN (1999)　　*Revision of the World Population Estimates and Projections*. Department of Economic and Social Affairs, United Nations, New York, http://www.un.org.

UN (1999b)   *Long-Range World Population Projections: Based on the 1998 Revision*.   Department of Economic and Social Affairs, United Nations, New York, http://www.un.org.

UN (1998)   *World Urbanisation Prospects: The 1996 Revision*. Department of Economic and Social Affairs, Population Division, United Nations, New York.

USDA (1999)   *World Agricultural Outlook Report, 12 May 1999*.   Economic Research Service, United States Department of Agriculture, http:/www.usda.gov.

USDA (1999b)   *Adjusted Gross Revenue Standards Handbook: 1999 and Succeeding Insurance Years*.   United States Department of Agriculture, Washington, DC.

USDA (1992)   *New Crops, New Uses, New Markets: 1992 Yearbook of Agriculture*. United States Department of Agriculture, Washington DC.

Uys, H (2000)   *Technology Tracking and Impact on Business: Second Report*. Telkom Business Solutions, Cape Town.

Uys, H (1999)   *Technology Tracking and Impact on Business: First Report*. Telkom Business Solutions, Cape Town.

Van Rooyen, CJ (1997)   Challenges and Roles for Agriculture in the Southern African Region. *Agrekon*, 36 (2): 181 – 205.

Van Rooyen, CJ (1990)   Agricultural Restructuring in Southern Africa: The Contribution of the Developing Agricultural Sector. *Agrekon*, 29 (1): 3 – 10.

Van Rooyen, CJ, Fényes, TI & van Zyl, J (1987)   A comparison of the contribution and relative performance of agriculture in South Africa. *Development Southern Africa*. 4 (2): 183 – 198.

Van Schalkwyk, HD & Groenewald, JA (1993)	An Estimate of Aggregate Supply Response in South African Agriculture. *Development Southern Africa*, 10 (4): 549 – 558.

Van Schalkwyk, HD & Groenewald, JA (1992)	Regional Analysis of South African Agricultural Resource Use and Productivity. *Agrekon*, 31 (3): 116 – 127.

Van Schalkwyk, HD; van Zyl, J & Jooste, A (1995)	The effect of the exchange rate and international factors on the competitive position of South African wheat producers. *Agrekon* 34 (4).

Van Zyl, DJ (1967)	*Die Geskiedenis van Graanbou aan die Kaap (1795 – 1826)*. Unpublished MA (history) thesis, University of Stellenbosch, Stellenbosch.

Van Zyl, J & Thirtle, C (1996)	Public Research, Development and Agricultural Extension as source of productivity change in South African Agriculture. *Paper presented at the National Seminar on Impact Assessment Awareness*, Silverton, Pretoria.

Vellante, S (1999)	"Learning" and "knowing" about Agribusiness Development in Southern Italy: Ruralism, Fordism and Post-Fordism. Unpublished research report, *University of Naples*, Italy.

Venter, RH & Horsthemke, O (1999)	Analysis of the Competitive Nature of the Southern African Sheep Meat Value Chain. *Agrekon*, 38 (4): 716 – 725.

Vink, N (1998)	The Political/Institutional Environment. In: Spies, PH (ed) (1998) *Agrifutura 1997/98*. Agrifutura Project, Department of Agricultural Economics, University of Stellenbosch.

Vink, N (1993)	Entrepreneurs and the Political Economy of Reform in South African Agriculture. *Agrekon*, 32 (4): 153 – 166.

Vink, N & Kassier, WE (1991) Agricultural Policy and the South African State. In: de Klerk, M (1991) *A Harvest of Discontent: The Land Question in South Africa*. IDASA, Cape Town.

Vink, N & van Zyl, J (1998) Black Disempowerment in South African Agriculture: A Historical Perspective. In: Kirsten, J, van Zyl, J & Vink, N (1998). *The Agricultural Democratisation of South Africa*. Africa Institute for Policy Analysis and Economic Integration (IAPA), Cape Town.

Voon, TJ (1994) Measuring research benefits in an imperfect market. *Agricultural Economics*, 10.

Wallace, M (2000) *Personal Communication*. Resource Division, Chief Directorate: Agriculture of the Western Cape Province, Elsenburg.

Walsh, DE & Gilles, KA (1974) Macaroni Products. In: Inglett, GE (Ed). *Wheat: Production and Utilization*. AVI Pub. Co, Westport, Connecticut.

WCDOA (1999a) *Swartland Duisendpunt-Opname 1999*. Hoofdirektoraat Landbou, Wes-Kaap Provinsie, Elsenburg.

WCDOA (1999b) *Duisendpunt-Opname Suidkusstreek 1999*. Hoofdirektoraat Landbou, Wes-Kaap Provinsie, Elsenburg.

Wesgro (1998) *Die Wes-Kaap Ekonomie op Pad na Globale Mededingendheid en Maatskaplike Bestendigheid*. Report to the Provincial Legislature. Wesgro, Cape Town.

Wheat Board (1997) *Wheat Board statistics*. Wheat Board, Pretoria.

Williamson, OE (1985) *The Economic Institutions of Capitalism*. The Free Press, New York.

Wilson, TP & Clarke, WR (1998)   Food Safety and Traceability in the Agricultural Supply Chain: Using the Internet to Deliver Traceability. *Supply Chain Management*, 3 (3): 127 – 133.

WNNR (1997)   *South African National Land Cover Database*. WNNR, Pretoria.

World Bank (1999)   *World Development Report 1998/99: Knowledge for Development*. Oxford University Press, New York.

World Bank (1995)   *World Development Report 1995: Workers in an Integrated World*. Oxford University Press, New York.

World Bank (1994)   *South African Agriculture: Structure, Performance and Options for the Future*. Discussion Paper, South African Department, The World Bank, Washington DC.

WP (2000a)   *Western Cape Designated Agricultural Products Board Draft Bill*. Provincial Gazette, Parliament of the Western Cape Province, Cape Town.

WP (2000b)   *Western Cape Protection of Geographical Indications and Designations of Origin for Agricultural Products and Foodstuffs Draft Bill*. Provincial Gazette, Parliament of the Western Cape Province, Cape Town.

WP (2000c)   *Western Cape Certificates of Specific Character for Agricultural Products and Foodstuffs Draft Bill*. Provincial Gazette, Parliament of the Western Cape Province, Cape Town.

WP (2000d)   *Western Cape Certification of Organically Produced Agricultural Products and Foodstuffs Draft Bill*. Provincial Gazette, Parliament of the Western Cape Province, Cape Town.

WP (1999)   *Western Cape Agricultural Commodities Levies Draft Bill* (First Departmental Draft). Chief Directorate Agriculture, Elsenburg.

Yrarrazaval, R; Navarrete, R & Valdivia, V (1982) Costosy beneficios sociales de los programas de mejoramiento varietal de trigo y maiz en Chile. In: Elgueta, M & Venezlan, E (Eds). *Economia y Organizacion de la Investigaccion Agropecuaria*, INIA, Santiago.

Zentner, RP (1982) *An econometric evaluation of public wheat research expenditures in Canada*. Unpublished Ph.D. dissertation, University of Minnesota, Minneapolis, Minnesota.

A

ATTACHMENT A

Hulpbronpotensiaal vir Koringverbouing
in die Wes-Kaap onder
Droëlandtoestande

Wes-Kaap
Landdrosdistrikte
Groter dorpe
Berge
Potensiaal: *
Nie-geskik (0 - 1.8 t/ha)
Laag (1.9 - 2.6 t/ha)
Medium (2.7 - 3.9 t/ha)
Hoog (4.0 - 6.0 t/ha)

* Omgewingspotensiaal onder ideale toestande

Areas: (ha)	
Nie-geskik	9 296 294
Laag	1 095 517
Medium	1 693 774
Hoog	950 122
	12 940 118

Vredendal
Pikenberg
Kaapstad
Worcester
Bredasdorp
Laingsburg
Oudtshoorn
Mosselbaai
Beaufort Wes

B
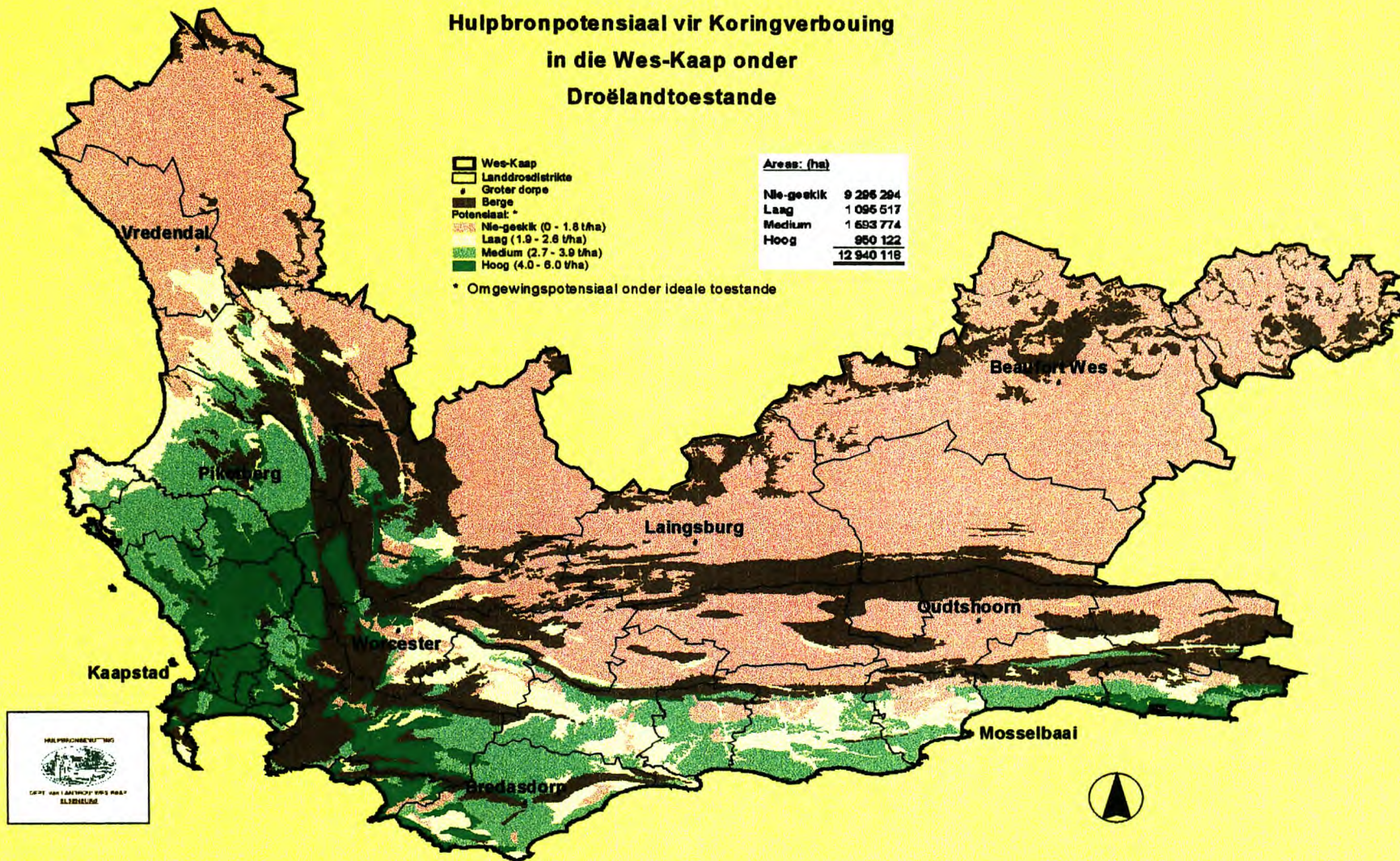
ATTACHMENT B

National Land Cover Classification: Western Cape

N
W E
S

VREDENDAL

CLANWILLIAM

CERES

PIKETBERG

CERES

MALMESBURY

PAARL

CAPE TOWN

STELLENBOSCH

ROBERTSON

SWELLENDAM

BREDASDORP

BEAUFORT - WEST

LAINGSBURG

OUDTSHOORN

GEORGE

RIVERSDALE

MOSS EL BAY

KNYSNA
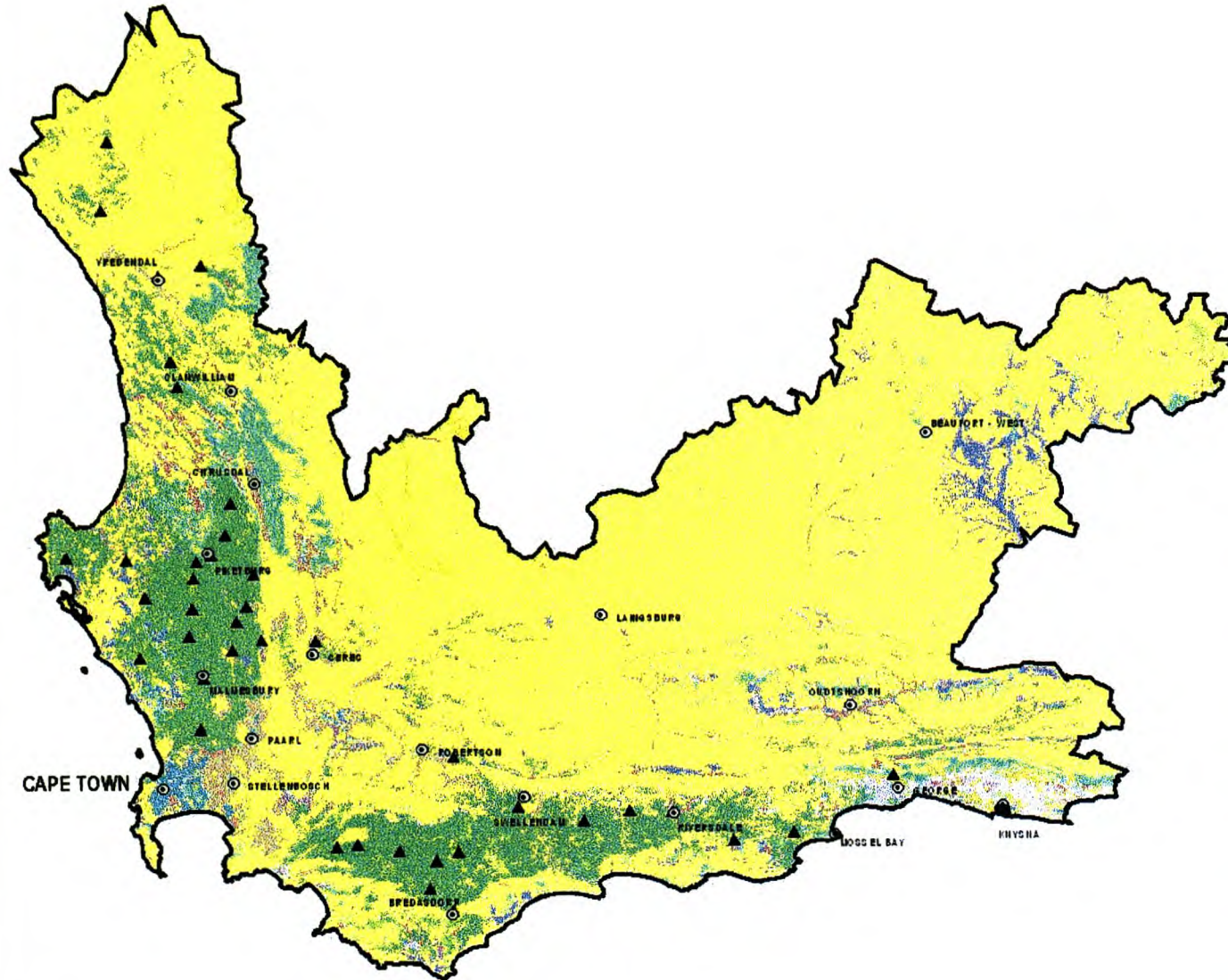
Landcover Classification

- Barren rock
- Cultivated: permanent - commercial dryland
- Cultivated: permanent - commercial irrigated
- Cultivated: temporary - commercial dryland
- Cultivated: temporary - commercial irrigated
- Cultivated: temporary - semi-commercial/subsistence dryland
- Degraded: herbland
- Degraded: shrubland and low Fynbos
- Degraded: thicket & bushland (etc)
- Degraded: unimproved grassland
- Dongas & sheet erosion scars
- Forest
- Forest and Woodland
- Forest plantations
- Herbland
- Improved grassland
- Mines & quarries
- Shrubland and low Fynbos
- Thicket & bushland (etc)
- Unimproved grassland
- Urban / built-up land: commercial
- Urban / built-up land: industrial / transport
- Urban / built-up land: residential
- Urban / built-up land: residential (small holdings: bushland)
- Urban / built-up land: residential (small holdings: grassland)
- Urban / built-up land: residential (small holdings: shrubland)
- Waterbodies
- Wetlands

05/01/2001

Potential Wheat Areas: Western Cape

Area extracted from the National Land Cover Project
Database, defined as "Temporary Cultivated Areas"

05/01/2001

C
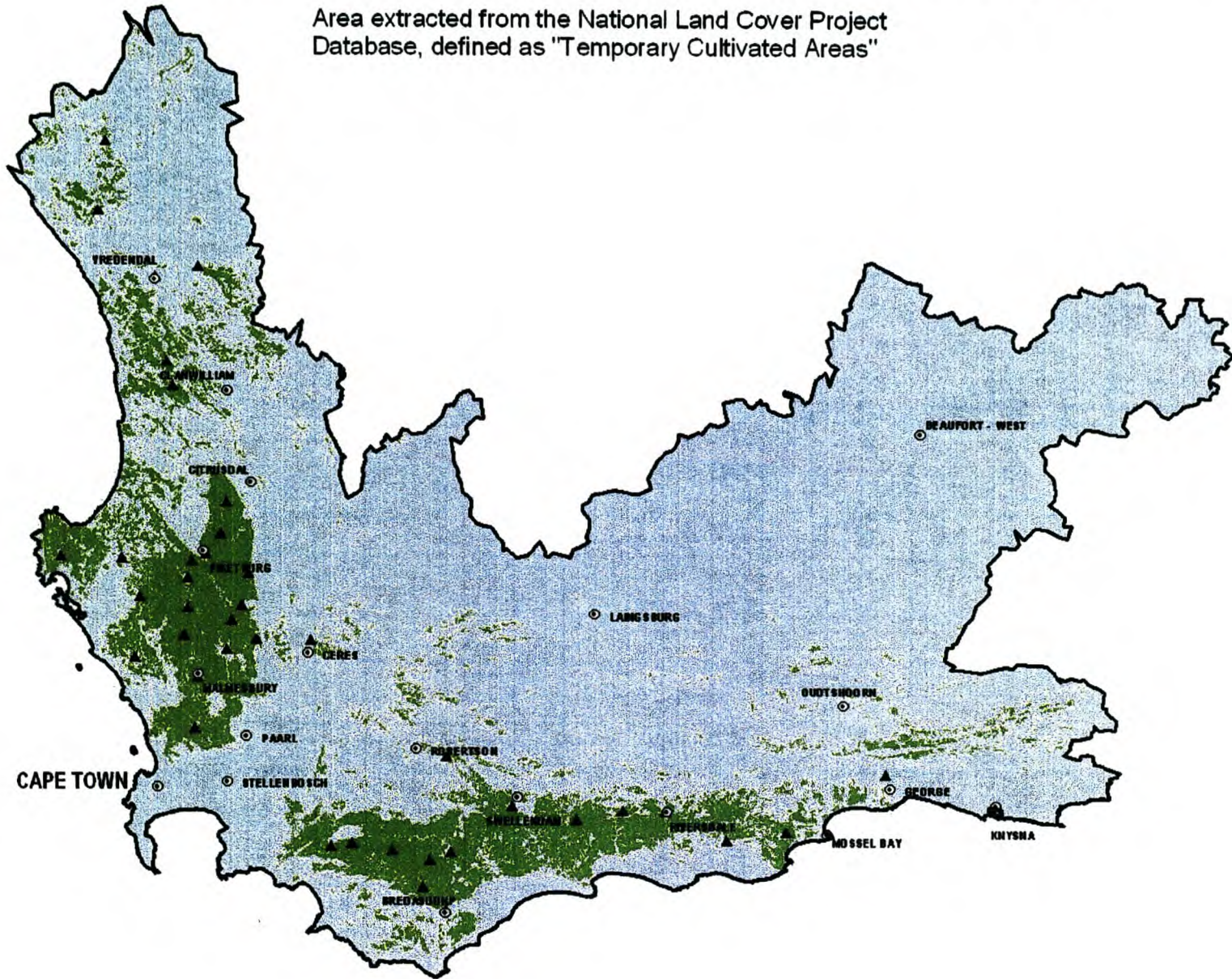
ATTACHMENT C

Dryland Wheat Production: Margin analysis

Scenario I

Legend:

- ⊚ Towns
- ▨ Western Cape
- ▲ Silos
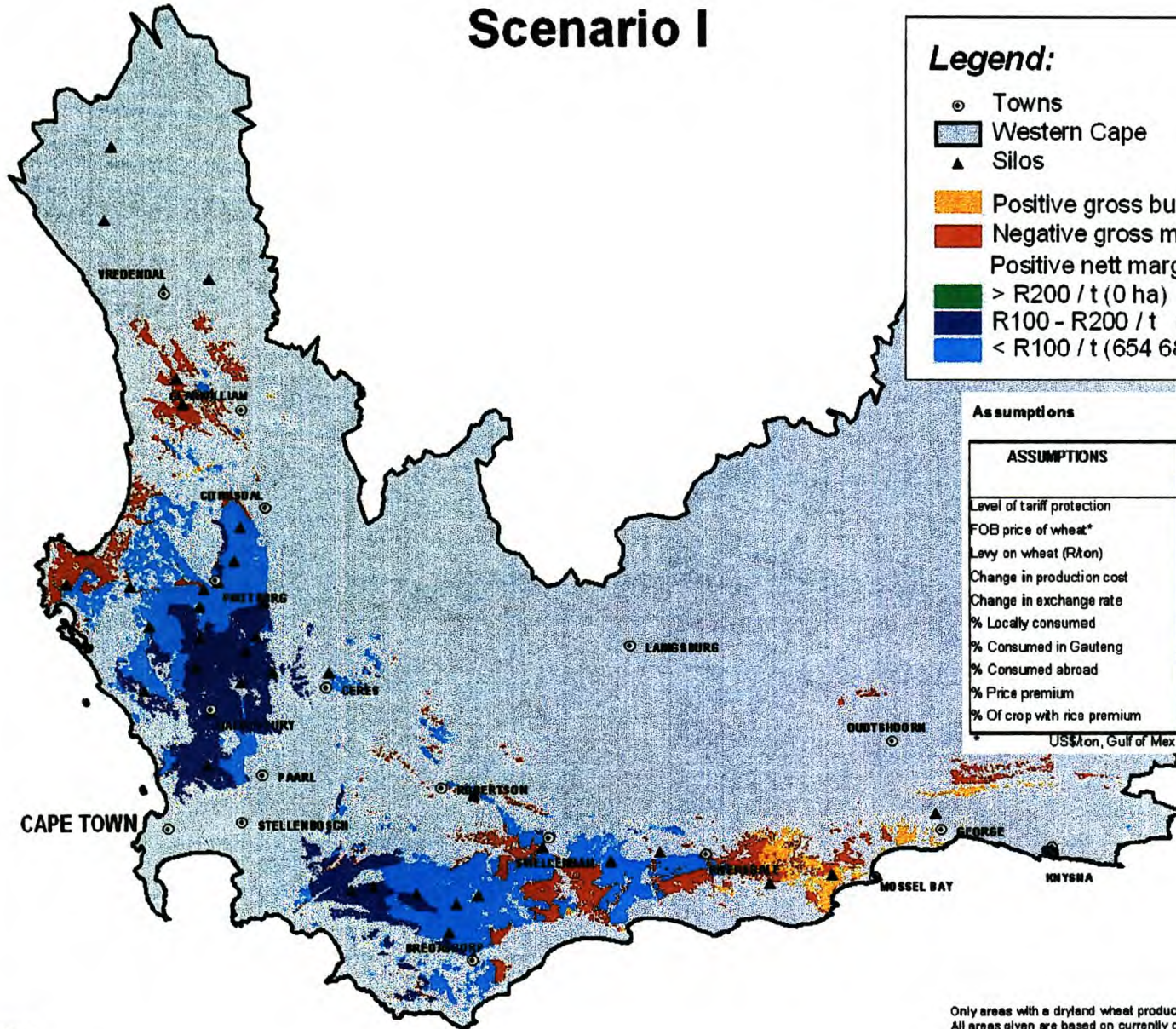
▨ Positive gross but negative nett margin (64 291 ha)
▨ Negative gross margin (332 473 ha)

Positive nett margin:
▨ > R200 / t (0 ha)
▨ R100 – R200 / t (398 610 ha)
▨ < R100 / t (654 682 ha)

Assumptions

ASSUMPTIONS	SCENARIO						
	I	II	III	IV	V	VI	VII
Level of tariff protection	0%	0%	0%	0%	0%	0%	0%
FOB price of wheat*	$120	$120	$120	$120	$120	$100	$120
Levy on wheat (R/ton)	R0	R0	R0	R10	R10	R0	R10
Change in production cost	0%	0%	0%	0%	-20%	0%	-20%
Change in exchange rate	0%	0%	0%	0%	0%	0%	0%
% Locally consumed	40%	60%	60%	40%	40%	40%	60%
% Consumed in Gauteng	20%	20%	20%	20%	20%	20%	20%
% Consumed abroad	40%	20%	20%	40%	40%	40%	20%
% Price premium	0%	0%	100%	0%	0%	0%	100%
% Of crop with rice premium	0%	0%	10%	0%	0%	0%	10%

* US$/ton, Gulf of Mexico

Only areas with a dryland wheat production potential of more than 1.8 tons/ha/annum were considered in this study
All areas given are based on currently cropped areas according to the National Land Cover Project

Towns appearing on map: VREDENDAL, CLANWILLIAM, CITRUSDAL, PIKETBERG, CERES, MALMESBURY, PAARL, ROBERTSON, CAPE TOWN, STELLENBOSCH, SWELLENDAM, RIVERSDALE, LANGSBURG, OUDTSHOORN, GEORGE, MOSSEL BAY, KNYSNA, BREDASDORP

3/01/2001

Dryland Wheat Production: Margin analysis

Scenario II

N
W E
S

Legend:

⊙ Towns
▢ Western Cape
▲ Silos

■ Positive gross but negative nett margin (145 183 ha)
■ Negative gross margin (187 215 ha)
Positive nett margin:
■ > R200 / t (398 470 ha)
■ R100 – R200 / t (649 608 ha)
■ < R100 / t (69 476 ha)

Assumptions

ASSUMPTIONS	SCENARIO						
	I	II	III	IV	V	VI	VII
Level of tariff protection	0%	0%	0%	0%	0%	0%	0%
FOB price of wheat*	$120	$120	$120	$120	$120	$100	$120
Levy on wheat (R/ton)	R0	R0	R0	R10	R10	R0	R10
Change in production cost	0%	0%	0%	0%	-20%	0%	-20%
Change in exchange rate	0%	0%	0%	0%	0%	0%	0%
% Locally consumed	40%	60%	60%	40%	40%	40%	60%
% Consumed in Gauteng	20%	20%	20%	20%	20%	20%	20%
% Consumed abroad	40%	20%	20%	40%	40%	40%	20%
% Price premium	0%	0%	100%	0%	0%	0%	100%
% Of crop with rice premium	0%	0%	10%	0%	0%	0%	10%

* US$/ton, Gulf of Mexico

Towns labelled on map: VREDENDAL, CITRUSDAL, LANGSBURG, CERES, OUDTSHOORN, PAARL, ROBERTSON, STELLENBOSCH, CAPE TOWN, GEORGE, MOSSEL BAY, KNYSNA

Only areas with a dryland wheat production potential of more than 1.8 tons/ha/annum were considered in this study
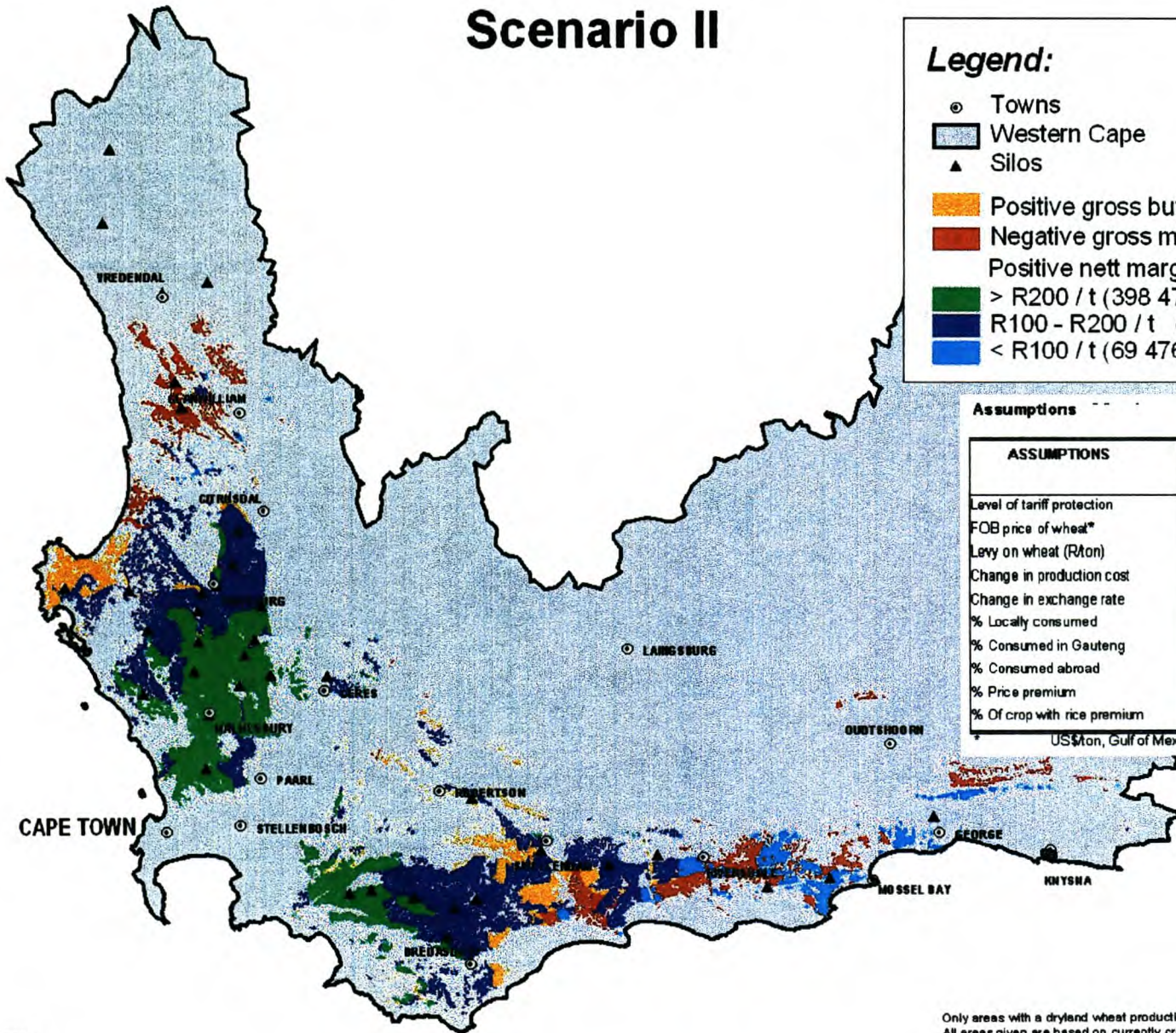All areas given are based on currently cropped areas according to the National Land Cover Project

03/01/2001

Dryland Wheat Production: Margin analysis

Scenario III

N
W — E
S

Legend:

⊙ Towns
☐ Western Cape
▲ Silos

■ Positive gross but negative nett margin (332 472ha)
■ Negative gross margin (0 ha)
Positive nett margin:
■ > R200 / t (1 002 996 ha)
■ R100 - R200 / t (114 587 ha)
■ < R100 / t (0 ha)

Assumptions

ASSUMPTIONS	SCENARIO						
	I	II	III	IV	V	VI	VII
Level of tariff protection	0%	0%	0%	0%	0%	0%	0%
FOB price of wheat*	$120	$120	$120	$120	$120	$100	$120
Levy on wheat (R/ton)	R0	R0	R0	R10	R10	R0	R10
Change in production cost	0%	0%	0%	0%	-20%	0%	-20%
Change in exchange rate	0%	0%	0%	0%	0%	0%	0%
% Locally consumed	40%	60%	60%	40%	40%	40%	60%
% Consumed in Gauteng	20%	20%	20%	20%	20%	20%	20%
% Consumed abroad	40%	20%	20%	40%	40%	40%	20%
% Price premium	0%	0%	100%	0%	0%	0%	100%
% Of crop with rice premium	0%	0%	10%	0%	0%	0%	10%

* US$/ton, Gulf of Mexico

VREDENDAL
CLANWILLIAM
CITRUSDAL
LANGSBURG
CERES
MALMESBURY
OUDTSHOORN
PAARL
ROBERTSON
CAPE TOWN
STELLENBOSCH
GEORGE
MOSSEL BAY
KNYSNA

Only areas with a dryland wheat production potential of more than 1.8 tons/ha/annum were considered in this study
All areas given are based on currently cropped areas according to the National Land Cover Project

03/01/2001

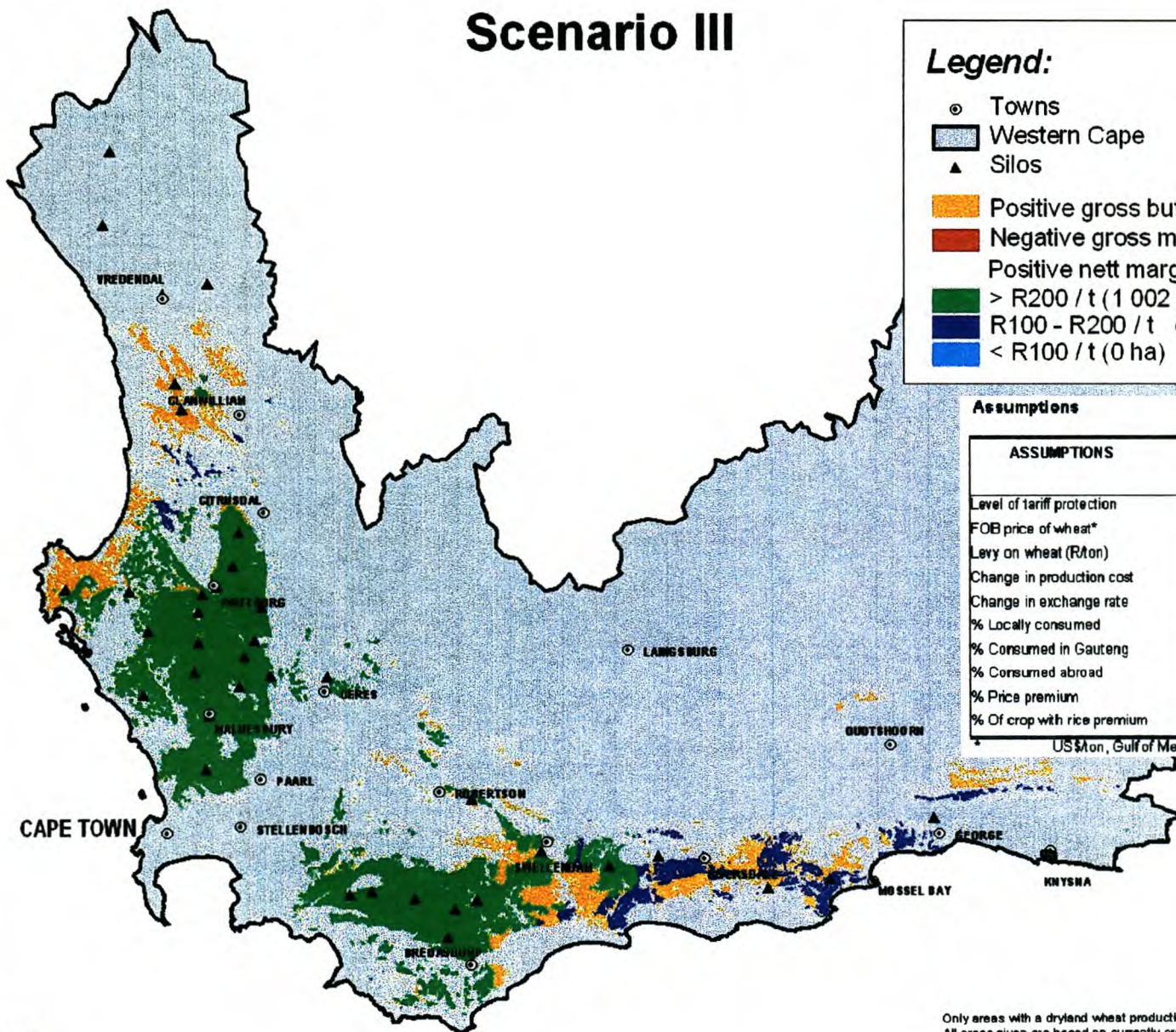# *Dryland Wheat Production: Margin analysis*

Scenario IV

Legend:

- ⊙ Towns
- ▢ Western Cape
- ▲ Silos

▨ Positive gross but negative nett margin (92 694 ha)
▨ Negative gross margin (332 472 ha)

Positive nett margin:
▨ > R200 / t (0 ha)
▨ R100 - R200 / t   (397 589 ha)
▨ < R100 / t (605 406 ha)

Assumptions

ASSUMPTIONS	SCENARIO						
	I	II	III	IV	V	VI	VII
Level of tariff protection	0%	0%	0%	0%	0%	0%	0%
FOB price of wheat*	$120	$120	$120	$120	$120	$100	$120
Levy on wheat (R/ton)	R0	R0	R0	R10	R10	R0	R10
Change in production cost	0%	0%	0%	0%	-20%	0%	-20%
Change in exchange rate	0%	0%	0%	0%	0%	0%	0%
% Locally consumed	40%	60%	60%	40%	40%	40%	60%
% Consumed in Gauteng	20%	20%	20%	20%	20%	20%	20%
% Consumed abroad	40%	20%	20%	40%	40%	40%	20%
% Price premium	0%	0%	100%	0%	0%	0%	100%
% Of crop with rice premium	0%	0%	10%	0%	0%	0%	10%

*   US$/ton, Gulf of Mexico

Towns on map: VREDENDAL, CLANWILLIAM, CITRUSDAL, PIKETBERG, LAINGSBURG, OUDTSHOORN, PAARL, ROBERTSON, CAPE TOWN, STELLENBOSCH, SWELLENDAM, GEORGE, MOSSEL BAY, KNYSNA, CERES, BREDASDORP

Only areas with a dryland wheat production potential of more than 1.8 tons/ha/annum were considered in this study
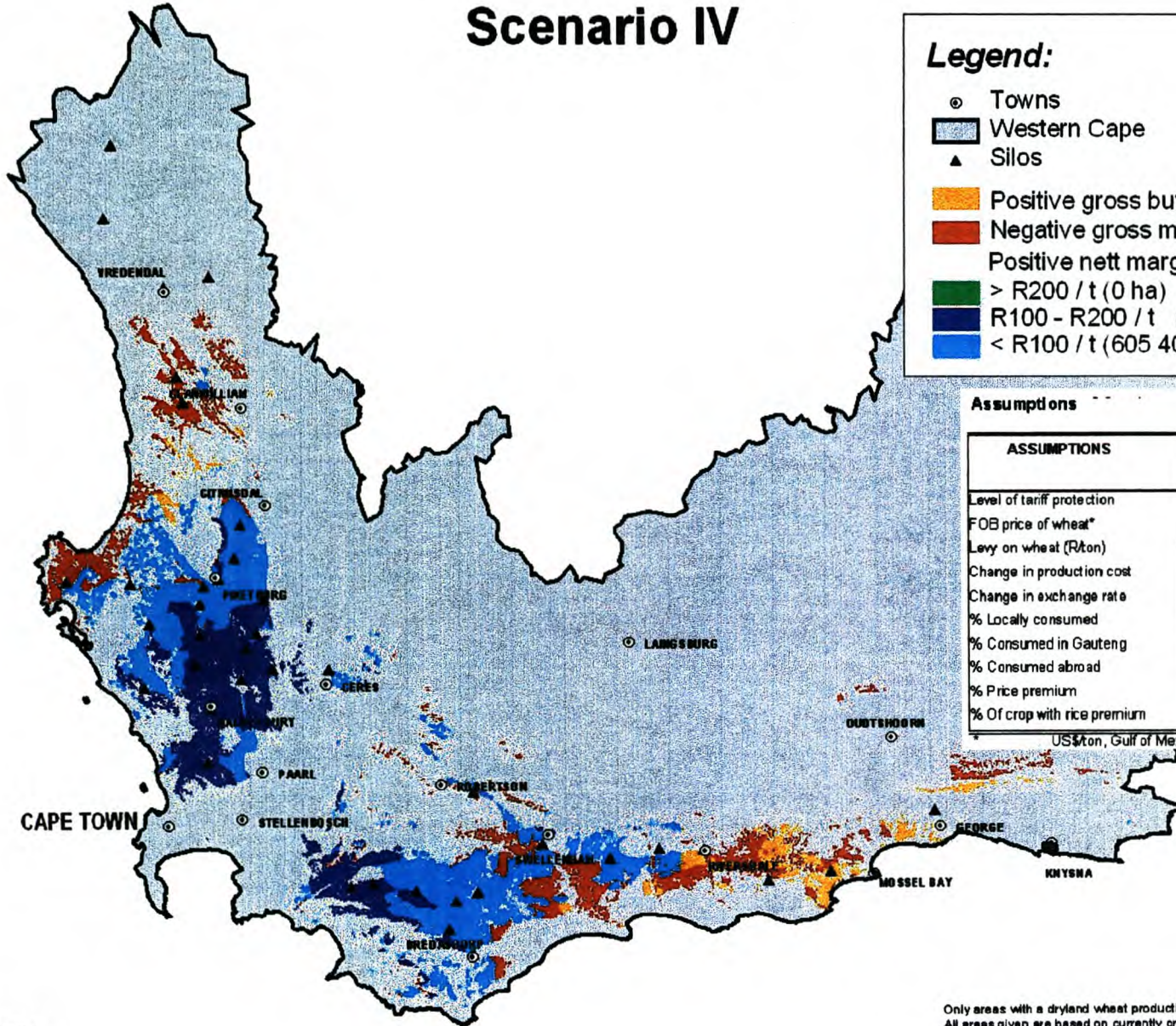All areas given are based on currently cropped areas according to the National Land Cover Project

04/01/2001
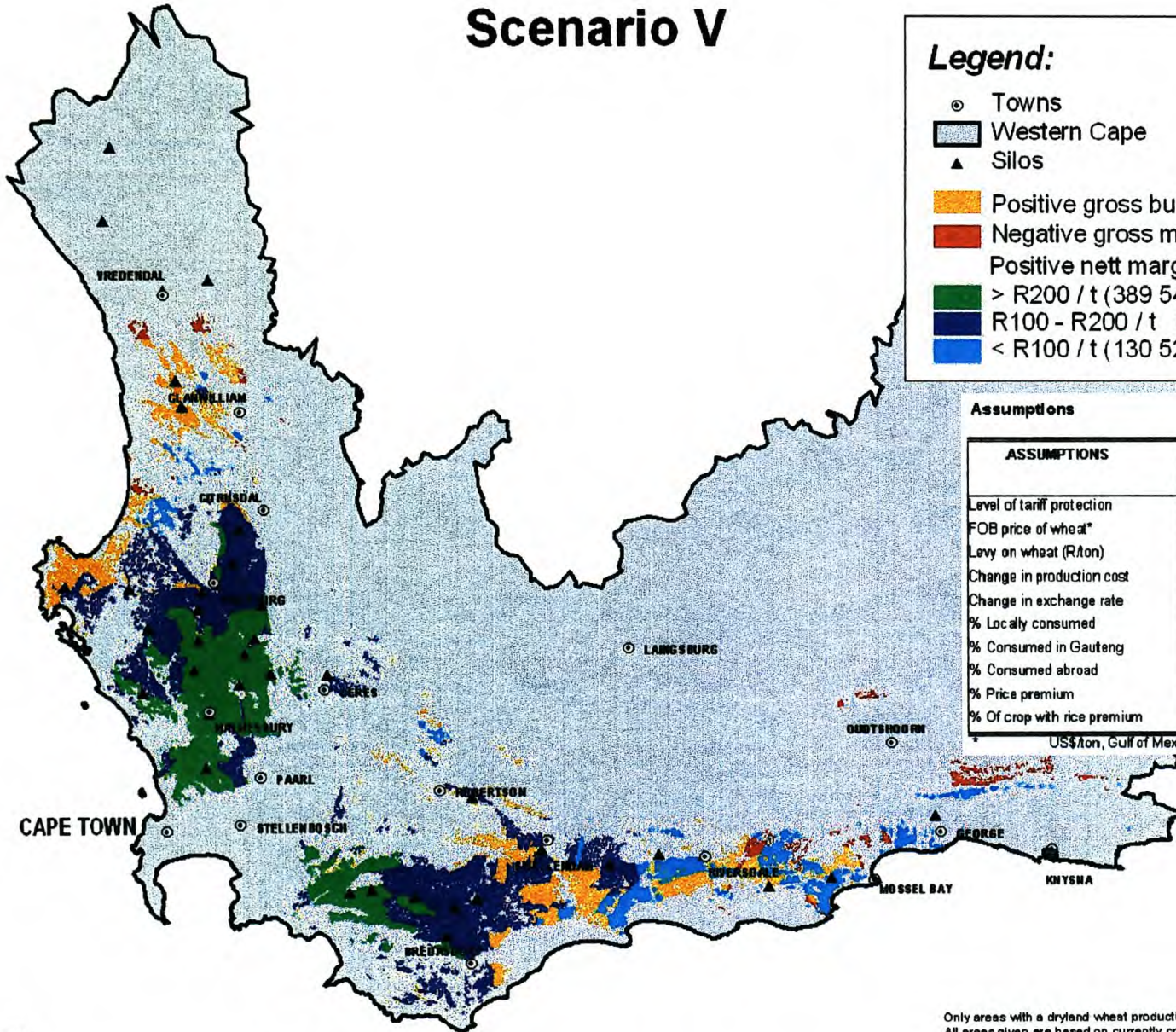
Dryland Wheat Production: Margin analysis

Scenario V

Legend:

⊙ Towns
▢ Western Cape
▲ Silos

▨ Positive gross but negative nett margin (285 824 ha)
▨ Negative gross margin (46 648 ha)
Positive nett margin:
▨ > R200 / t (389 549 ha)
▨ R100 – R200 / t (591 233 ha)
▨ < R100 / t (130 525 ha)

Assumptions

ASSUMPTIONS	SCENARIO						
	I	II	III	IV	V	VI	VII
Level of tariff protection	0%	0%	0%	0%	0%	0%	0%
FOB price of wheat*	$120	$120	$120	$120	$120	$100	$120
Levy on wheat (R/ton)	R0	R0	R0	R10	R10	R0	R10
Change in production cost	0%	0%	0%	0%	-20%	0%	-20%
Change in exchange rate	0%	0%	0%	0%	0%	0%	0%
% Locally consumed	40%	60%	60%	40%	40%	40%	60%
% Consumed in Gauteng	20%	20%	20%	20%	20%	20%	20%
% Consumed abroad	40%	20%	20%	40%	40%	40%	20%
% Price premium	0%	0%	100%	0%	0%	0%	100%
% Of crop with rice premium	0%	0%	10%	0%	0%	0%	10%

* US$/ton, Gulf of Mexico

Only areas with a dryland wheat production potential of more than 1.8 tons/ha/annum were considered in this study
All areas given are based on currently cropped areas according to the National Land Cover Project

04/01/2001

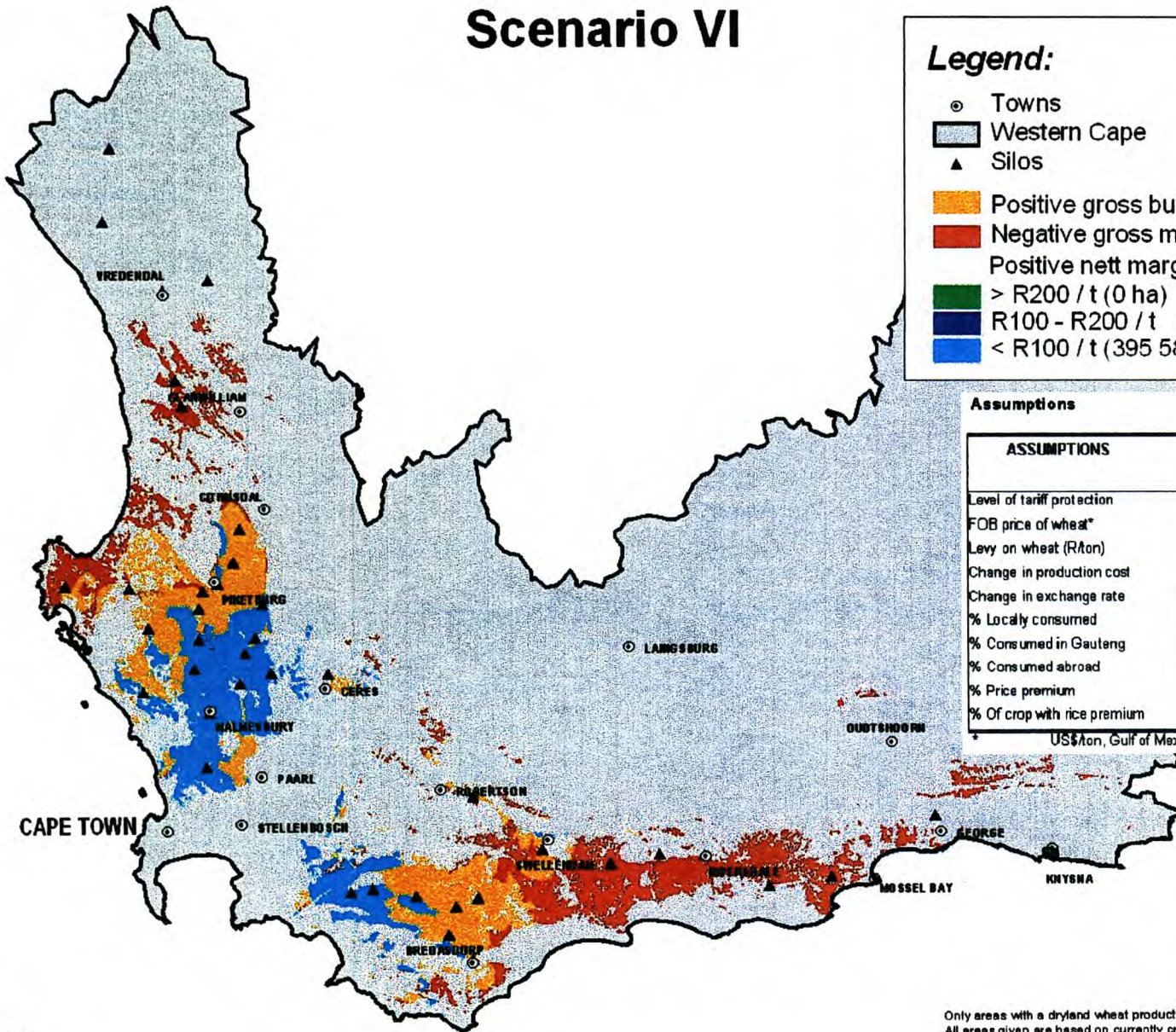# *Dryland Wheat Production: Margin analysis*

Scenario VI

Legend:

- ⊙ Towns
- ☐ Western Cape
- ▲ Silos

- ▮ Positive gross but negative nett margin (509 681 ha)
- ▮ Negative gross margin (544 427 ha)

Positive nett margin:
- ▮ > R200 / t (0 ha)
- ▮ R100 - R200 / t (0 ha)
- ▮ < R100 / t (395 587 ha)

Map town labels: VREDENDAL, CLANWILLIAM, CITRUSDAL, PIKETBERG, CERES, LAINGSBURG, MALMESBURY, PAARL, ROBERTSON, OUDTSHOORN, CAPE TOWN, STELLENBOSCH, GEORGE, SWELLENDAM, MOSSEL BAY, KNYSNA, BREDASDORP

Assumptions

ASSUMPTIONS	SCENARIO						
	I	II	III	IV	V	VI	VII
Level of tariff protection	0%	0%	0%	0%	0%	0%	0%
FOB price of wheat*	$120	$120	$120	$120	$120	$100	$120
Levy on wheat (R/ton)	R0	R0	R0	R10	R10	R0	R10
Change in production cost	0%	0%	0%	0%	-20%	0%	-20%
Change in exchange rate	0%	0%	0%	0%	0%	0%	0%
% Locally consumed	40%	60%	60%	40%	40%	40%	60%
% Consumed in Gauteng	20%	20%	20%	20%	20%	20%	20%
% Consumed abroad	40%	20%	20%	40%	40%	40%	20%
% Price premium	0%	0%	100%	0%	0%	0%	100%
% Of crop with rice premium	0%	0%	10%	0%	0%	0%	10%

* US$/ton, Gulf of Mexico

Only areas with a dryland wheat production potential of more than 1.8 tons/ha/annum were considered in this study
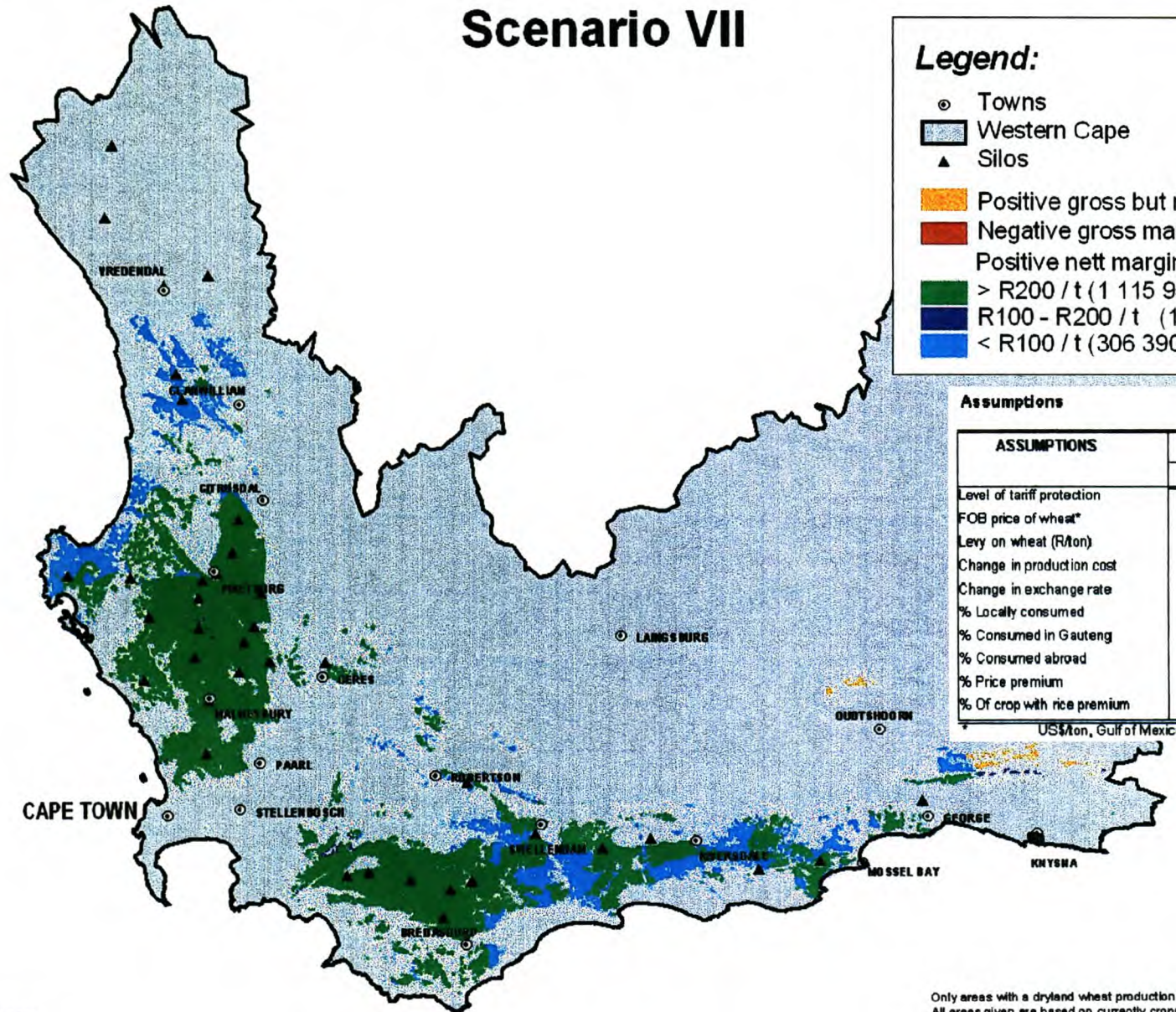All areas given are based on currently cropped areas according to the National Land Cover Project

04/01/2001

Dryland Wheat Production: Margin analysis

Scenario VII

Legend:

- ⊙ Towns
- Western Cape
- ▲ Silos

Positive gross but negative nett margin (10 568 ha)
Negative gross margin (0 ha)
Positive nett margin:
> R200 / t (1 115 956 ha)
R100 - R200 / t (15 041 ha)
< R100 / t (306 390 ha)

Assumptions

ASSUMPTIONS	SCENARIO						
	I	II	III	IV	V	VI	VII
Level of tariff protection	0%	0%	0%	0%	0%	0%	0%
FOB price of wheat*	$120	$120	$120	$120	$120	$100	$120
Levy on wheat (R/ton)	R0	R0	R0	R10	R10	R0	R10
Change in production cost	0%	0%	0%	0%	-20%	0%	-20%
Change in exchange rate	0%	0%	0%	0%	0%	0%	0%
% Locally consumed	40%	60%	60%	40%	40%	40%	60%
% Consumed in Gauteng	20%	20%	20%	20%	20%	20%	20%
% Consumed abroad	40%	20%	20%	40%	40%	40%	20%
% Price premium	0%	0%	100%	0%	0%	0%	100%
% Of crop with rice premium	0%	0%	10%	0%	0%	0%	10%

* US$/ton, Gulf of Mexico

Only areas with a dryland wheat production potential of more than 1.8 tons/ha/annum were considered in this study
All areas given are based on currently cropped areas according to the National Land Cover Project

04/01/2001