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SWEET ORANGES, UNCERTAIN MARKETS, AND BITTER LOSSES: A STUDY OF SMALL SCALE CITRUS FARMING IN THE EASTERN CAPE, SOUTH AFRICA.

By

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ABSTRACT

SWEET ORANGES, UNCERTAIN MARKETS, AND BITTER LOSSES: A STUDY OF SMALL SCALE CITRUS FARMING IN THE EASTERN CAPE, SOUTH AFRICA

By

Andile Siyengo

This study examines how global forces influence the activities of small-scale producers in developing countries based on an empirical case in the Eastern Cape, South Africa of small-scale citrus producers who have become part of the global citrus chain. The South African dualistic system of food production, and the counter-seasonal advantage South Africa has among major citrus producers are used as a context for the study.

Four research questions have guided the study: How do international food and agricultural standards structure the global citrus production and distribution chain? How are standards formulated, communicated, and applied? How do the emergent farmers structure their production practices to conform to the product requirements set by the international markets? What shortcomings can be identified both at the level of farm operations and at the level of the chain?

The study is conceptualized within the tradition of commodity chains analysis and seeks to understand the processes surrounding the passage of products along the citrus global chain. At the core of these processes are international food and agricultural standards that have become systems of regulation used by the dominant actors to structure the activities of other actors in line with their preferences.

Four key findings are reported: First, unlike the popular belief that global deregulation results in an end of regulation locally, the citrus chain is highly regulated with standards playing a central regulatory role. I argue that standards are now at the center stage in the citrus chain, and they are used as systems of coordination. Second, in spite of the tight system of regulation, the small-scale farmers face challenges in attempting to meet the standards; however, they do not have any alternative but to operate within the chain. Consequently, they construct their own definitions of standards, which are primarily informed by a consideration of costs. Third, the citrus chain is organized in a peculiar manner that is to the disadvantage of the small-scale farmers. Fourth, standards are not purely technical tools that are informed by neutral science. Other forces including power, values, and profits play a significant role, but their significance often is downplayed.

This study develops a theoretical construct that explains the role of standards in global commodity chains. It proposes that actors along the commodity chain use standards to define their responsibilities and their expectations. They also use standards to measure risk. The major contribution is that this study extends the analytical tools of commodity systems approach and global commodity chains to include an account for the regulatory processes within the chains. Finally, as more insight is gained on how the international standards structure the global citrus chain, we make suggestions on changes needed in these processes to enhance the capacity and success of the small farmers.

DEDICATION

I dedicate this work to my wife, Nondumiso.

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Navigating your way through a Ph.D. program is a great challenge that requires several resources. It is going to be very difficult for me to mention everybody who has been helpful in this process by name. There are however those who stand out as being exceptionally helpful and I want to acknowledge their assistance. First I want to thank the members of my guidance committee for their academic guidance, Dr Dave Wiley was my chair. He is the first contact that I had with the department and helped me gain admission to the program. He is a very resourceful person and has linked me up with several useful contacts during my time in East Lansing. Dr Larry Busch hired me as a research assistant at the Institute for Food and Agricultural Standards (IFAS), and later at the Partnerships for Food Industry Development- Fruit and Vegetables (PFID-FV). It was through Larry's foresight and encouragement that the project was conceived. His intimate involvement with issues in the Food and Agricultural Sector has provided good insight as I struggled to make sense of the data that I brought from the field. Dr Craig Harris was part of the core faculty at IFAS with a very rich background in working with Michigan Farmers. His inputs were always useful. Dr Assefa Mehretu is from the Geography Department and his understanding of the Political Economy proved very helpful in making meaningful linkages in the dissertation. I also need to acknowledge the role played by early mentors at Fort Hare, Bra Mak Makalima and But' Tshezi Mafanya. Thank you for your confidence, support and guidance.

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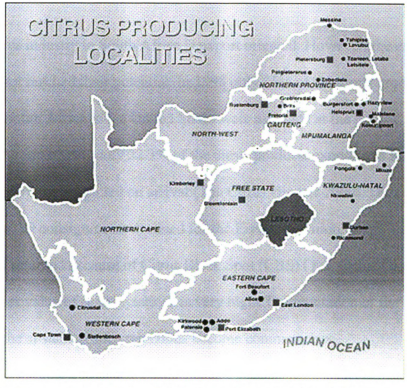


www.arc.agric.za/.../ main/citrus/prodareassa.htm, 2004.

CHAPTER 1

Purpose of the Study

Introduction

The citrus industry in South Africa is export oriented. However, the export volumes have not reached their potential. In 1998 only 35% of the citrus products exported from South Africa to the United States were accepted at the port of entry. During the same year, only 22.3% of the citrus products exported to Korea were accepted; 56% were spoiled on arrival (The Citrus Grower 2000). During the 1999 season, 19 consignments destined for the European Union were intercepted and returned because of Citrus Black Spot (CBS) (The Citrus Grower 2000). The dollar value of such rejections is very high. The reputation of the industry might be at stake if such rejections become commonplace.

Statement of the Research Problem

The interceptions and rejections highlighted above represent two contradictory processes. First, they represent victory for the tracking system through which the production chain is able to trace the source of all the products that are in the chain. However, the rejections also raise concern about the effectiveness of the system of management and control of standards within the industry that generally has been viewed as leading the way in responding to international requirements (Mather 1999).

In South Africa, citrus has been identified as a growth industry because its growth rate has been consistently much higher than other commodities. For example, whereas in 1995 the general growth rate for agricultural production was

9%, it was 17% for citrus. In the fresh fruit sector, citrus had the highest foreign exchange earnings. In 1998 citrus fruit accounted for 48% of the volume of fresh fruit that was exported. Despite the rejections, the value of earnings exceeded R850m (around$200m at the exchange rate at that time) (Trade and Industry Policy Secretariat and International Institute for Sustainable Development (TIPS&IISD) 1999). There is concern however, that, with the continuing rejections, the citrus industry will not be profitable over the years to come. It will be impossible for the farmers, especially the emergent farmers, to sustain their activities.

Second, there is the possibility of growth in the industry if South Africa could exploit the counter-seasonal advantage that it has with most citrus producing countries of the Northern Hemisphere. In the Southern Hemisphere, South Africa is among the top four citrus producers. However, Brazil, which accounts for 36% of world citrus production, focuses on Valencia oranges that are contracted for the juice industry. Argentina and Australia each produce about half of South Africa's output. This suggests that South African citrus can play a major role in the counter-seasonal citrus markets if the standards are maintained consistently. However, with the current rejections, the industry is not able to fully exploit the counter-seasonal export opportunities that are available.

Third, as substantial citrus goods are not exportable, they tend to flood the local markets leading to a price depression. This, in turn, translates to fewer incentives for those who are involved in the industry. They are both unwilling and unable to commit further investment in their undertakings. Continuing rejections

will lead to apathy among the producers and the destruction of an industry that has great potential.

There is a strong possibility that the identified problems span the entire citrus industry. This academic study represents a first attempt to deal with the problems that the industry in South Africa is facing. The focus is on a single citrus-producing region located in the triangle towns of Fort Beaufort, Alice, and Peddie. This region was chosen for two reasons. First, it has the highest number of emergent African farmers who are recent entrants to the export-oriented citrus production chain. Second, this group of new entrants is constituted mostly of professionals with very strong entrepreneurial interests.

The reports of rejections and interceptions do not indicate whether the failure in meeting the standards is an outcome of the changing international regulations or of farmers' inability to follow the "Best Practice."[1] In this study we will focus mainly on small-farmers and their conceptions of the best practices.

Aim of the Study

The rejection rates highlighted above are a cause for concern, and have major impacts on the citrus farmers of the Eastern Cape. The aim of this study is to examine how international food and agricultural standards impact on the activities of small-scale farmers in this region. This group has a low export rate when compared to the established commercial farmers. Guided by a belief that standards are now the central organizing principles within the citrus global trade, this study seeks to examine their purposes within global chains, and how such purposes are served. Second, the study seeks to understand the activities of the

[1] The concept best practice will be discussed in Chapter 5.

small-scale farmers who are participants in global trade, in terms of how they are informed by the set standards. This includes understanding interpretations of standards by the various participants in the chain, and how such interpretations affect small-scale farmers' actions. The study also will examine how the entire chain is structured and how the structure affects the actions of the small-scale farmers.

The study focuses on the impact of standards. This does not suggest that all other effects on small-scale citrus production are not relevant, but the main thesis is that standards now play a dominant role. Standards will from time-to-time interact with other factors such as politics and history. An understanding of such interaction may enrich the arguments that will be advanced, but it will not be the main thesis.

Research Questions

Given the observations made above, the following four research questions were formulated: First, how do international food and agricultural standards structure the global citrus production and distribution chain? Second, how are standards formulated, communicated, and applied? Third, how do the emergent farmers structure their production practices to conform to the product requirements set by the international markets? Fourth, what shortcomings can be identified both at the level of farm operations and at the level of the chain?

Hypotheses

First, I hypothesize that unlike the popular convention that suggests that there has been an end of regulation following the discontinuation of single

channel marketing systems, where most states played a central role, the citrus chain is highly regulated with standards playing a central role. Second, small-scale farmers have difficulty in meeting most of the standards. However, they do not have any alternative but to operate within the chain. Third, there are problems with the way the citrus chain is structured, and these impact more on the small-scale farmers than any other group within the chain.

Overview of the Dissertation

Chapter two outlines the methodology. In this chapter I explain that the study is a qualitative study that utilizes several data gathering methods, including a review of documents, semi-structured interviews, and focus groups. It has been conceptualized within the commodity chain analysis and also includes techniques from other approaches notably the farming systems approach. Using the commodity chain analysis it has been possible to trace the movement of citrus products from one actor to the next along the production and distribution chain. Understanding and analyzing the activities at each point of the production process has been informed by the farming systems approach.

Chapter three is a literature review. In this chapter I argue that this study is about three interrelated phenomena. First, it concerns food production, more specifically, fruit production through small-scale farming. Second, it is about global trade in fresh fruit. Third, it is about standardization. Consequently, the study is anchored within the bodies of literature that address the three broad areas of knowledge. The study makes a theoretical contribution that is geared towards

uniting bodies of literature in the area of commodity systems analysis and Global Commodity Chains (GCC) with that of standards.

Chapter four provides a context for understanding the challenges facing South Africa. It is an overview of the South African agricultural system and the role of the citrus industry in it. The key argument is that South African agricultural policies were for a long time subjected to the social policy of apartheid. Consequently the evolution of agriculture and class relations in general needs to be understood within the context of such developments. Further, the major challenges that face the new government are equity in land distribution, scientific knowledge that services a broader agricultural community, and developing linkages that would allow emergent farmers access to markets.

Part two of the chapter makes an observation that the citrus industry in South Africa has great potential. The prospects for its growth are linked to the fact that it has a counterseasonal advantage with most of the major citrus producers around the world. The scope for improvement in this industry lies in improving the export capabilities of the emergent small-scale African farmers. Meeting the standards for export continues to be a challenge for this group.

Chapters five to eight are the presentation of the findings of the study. Following the discussion in the review of literature (Chapter 3), Chapter 5 addresses the task of uniting the three bodies of literature by filling the gaps that were identified earlier. The chapter examines the role of standards as systems of coordination in the citrus chain. It responds to the following questions: How do international standards structure the global citrus trade? How are standards

formulated and communicated, and who are the major actors in the entire chain? A theoretical construct is developed to outline the role of standards in global chains. The main argument is that in the citrus chain, standards are used as systems of coordination. In that regard they define expectations and responsibilities, and they are used to measure risk. This chapter shows how the activities at each level represent an interpretation of expectations and a definition of responsibilities. The same process of interpreting expectations and defining responsibilities becomes a measurement of risk.

Chapter six outlines how standards are enforced along the citrus chain. In this chapter I argue that the enforcement of standards is built into the entire citrus chain. The inputs that are used are subject to approval from the marketing agents and the government. The departments of health and agriculture audit the farms. Marketing agents and the officials of the farmers' cooperative monitor the farmers' production practices to ensure that the farmers are following the prescriptions. Marketing agents and government departments audit the packhouses. The products that are exported are inspected by an independent inspection service at the packhouse and at the port of exit.

Further, enforcement has been simplified with the adoption of three operational principles: principle of unrestricted access, a system of centralized sourcing inputs, and a well-developed tracking system. The chapter concludes by acknowledging that there is indeed a high level of regulation within the citrus industry.

Chapter seven seeks to explain the structural challenges associated with small-scale citrus production. Guided by Friedland's organizing principles for commodity systems studies, the chapter examines the nature of land ownership, production practices, the role of science in productive activities, and labor as a factor of production. The chapter answers the question: How do small-scale citrus producers structure their activities to be in line with international expectations? Several points are made in the chapter: First, the uncertainty associated with the current status of ownership among the small-scale citrus producers affects their investment decisions, which in turn undermines their ability to meet some of the external quality standards that are set by the industry. Second, citrus production is a technically complex undertaking. Citrus is subject to several diseases, and it is in trying to control the diseases that some farmers may violate the standards. Third, standards are a cost to the farmer. For small-scale farmers, there is constant need to try to minimize such costs. Sometimes the cost considerations will override the concerns for meeting the standards. Fourth, science is central in all the activities of the farmers. Farmers realize their dependence on science but are concerned by the fact that they have no access to ownership of the scientific knowledge that they fund through the levies that they pay. Fifth, most actors do not recognize labor standards without any negative sanction from the chain.

The impact of the points raised above is that farmers now construct their own meaning of the standards. Restricted by the structural problems that they face, they focus on what they can afford and what they regard as absolutely necessary. Most of the time these judgments are not effective.

Chapter eight looks at the way in which the citrus chain is structured and how the present structure impacts on small-scale producers. In this chapter I propose that that the way the citrus chain is currently structured impacts negatively on the small-scale producers. The chapter seeks to answer the question: what shortcomings can be identified both at the level of farm operations and at the level of the chain? I raise five issues in support on my proposal. First, I argue that there is a peculiar way in which risk is distributed in the citrus chain and other fresh fruit and vegetable chains. I propose that in the South African case, this peculiar way is the function of the evolution of the marketing function. Second, I observe that the way in which the chain is currently structured reduces the shelf life of the farmers' products. Third, I argue that while diseases continue to be a major problem for the industry, it is difficult to understand neutral interpretations of their impact. Most explanation of the nature and the impact of diseases seem to justify positions adopted by the countries in question rather than providing neutral explanations of the nature of the problem. Fourth, I argue that the high number of marketing agents operating within the chain is to the disadvantage of the farmers. Finally, I argue that recent improvements in refrigeration technology are leading to the adoption of protectionist principles and redefinitions of the meaning of freshness.

Chapter nine seeks to translate the empirical knowledge gained from a study of the impact of standards on the global citrus chain to improve our understanding of the nature of standards within the food sector. This objective is achieved by critically examining the bases for standards. The chapter proposes

that there are three major bases for standards: science, power, and profits. The supporters of the technical view of standards are influenced by the conventional views of science. Supporters of the political view of standards are influenced by the alternative views of science. The view that links standards to profits is associated with the business view. The chapter proposes that it is better to conceptualize standards as having elements embracing all the views discussed above. The main argument is that standards are not limited to science. Other interests including the principles of protectionism have been built into standards. This explains why there is always ongoing debate on the intended objectives and the unforeseen impact of standards. What does seem to be the case is that power plays a significant role in ensuring that some groups' interests are protected within the international standards

Chapter ten outlines the conclusions, recommendations, and areas for further research. The chapter proposes that agricultural projects are not self-sustaining. Funding agencies and governments need to be aware of the need to create sustainable linkages for agricultural projects to be viable. Second, commodity chains are not always profitable for all actors. There is an observation that the longer the chain, the less the benefits that are distributed to the farmers. Third, standards need to be understood as being largely influenced by ways of life and value systems and they can in fact be linked to modernity practices. What is achieved through standards is what could not be achieved through development policies like modernization.

The second part of the chapter proposes two areas for further research. First, it proposes that it should be interesting to examine the effects of time on small-scale operations. Second, more insight may result from examining value creation along the chain and the distribution of benefits among actors.

CHAPTER 2

Methodology

Introduction

In chapter one we indicated that the aim of this study is to understand how international standards impact on the operations of small-scale farmers. We also indicated that to get insight into that we need to understand how the entire citrus chain is structured. In this chapter we lay out the system of collecting data to ensure that all the key actors are covered. While several data-gathering techniques are used at different levels in this project, it is guided by the philosophy of the commodity systems approach.

Commodity Systems Approach and Farming Systems

This study is a qualitative study designed within the context of both commodity systems analysis and farming system approach. Buttel and Goodman (1989), following Friedland (1984), see the goal of this approach as:

> understanding the agricultural commodity production as a system in which technical and manufactured inputs are incorporated into a labor process in which commodities are produced, processed and marketed in industrial structures (p87).

Using this approach researchers are able trace the path of commodities on the production and distribution chain. Friedland's idea was to develop an approach that would utilize production as an entry point in an attempt to understand the entire chain. This approach has enabled us to trace the path of the citrus products from the growers to the broader market, thus providing an understanding of how standards structure the relations between the various actors in the production chain.

Second, the study utilizes principles of farming systems research to gain an understanding of the operations of actors at various levels of the production and distribution chain (Conway 1994). This method provides rationale for the researcher to spend time in a given location to gain insight into its operations. Consequently this researcher has spent time with the growers on their farms, with packers, shippers and marketing agents in the packhouses, inspection agents at the packhouses, and the port of exit.

Research Design

The study is designed to achieve two broad objectives. First, it seeks to understand the planned activities within the context of meeting production goals. In this regard semi-structured interviews have been conducted with actors along the production and distribution chain targeting the five areas proposed by Friedland as the focal points for the commodity systems approach. (See below).

Second, it seeks to gain understanding of the actual execution of tasks that are designed to achieve the objectives outlined above. In this regard there were observation visits to the farms by different members of the research team in an attempt to gain insight from different perspectives about the farm activities. These two data gathering methods were reinforced by focus group discussions, which sought further explanation of the on farmers' activities.

Identification of a Population and the Sampling Method

The population for this study includes all the actors in the citrus trade, from the producers of inputs and breeders to the final consumer. The major aim, however, has been on understanding the operations of small-scale producers

within the context of global forces. For this reason most of the focus of the study is on small-scale producers. The ideal would have been to include all the small-scale producers but this was not possible for logistical reasons. The sample that has been chosen covers more than 80% of the small-scale citrus producers in the region. The table below provides an overview of the profile of the participants in the study:

Table 1: Gender and "Racial" Profile of the Research Participants[2]

	Male	Female	African	Coloured	White	Total
Farmers	27	2	27	0	2	29
Officials of the Coop	4	0	0	0	4	4
Marketing Agents	5	0	1	0	4	5
Inspectors	4	0	0	2	2	4
Harbor Logistics Officer	1	0	0	0	1	1
Ship Engineer	1	0	0	0	1	1
Total	42	2	28	2	14	44

Note that the two white commercial farmers were used as benchmarks and their operations are not discussed in the report. The general overview proposes that there is an overrepresentation of men in the citrus sector with only two women farmers as part of the key actors. Also there is an interesting racial divide in terms of which Africans are not represented in the activities that take place beyond the farm gate. This has significant consequences for the power relations within the chain. In the case of the importing countries logistical problems limited the researcher to secondary analysis.

[2] The author believes in the existence of a single human race. Categories used here only capture general conventions used in South Africa following the usage of race as an organizing principle for all aspects of social life.

Data Collection

Several data collection methods were used at different point in this study. Fieldwork was preceded by a review of government documents. Fieldwork involved the use of semi-structured interviews with key actors as described below. The interviews were guided by two sets of interview schedules. One was intended for the farmers, while the other was intended for all the other actors in the chain (see appendix for copies). Further, observation visits were organized for all the workstations that are located in South Africa. This included farm visits, packhouse visits, inspection stations visits, port of exit visits and a tour of a ship that transports the products. In addition to the methods described above, farmers were invited to participate in focus group discussions. A total of five sessions were held with an average of 4 farmers per session. The focus groups discussed the broad areas covered in the interview schedule.

Document Review

The review of public documents dealt specifically with issues of standards for the citrus industry. The National Department of Health is responsible for enforcing phytosanitary standards and, therefore, publishes national regulations to this effect. The National Department of Agriculture is a member of the International Plant Protection Convention and is responsible for ensuring that precautions are taken to limit infection of fruit, especially fruit that is intended for export. In this regard it has developed a system of accreditation for farmers whose products have been intercepted and withdrawn at some point (Citrus Grower 2000). This department also, is responsible for the development and publication

of the official standards for all citrus products. There is a set of standards for products intended for the local markets and a different set for products intended for the export market. Such standards offer definitions of the various types and varieties of citrus products. They also explain methods to be used in sampling and inspection. They also prescribe the tools that are to be used in testing for content (e.g., acidity and sugar content). The department has delegated this function to an independent inspection agency.

This information was supplemented by in-depth interviews with government officials to understand the government's role in the industry. Specifically, information was sought on the government's role in the development and application of local standards and the interpretation of international standards.

Semi-structured Interviews

Semi-structured in-depth interviews were held with all the identified participants. These interviews were semi-structured to allow the introduction of important issues of interest that were not considered when the interview schedules were drawn up. This applied to all the selected participants in the chain. The principal researcher conducted the in-depth interviews.

Observational Visits

Observational visits were included in the study to achieve two things. First, they were intended to give the researcher an opportunity to be familiar with the production process and understand the environment and the conditions under which the actors performed their tasks. Second, they were intended to see the relationships between the actors' explanations and their actions.

The visits were significant for the study and focused on understanding production practices or daily activities of the actors. With the farmers, there was a need to arrange before hand to have the visit on a day that specific activities would be conducted to observe the actual action. With other actors this was not necessary, as they were following similar routines daily.

Focus Groups

Focus group sessions were organized specifically for the farmers. The idea of focus groups came from the fact that the farmers met regularly to discuss their production problems and the researcher saw this as an opportunity to direct such discussions in the direction of the study. Focus groups served as very meaningful educational forum for both the participants and the researcher. In their discussions there were often disagreements, which led to a better understanding by all those who were involved.

Below is a summary of the data gathering methods that were used at each production point in the entire chain:

Farm Level Operations

The concept farm level operation is used to refer to the activities that take place on the farms. In these activities the farmer is the major actor. The concepts farm level operations, farmer, and grower have the same meaning in the study. At the farm level three major data gathering tools were employed. First, there were in-depth interviews with the farmers conducted by the principal researcher. Second, there were several guided observational visits conducted by the research assistants. Third, there were focus group discussions involving about four farmers

at a time. In this way data collected using one method could be corroborated against the data collected using the other methods.

Following Friedland (1984), Busch (1990) and Moore (1995), the initial interviews sought to introduce the study and to seek information on five key areas as recommended by the commodity systems approach. These areas are land tenure, production practices, labor usage, farmer organization and the role of science in the business.

Following these interviews the two research assistants spent time at each of the farms (one person per farm at a time) to make independent observations on the issues raised in the interviews. The focus groups brought together about four farmers whose farms had already been visited for a discussion of the issues that they had raised in the interviews. What was common in all three forums was assumed to be factual.

Packhouse Operations

A packhouse is a facility that is used to clean the fruit, grade it and pack it before it is shipped to the market. The three towns have a total of four packhouses. Of these, the research team had access to three. One is privately owned and could not be part of the study but was nonetheless used to benchmark the activities in the other packhouses. One is rented by a small group of emergent farmers and the other is owned by the farmers' cooperative. In all packhouses there were systemic observations of the path of the citrus products from the time they arrived until they were shipped to either the port of exit or to the local markets. Further, there were in-depth interviews with the packhouse manager, the

technical advisor and the financial manager. These functions were only well developed and diversified in the case of the farmers' cooperative. In the case of the other packhouses they were unified within one person.

Inspection Service Stations (a detailed discussion of the inspection service is in chapter 6)

Inspection service stations are located at the packhouses and at the port of exit. A regional office is located in the same town as the port of exit. Interviews were conducted with the person in charge of each station. These were followed by several days of observation to understand the inspection service activities. Two of the packhouses described above have Inspection Service Stations; one does not. The products from the one packhouse are inspected at the port of exit, because the cost of retaining inspectors on site would be very high. A regional manager also was interviewed to provide more context for the activities of the inspection service.

Marketing Agents

Marketing agents are responsible for the marketing, distribution and sale of the farmers products. They are independent companies that link the farmers with both local and international networks. While there will be marketing agents in the region all times conducting site visits to the farms, during the harvest time, all will gather at the packhouses to oversee the packaging of fruit that they will market. Further, they also will be located at the port of exit to ensure that the fruit has left in a suitable condition. Interviews were held with agents located at the packhouse and agents at the port of exit. These interviews were followed by

several days of observation of the inspectors activities to understand the meaning of the information supplied during the interview.

Engineer of the Ship

The engineer of the ship is the chief technical officer of the ship. He is in charge of the control room. He is responsible for ensuring that the storage rooms reach the required temperature at the required times, and are securely closed so that the temperature can remain constant. An in-depth interview with the engineer of the ship was conducted. This was followed by a tour of a loading ship, a review of the documents that the ship had received before docking, and an observation of the activities in the control room.

Data Analysis

Data was organized into the five broad themes of the interview schedule. Within each theme there was a review of the responses provided, a review of the observations made by the researcher, and in the case of farmers, a review of the notes from the focus group discussions. This review led to the identification of what Lincoln and Guba (1985) call emergent factors, which have been used in organizing the report. These are derived from the concepts that the participants used in explaining the issues that they were asked to describe. In analyzing the data, the emergent concepts are linked to literature on the subject or to further explanation from the government documents.

From the emergent themes, I have been able to formulate an assessment of the aims of the citrus chain and the role of standards in the chain. The broad aims of the chain are to ensure marketability of the products, limit food safety

violations, and improve traceability of all the products that are on the chain. On the other hand, standards are used to define responsibilities of each actor in the chain, thereby formulating expectations from other actors. They also are used as measurements of risk.

Conclusion

In this chapter we have proposed that this is a qualitative study that utilizes several data gathering methods, including a review of documents, semi-structured interviews, and focus groups. It has been conceptualized within the commodity chain analysis and also includes techniques from other approaches notably the farming systems approach. Using the commodity chain analysis it has been possible to trace the movement of citrus products from one actor to the next along the production and distribution chain. Understanding and analyzing the activities at each point of the production process has been informed by the farming systems approach.

Data is organized and interpreted according to the five focal areas for commodity systems analysis, namely: land tenure, production practices, labor usage, farmer organization and the role of science in the business.

In the following chapter we will locate the study within a wider body of knowledge by conducting a literature review in the areas of commodity chains analysis, Global Commodity Chains (GCC) and standards. Our aim is going to be to try to show how the three areas are interlinked such that it becomes more meaningful to consider the contribution of each to understanding the nature of the citrus global chain.

CHAPTER 3

Literature Review

Introduction

In chapter one we indicated that the aim of the study is to examine the purposes served by standards within the citrus global chain. The principal research question is how do international food and agricultural standards structure the global citrus production and distribution chain? In chapter two we explained the philosophy governing the study and the methods followed in data gathering. In this chapter we locate the study within a body of knowledge by conducting a literature survey in three key areas that are covered.

Conceptual Framework

This study concerns three interrelated phenomena. First, it concerns food production, more specifically, fruit production through small-scale farming. Second, it is about global trade in fresh fruit. Third, it concerns standardization. Consequently, the study needs to be anchored within the bodies of literature that address these three broad areas of knowledge.

As indicated earlier, this study has been conducted within the ambit of commodity systems analysis. The study makes a theoretical contribution geared toward uniting bodies of literature in the area of commodity systems analysis and Global Commodity Chains (GCC) with that of standards.

The literature on commodity systems analysis that is reviewed in the report explains how the transformation of subsistence farmers to commercial farmers has resulted in the creation of links among several actors. The GCC

literature attempts to explain the organization of global trade with special reference to fruit and vegetables, paying special attention to the role of small-scale producers within that system. Much of the literature on standards argues that standards have become means of stabilizing relationships among the productive units within the commodity chains. Consequently, standards impact the activities of small-scale operations.

Commodity Systems Analysis

Traditional food production started with the family being a unit for both production and consumption. To a large extent production dependent on what was available on the farm with very limited inputs being sought outside the farm. Axinn and Axinn (1984) propose that such farms operated on a system that allowed for a high recycling ratio within the farm.

Commercial farming has changed both the purpose and the methods of farming. The aim of commercial farming is to link the farmer to a market. What is central are the profits resulting from market penetration. Consequently, the farmer targets the market in his/her production decisions. This often is referred to as growing "cash crops." Further, the farm has ceased to operate on a high recycling ratio as most of the goods that it requires for its production are no longer produced on the farm but are sourced as inputs from external suppliers. To be effective, such systems of farming must be based on specialization. The farmer is linked backward to the producers, suppliers, and distributors of the inputs that are needed by the farm. He/she also is linked forward to those who require the output

of the farm either for further processing or for consumption. These might be middlemen, marketers, distributors, or consumers.

The transformation of traditional farmers who practiced subsistence farming to commercial farmers explains the processes of the evolution of commodity chains. The idea of a chain explains the links, backward and forward, that exist among the actors in the production, distribution and consumption system. This is in line with Busch's (1990) thinking that in commercial agriculture, production neither starts nor stops at the farm gate. Other actors have joined the chain to add value to farm production. A study of commodity systems, therefore, would seek to understand the nature of the flow of commodities along the production, distribution, and consumption chain.

The idea of a commodity chain needs to be understood as an abstraction that represents a relationship between actors who are part of the production, exchange, and consumption system. Friedland (1984) has proposed that in thinking about commodity chains, one should imagine the existence of a social reality that can be delineated as discrete. Such delineation should be for analytic purposes only because in reality all the systems are integrated. With the degree of specialization that dominates commodity production, Friedland felt that it might be possible to do the delineation accurately.

Busch (1990) warns against the reification of the commodity chain abstraction. He argues that to provide an accurate analysis, commodity chains need to be viewed as real and existing independently of other social formations.

However, in actual practice the actors in a given commodity chain will be engaged in other operations involving other products.

The concept of commodity chains can be used in two different ways. First, it can be used to refer to refer to social relations that enable goods and services to pass from one actor to the next. Because a chain essentially expresses a relationship, not everyone will be part of that relationship. Participation can be viewed as involving the use of both free will and coercion. Actors may choose to operate outside the established commodity chains. In that way they might risk greater market uncertainty. They might also choose to be part of the chains and, therefore, subject themselves to systems of governance within the chains.

Commodity chains become global in character when their links extend beyond nation states. The tendency is for these chains to increase their geographic reach as they seek cheaper labor and raw materials. They have, therefore, become global because of attempts to reduce costs (Hopkins and Wallerstein 1986).

Second, the concept can also be used to refer to a method of study that traces the flow of the goods and services on the production chain (commodity chain analysis). The passage of the goods represents concrete exchange made possible by the existence of a relationship between the actors. As a methodological tool, the GCC approach seeks to understand the systematic distribution of productive activities around the world (Friedland 1984, Hopkins and Wallerstein 1986, Gereffi and Korniewicz 1994).

Global Commodity Chains

The key ideas in the literature on what has now come to be known as GCC are captured in the work of Hopkins and Wallerstein (1986), Gereffi and Korniewicz (1994), and Raikes and Gibbon (2000). Hopkins and Wallerstein see the dominance of GCC as the fruition of the capitalist world system identified earlier by Wallerstein (1979). GCC are seen as reinforcing the structural inequality existing among societies that participate in the world system. They also view the GCC as agents for facilitating the movement of capital from the periphery to the capitalist core societies. Their focus, therefore, is on such issues as the distribution of costs and benefits among peripheral and core societies. Consequently, they have proposed that the starting point for explaining the nature of the GCC is to understand their social organization.

For them the GCC approach seeks to analyze the ongoing division and integration of the labor process. This involves understanding how each of the units that constitute the chain is structured and how each operates. They propose that one can track the continuing division and integration of the labor process by tracing the links of the networks in commodity chains. This would provide an explanation for the development and transformation of the world economic production system (Hopkins and Wallerstein 1986).

Further, they assert that what constitutes a commodity chain is a collection of different production units. The boundaries separating the various units are socially-constructed and are continuously negotiated given the ongoing technological advances. What locates the units within a commodity chain is the fact that they receive inputs from some actors and produce outputs needed by

other actors. However, while these linkages are strong, they are not the only forms of linkages that may be present. In some cases more than one unit can be part of a single firm, as in the case of vertical integration. Vertical integration removes the chain linkage from the sphere of market-like transactions.

The changing functions of the different units and their geographical location and relocation explain the character of the commodity chains. They will be global when the units are located in several parts of the world.

It is important to locate Hopkins and Wallerstein's ideas within the body of literature associated with the world system because this work is trapped in the institutional thinking of the world system. It appears that these authors looked for concrete structures or institutions that can best explain the existence of chains. As indicated earlier, the notion of a chain is an abstraction. The concept can best be understood as a relationship which is dependent on human agency, centered on choice and coercion.

Second, costs no longer are the only basis for the inclusion or exclusion of some units or countries in GCC. A review of the literature on standards will reveal that there are other considerations in the establishment of commodity chains. Finally, they have not addressed the question of the stabilization of the chain. They do not address the issue of governance structures that regulate the activities of the various actors within the chain. I will argue that standards have become the means for deciding on inclusion and exclusion, and they have also become the means for the stabilization of the chains.

The work of Gereffi and Korniewicz (1994) puts emphasis on understanding the GCC approach as a method of study. For them, GCC represent an attempt to analyze the new patterns of global organization and change. Their starting point is that capitalism today entails the disaggregation of stages of production and consumption across national boundaries under the organizational structure of densely networked firms or enterprises.

They further argue that GCC are formed out of inter-organizational networks clustered around specific commodities or products. Each chain links households, enterprises, and states to one another within the world economy. The fundamental principle of such chains is that they are socially-constructed and locally-integrated. In using this approach one will understand how social relations and organization shape production, distribution, and consumption.

The GCC approach provides an analysis of the world economy and spatial inequalities in terms of differential access to market resources. Based on these factors, they conclude that the approach has the capacity to probe above and below the level of nation-state to better analyze structure and change in the world economy (Gereffi and Korniewicz 1994).

As a method of study, the GCC approach provides an effective means of understanding the power of business over given political systems. The approach explains the organizational forces behind the operation of GCC. However, it does not go far enough to acknowledge the organization of the chain as being founded on a relationship between trading parties.

The third trend of thought within the GCC approach represents a significant move toward acknowledging the foundation of GCC as being a relationship. This is captured in the work of Raikes and Gibbon (2000). For them, the GCC approach provides an opportunity for analyzing the role of power in economic relations (Raikes and Gibbon 2000). This becomes evident in the analysis of the place of the developing world in GCC. They propose that the starting point for examining the place of the developing world, more specifically Africa, in global trade is the observation that it has become marginal in the current global economy. For them, it is significant to understand the precise contours of marginalization and to explicate the dynamics that give it shape (Raikes and Gibbon (2000).

They observe that globalization has now become the means by which the economic activities of most countries are intertwined. For them, one of the key consequences of globalization is the fact that the capacity of national governments to follow policies that diverge from the interests of international capital is severely decreased.

They then propose that as the global economic actors seek to extend their control of resources and markets, there tends to be a redefinition of the economic role of the developing world. Depending on the competing interests of the developed world, some links with the developing world are strengthened, others are weakened, some disappear, and others are restricted. This suggests that the structures established as a result of a relationship between the key actors in GCC are designed in such a way as to facilitate the interests of the developed core.

There is a trend for the companies located in the developed world to try to control quality and the timing of the delivery of the products. To achieve these aims, they generally need to occupy a dominant position in the GCC, confirming Wallerstein's idea of a stratified world system (Raikes and Gibbon 2000). I will argue that the evolution of standards within the GCC is therefore linked to attempts to establish systems of governance within such chains in line with the interests of the dominant groups.

Raikes and Ribbon's work is significant for the GCC literature in that it raises the awareness of analysts to the role of power relations within the GCC. This suggests that power is not equally distributed in the GCC and that most of the power rests with the capitalist core. Further, they see the need for governance. Controlling the quality and timing of the delivery of the products are important aspects of governance.

The Dynamics of Global Fruit Markets

Friedland (1994) has outlined the significance of global trade in fresh fruit and vegetables. He has indicated that it has involved the integration of new regions of production to supply markets on a year round basis with seasonal commodities. In the United States (U.S) this began with the import of grapes from Chile in winter. These chains are characterized by counter-seasonal production, creation of a clientele for consumption, value adding, and creation of market niches. He also notes that this system increases the availability of what were once regarded as exotic products. The economic implications of this have been to increase the mobility of capital and to encourage the establishment of joint

ventures. Further, he notes that profit margins have been increasing at the retail level through systems of value adding.

Among the key factors to affect growth in this area are the emergence of a professional class with high disposable income, the high rate of migration that has brought to the U.S. new dietary preferences, and the general concern for longevity. Increasingly, more people are moving toward the consumption of fruits and vegetables for health reasons.

Friedland (1994) indicates that there are serious food safety challenges, which are linked to chemical usage in the industry. There are further complications when the products are produced in different countries. It is concerns like these that have brought food and agricultural standards to the center stage with aspects that cover specific food safety concerns.

For Murray (1995) global fruit markets have now become very competitive. There is intense competition from the counter-seasonal producers in the South for attractive markets in the North, which generally has led to the saturation of these markets. He proposes that this has created a stagnation of the growth trajectory and a significant drop in the overall prices of fresh fruit. Further improvements in storage technology are becoming a threat to counter-seasonal producers leading to protectionism within the receiving markets. He cites the European Union and the U.S. as leaders in protectionist practices. Finally, Murray proposes that the strategies that are adopted by the private export companies to improve their profitability tend to be to the disadvantage of the small-scale growers. While his research focuses on grape producers in Chile, there are several

similarities between his small-scale grape growers and the small-scale citrus growers in South Africa.

Governance / Standards?

Problems of governance in commodity chains are beginning to draw the attention of several scholars. However, the interests of such scholars are diverse and therefore tend to compartmentalize the discourse. Some scholars focus on issues relating to food safety. Others focus on the protection of the environment. Others focus on product quality, while others focus on government regulations. There have been very few attempts to unify such diverse bodies of literature. What draws these bodies of knowledge together is that they are all about 'standards.' The purposes served by such standards might be very diverse. Nonetheless they are founded on the application of some standard that is developed and enforced. To explain the compartmentalization of the debate, let us consider the work of Haywood et al.'s (1998). They propose that there should be a clear distinction between regulation and governance. They argue that while regulation is a form of governance in which the state or other legal apparatus exercises influence or control of the commodity chain, it is not the only possible form of governance. For them, governance is a contestable feature of the commodity chains. It is a set of norms that transcend the chain governing the relations among the units that constitute it. While governance is a necessary feature of all commodity chains, state regulations might effectively supercede other forms of governance.

State interference with commodity chains was a dominant feature during the era of fordist production relations in which there was emphasis on homogeneity of products. Now that there has been a shift away from centralized coordination to market coordination, a structural space for new governance solutions has been created. They note that during this era other governance solutions may emerge and become significant as the state withdraws from key areas of monitoring product quality.

In an earlier paper, the same team of researchers (Perry et al. 1997) had proposed that quality management initiatives represented a new governance dimension. The guiding philosophy for this system of management is that:

> quality is free where it is built in rather than inspected in and where the cost of poor quality is measured by the value of lost orders, rework, returned goods, waste and interrupted schedules than the investment in assurance procedures (Perry et al. 1997).

They highlight seven principles that constitute total quality management. Each of these principles challenges some of the traditional applications to horticulture and leads to key changes in the way the sector is organized. I will mention three that I think are the most important. The first principle is that quality rather than price or timing of delivery is the key to business success in the 1990s. This principle requires producers to integrate with end buyers to determine specifications of quality and to ensure satisfaction. It challenges the traditional marketing strategies emphasizing bulk undifferentiated produce. The second principle is that the internal and external customers have needs and expectations to be filled. This suggests that there needs to be cooperation between stages in the production chain, which is based on the recognition of the fact that value can be

added or lost by all participants in the production chain. Customer expectations are central to the activities of everyone on the chain. This principle affects the relationship between the steps in the production chain. Third, the quality of the final product results from every single activity in the organization. This requires the key actors to develop a permanent workforce with broader work responsibilities and commitment. This challenges the notion of isolated participants in the industry.

The application of total quality management in the primary sector is viewed as a challenge. The new phase of agricultural trade gives greater prominence to fresh fruit and vegetables, which in turn has led to serious consideration of the quality of the products. For this particular industry to grow and to be profitable, it needs to devise means to address the food safety, environmental, and phytosanitary conditions under which the products are produced. The authors believe that total quality management is part of a new governance structure that integrates the entire commodity chain.

Based on their empirical studies of a New Zealand horticulture region, they conclude that total quality management leads to the structuring of the production system in line with the customer-identified specifications. When this system is in place, it is in the interests of all the actors in the commodity chain to ensure that they meet the requirements as specified.

Both papers offer meaningful interpretations of the role of governance in GCC. They also challenge the reader to examine the meaning of the concept of governance in modern capitalist societies. However, their notion of governance is

too restricted and, therefore, fails to account for other forms of governance that are already operational within GCC. Such forms of governance serve as guidelines as to who can or cannot be a participant within a given chain. In drawing a sharp distinction between regulation and governance, the authors strengthen the compartmentalization of the debate. However, discussing regulation as a form of standards, would link the debate to a larger area of knowledge.

Standards in the Food Sector

An historical examination of the evolution of standards shows a variety of interpretations of their role in society over time. Early studies of standards have highlighted their technical significance. Hill (1990) has seen them as rules of measurement designed to provide systems of classification in homogenous markets. In this view, standards communicate important information to consumers that makes the process of decision-making easier. Viewed in that manner, standards can be regarded as tools of standardizing both the products and the processes of production.

One would have expected that with post-fordist production principles and the shift away from homogeneous markets, the significance of standards would have diminished because the need for uniformity is no longer paramount. However, the opposite has been observed to be true. Reardon et al. (2001), Busch (2000), and Brunsson and Jacobsson (2000) have observed a proliferation of standards.

Recent accounts of standards have sought to examine their roles in differentiated markets (Farina and Reardon 2000, Reardon et al. 2001). Farina and Reardon observe that the establishment of grades and standards within the agrifood system can be viewed as being theoretically ambiguous. They argue that in some cases it might increase market size by reducing the barriers to trade while, on the other hand, it could decrease market size by limiting the number of firms that are participating by increasing the entry barriers.

Reardon et al. propose that standards can be understood as strategic instruments of competition in differentiated product markets. Further they view the roles of standards as tools used to effect market penetration, system coordination, quality and safety assurance, brand complementing, and product niche development. This has been made possible largely by richer consumers who have more sophisticated and varied tastes (Reardon et al. 2001).

Further, they propose that with globalized trade there has been a shift from product-based standards to process based standards. This change seems to have a negative effect on small-scale producers, because they have not been able to meet the investment obligations that have accompanied the change. Consequently, there has been a move towards concentration of productive activities as the small operators are weeded out. Notable exceptions to this trend have been cases where the small operations are professionally managed or where the farmers are part of the educated elite. Citrus farming in the Eastern Cape in South Africa should be a significant example of an exception because the farmers are well-grounded business people.

Busch (2000) highlights the social significance of standards. He proposes that standards are important in the regulation of behavior and that they should be viewed as part of the moral economy, defining the very morality of the actors and their actions in business. They are a guide in defining what is desirable and what is not desirable.

The approaches outlined above are similar in one crucial respect, which unfortunately is not explicitly stated in the debates. All give standards a regulatory function, whether it is to regulate uniformity or difference. When standards define uniformity, they also define difference. Further, all these approaches seem to be towards understanding the behavior of single firms in a state of competition with other firms. As such they are limited to micro analysis.

While Busch (2000) observes that standardization is linked to creating uniformity, he notes that the need for such uniformity is a function of two interrelated processes: the commoditization of goods and the globalization of trade, processes that have led to the unequal distribution of power and a system in which some were winners while others were losers.

While Brunsson et al. (2000) decided not to provide any working definition of standards, arguing that their main characteristics vary too much to be caught in a definition, they do lean toward a view that standards can be usefully conceptualized as rules. They propose that standards may evolve to handle the challenges of coordination in an era of globalization. They observe that standards seek to create regularity, implying a system where people follow the rules. While the rules will be directed towards actors, actors can choose to follow such rules or

not to follow them. Some rules might be voluntary whilst some might be compulsory. Standards nonetheless give an indication of some state of order, which is in line with Busch's notion of the moral economy.

What might confuse Brunsson and Jacobssons' argument is their treatment of standards and standardization to mean the same thing. The result is that a concept designed to mean "an ideal" or a "good commodity" is equated with a concept that is supposed to mean, "making uniform" Busch (2000). What is the strength of their argument is that they realize that standards have become a necessity with global trade and that they can facilitate coordination and cooperation.

Conclusion

From the discussion outlined above we can observe that the literature on the study of commodity systems is trapped in tracking the commodity as it moves from one actor to the next along the chain. The trap is that agency is limited only to the objects. It is objects that act. They move from one member of the chain to the next. Structural factors that may facilitate or inhibit such a move are not addressed. Further, the role of human agency is not considered. Structure here is used to refer to rules and institutions.

Similarly literature on the study of GCC limits the agency to structural factors by focusing on the location of the actors within the global network to the exclusion of human agency, or the role of objects in the action. This problem is in line with the limitations of the World System Perspective, which informs the thinking of this view.

On the other hand, literature on standards limits agency to institutions and rules to the exclusion of other important sources of action. The main argument is that actors act because they are guided by the rules as to what is acceptable or not. The role of human agency is not emphasized.

The significance of this research is that it shows that both the structure and agency are important in understanding the flow of the products in the GCC. In fact, products (objects) do not flow automatically along the production and distribution chain. Rules (structures) provide guidelines and relationships founded on trust between trading parties (human agency) are necessary for a stable system of trade.

My contribution to the debate is twofold. First, the power of standards as tools of coordination and cooperation can be observed when the operation of standards within commodity chains is examined. The authors discussed above seem to focus on the role of standards within individual firms. In this study the social character of standards has gained significance because the unit of analysis is no longer an individual firm. This study looks at the entire commodity chain. This study proves that within such chains, all the members of the commodity chain use standards to define responsibility and expectations and also to measure risk. Looking at the citrus chain in South Africa will show how actors use standards in the three ways to interpret and evaluate their interactions with other members of the chain.

Secondly, an examination of the nature of the citrus global chain will show that products do not flow automatically along the production and

distribution chain. It will also show that it is not only the location of countries within the world system that defines their responsibilities in the chain. Standards are central tools of facilitating the operations of the network. Using the citrus global chain as an empirical case, this study extends the analytical tools of commodity systems approach and GCC to include an account for the regulatory processes within the chains. As more insight is provided on how the international standards structure the global citrus chain, our principal research question will be answered.

CHAPTER 4

The Significance of Citrus in the South African Agricultural System

Introduction

In part one of this chapter, I argue that South African agricultural policies have long been subjected to the social policy of apartheid. Consequently, the evolution of agriculture and class relations needs to be understood within that context. Further, equity in land distribution, scientific knowledge that services a broader agricultural community, and developing linkages that would allow emergent farmers access to markets are the major challenges that face the new government.

In part two of the chapter, I argue that the citrus industry in South Africa has great potential. The prospects for its growth are linked to the fact that it has a counterseasonal advantage with most of the major citrus producers in the northern hermisphere. The scope for the improvement in this industry lies in improving the export capabilities of the emergent small-scale African farmers. Meeting the standards for export continues to be a challenge for this group.

Background Information

The population of South Africa is about 45.3 million. The GNP has showed serious fluctuations over the last few years. By 1998 it was US$137.7 billions. In 2001 it had dropped slightly to US$122.8 billions and by 2002 it had reached US$113.4 billions (The World Bank 2002). This decline does not necessarily suggest the weakening of the economy but contrary to that, they are evidence of a strong economy whose currency has improved significantly against

the US Dollar. On the other hand the GNP per capita, was approximately US$2820 in 2001 (The World Bank 2002). The World Bank has observed that the GNP is very skewed and in 1995 was about US$9250 for the white South Africans and US$975 for the Africans. Consequently, the skewed distribution of resources has permeated all aspects of social life, and about eight years after independence attempts to redress the imbalance have not yet yielded much fruit.

By 1989 the GDP was US$80 billions, of which about 5% was from agriculture. The proportion decreased to about 4.7% in 1991 from a GDP of US$120 billions. By 2001 the GDP had stabilized around US$113.3 billions and the proportion from agriculture had declined further to 3.1% (World Bank, 2002). The trend of a reduction in the proportion of the agricultural sector is generally not regarded as negative especially when the overall GDP is increasing.

Context of the South African Agricultural Sector

Ten years after majority rule, the South African agricultural sector still is struggling to move away from a racially-based and dualistic system of food production, distribution, and consumption. As in all the sectors of the South African economy, the World Bank has observed that the policies governing agriculture had been subordinated to the social policy of "Apartheid" (World Bank 2002).

Two schools of thought have become dominant in explaining the impact of the apartheid policies on agriculture. The conservative school proposes that apartheid policies have contributed to the creation of an efficient commercial system of food production. This has led to a much-needed stabilization of the food

supply. A key actor in this line of thought is the historian Kiewiet (1966). In its well developed form, this view proposes that apartheid has been beneficial to all South Africans as it had created conditions for accumulation and stability. Proponents, notably Lipton (1985), propose that South Africa has experienced a different kind of capitalism, apartheid capitalism, which is unique and has desirable consequences.

The radical school, on the other hand, seeks to understand the conditions surrounding the disappearance of a reasonably stable African agrarian farming class, which had existed before the mineral revolution in the country. The starting point for theorists writing within this tradition is the observation that there were African farmers in South Africa around the late 1800s. Further, they all share a view that the disappearance of this class was a function of state sponsored capital initiatives to transform Africans into a laboring class that would service the emerging mining sector. Scholars within this tradition are able to identify what they regard as the extra-economic measures that were geared toward achieving the stated objectives.

What is central in both approaches is that it can be confirmed that Africans were involved in some form of undeveloped agricultural production, which took both the form of peasant production and small-scale farming. Over and above the explanations provided, I would propose that looking at the evolution of commodity chains in the country will offer some insights into the disappearance of African agricultural producers in the country. Commodity chains generally involve marketing and distribution functions, and these in turn become central in

sustaining on-farm activities as they provide the needed access to consumer markets. Evidence suggests that in South Africa these functions developed along friendship or family lines. This point will be developed further in Chapter 9.

With all three explanations on the development of the agricultural sector in the country, one fact is central: In South Africa there was a serious attempt to create a class of white commercial farmers who would be serviced by African workers. This could be possible only with state direct involvement geared toward empowering one group while disempowering the other. This was particularly the case with land ownership.

Structure of the South African Agricultural System:

Land Ownership

Goss et al. (1980) have proposed that there are two necessary institutional structures for the development of capitalist agriculture: the private ownership of the land and commercial production. Further developments in agriculture around the world have tended to be geared towards the generalization of the system of private ownership and the transformation of the motive for production to capitalist profit.

As indicated above, the state through its legislative power plays a central role in allocation of land. In analyzing the role of the state in agricultural policy, Mann and Dickson (1980) have proposed that such policies can be categorized as being "extensive or intensive." Extensive policies are designed to enhance the development of agriculture by making land acquisition easier. In the United States, such policies dominated the era of settler colonialism. As a result of such

policies the new immigrants were able to obtain state assistance in purchasing land at very low prices. Intensive policies refer to policies that represent the state response to challenges facing agriculture under a capitalist system of production. Such policies are fairly recent in comparison to the extensive policies. Whereas the extensive policies explain issues of access to farmland, intensive policies address issues of assistance to farmers.

The South African land tenure system needs to be understood within the context of colonial relations that have dominated the continent. Such relations found expression in the power wielded by colonizers granting them rights to pass laws that defined tenure systems without consulting the local population and using various forms of violence to enforce such laws.

In South Africa the difference is that this practice took the most extreme form possible with race being used as an organizing variable and culminated with the passage of the Land Act in 1913. Under this act, South Africa was divided into several areas each of which was allocated to a specific racial group. The consequence was that the land surface of the country was divided in such a way that the white members of the population, who constituted less than 20% of the population, were allocated about 87% of the land. Africans, who constituted more than 80% of the population, were allocated about 13% of the land. More crucially was that the white 87% constituted the most arable land, while the African 13% constituted the most arid parts of the country (Marcus 1989, Townsend 1997, Vink et al 2000). Further, ownership patterns would be different in such a way that the white community could have direct and private ownership of their land

while Africans would be restricted to either communal forms of ownership or tenancy on white land. In this process, some land was forcibly taken away from some groups and reallocated in line with the new racially-determined system of allocation (Vink et al 2000).

Consequently, the food production system in the country has been characterized by a duality that has been shaped by historic conditions. On the one extreme are the white farmers who have been the primary food producers for the country, producing about 90% of the food consumed in the country. Their land tenure system allowed them to invest in commercial farming. Over generations they have improved their farming skills to become very competitive food producers in the world.

On the other extreme are African peasant farmers who are trying to improve their means of subsistence. This group cannot fully subsist without purchasing goods and services from the competitive white farmers (Mbongwa, et al 2000, Townsend 1997, Vink et al 2000).

Concentration of Agricultural Land

Farm size has been identified as an important predictor of successful farming given different levels of technology. Large-scale farms are better able to use advanced technology to increase their productivity and remain efficient in the production of goods. Because technology is a cost to farming, such farms need to operate on largest possible scale to increase output to the maximum. The theory of economies of scale proposes that, as output is maximized, the "per unit cost" of production is reduced. On the other hand, small-scale operations are better suited

for traditional production methods that do not involve the use of sophisticated machinery and synthetic production inputs. It is interesting to note that for both capitalist and socialist countries, large-scale operations are viewed as efficient. Rosset's account of the Cuban agricultural system that is discussed below supports this view.

In the United States, since 1935 the number of farms has declined by about two-thirds while the total farming acreage has remained constant (Flora and Rodefeld 1978). This would suggest that there has been a high degree of concentration. For Gilbert and Harris (1984), the question of land concentration has been a feature of U.S. agriculture for a long time. They propose, following Lewis, that less than 0.5% of landowners hold 40% of all private land, and about 8% of the households own all the farmland. The important question for them is whether these levels of concentration have increased with the industrialization of agriculture. Their observation is that, while corporate ownership had increased, it still comprised a small portion of both owners and acreage. This would support the view that concentration has not automatically resulted in the elimination of the private farmer.

At the other extreme, Rosset (1998, 2000) has observed that in Cuba during the era of plantation agriculture, the average farm size was very large, and land was concentrated among a few owners. Because the majority did not have access to land, there was a very high rate of urban migration. While there were few peasant farmers, they generally were marginal to the mainstream agricultural economy.

Even after the revolution, the structure of the operations of the farms was not changed. The only major change was in the system of ownership and management. These were run by worker collectives in line with government policies of producing required quotas predominantly for export.
However, the big difference was that after the revolution, peasant agriculture began to play a significant role in the production of food for the local markets as most of the large farms were devoted to the export goods. These small operations would respond very well to the changed farming environment. Such farms have come to represent the Cuban family farm because they can produce without the obligations of the quota that has to be submitted to the government for local distribution. A new version of peasant agriculture is urban farming, in which urban communities use their garden space to produce fresh vegetable that can be sold at a farmers' market. This suggests that both large-scale and small-scale farming coexist to ensure export earnings and domestic consumption.

Similarly, in the case of South Africa, Marcus (1989) has observed the tendencies of concentrating agricultural land and consolidating agricultural activities. Over the years, there has been a decline in the number of farm units and an increase in the average size of each farm. The total number of farms declined from 104,554 in 1937 to about 70,000 in 1984. By 1998 the number had declined to 60,000. In addition, the average farm size has increased from 736 ha in 1951 to approximately 1,134 ha in 1976, but the total land area devoted to farming has remained fairly constant at about 84 million ha in 1935 and still 82 million ha in 1998 (Marcus 1989, FAO 1999).

Linked with the concentration of land has been the concentration of capital. At the level of production, concentration can be assessed in terms of the number of individuals or companies owning farming enterprises. Yet even more significant is the distribution of the volume of production and the market share that is commanded. In South Africa, at the production level, a low proportion of farmers are responsible for a high proportion of output, and thereby, are able to gain control of a larger market share for their products. For example by 1970, 50% of the farmers produced 95% of the agricultural output in the country. Of that, 75% was produced by 20% of the farmers, while the remaining 30% accounted for only 20%. This has significant consequences for the distribution of earnings within the sector (Marcus 1989, Townsend 1997).

At the distribution level, a similar picture emerges. Before the passage of the Agricultural Marketing Act in 1997, product distribution was highly centralized and controlled. This was possible through the application of the single channel marketing system that was overseen by marketing boards. Such boards influenced production by setting production quotas, establishing floor prices, and controlling national and international outlets.

Centralization of capital on the other hand is used to indicate the fusing of capital within the agricultural sector. In South Africa this has involved the controlling of diverse agricultural products by a few agricultural producers who might in turn be controlled by non-agricultural producers through corporate and company interests (Mbongwa et al, 2000, Vink, et al 2000). For an example Anglo America, which is a mining company dominates the fruit and canning

industry with several farms in the Western Cape Province. The same is true with the grapes and wine industry.

Labor

The racial divisions and tensions of the country are reflected in the productive relations that exist between owners of the means of production and sellers of labor power. Class divisions have taken on a racial character. Capital is essentially owned and controlled by the members of the "white race" while sellers of labor power are predominantly African. The status of the African population as a labo- selling group is linked to their position within the colonial system and the conscious decision of the state to disrupt their productive activities (Vink et al 2000).

Bundy (1988) has provided strong evidence that African farmers were very productive and were able to produce more than their required means of subsistence. Their position as sellers of labor power was not acquired through will, but it was imposed by the state in an attempt to strengthen the industrial economy. The history of the transformation of this group to paid labor is linked with mineral revolution that started in 1867 resulting in high demand for cheap labor.

Consequently, the state passed legislation that forced the Africans to abandon their productive activities to focus on the sale of their labor power. The first method used was a system of taxation in which all men of 16 years or more were expected to pay taxes in cash. In order for them to pay such taxes, they needed to earn the money through the sale of their labor power. Furthermore,

there was taxation for men who had not taken up employment for more than three months. These tax laws coupled with the Land Act (discussed earlier) effectively destroyed the independence of Africans and transformed them into proletarians (Marcus 1989, Townsend 1997, Vink et al 2000). Therefore, the relationship between the sellers of labor power and owners of capital has been awkward and strained, especially because some owners would own land that at some point, was owned by the workers' grandparents.

Science and Technology

Science has played a central role in the transformation of traditional farming to commercial farming. Friedman (1984) and Busch (1990) have observed that, in the process, alliances have been formed between the corporate world and the research institutes at private and public universities to produce knowledge that would profit the companies who fund the research. One can conclude therefore that science has served three interrelated purposes. It has been a meaningful tool for development. In this regard science has solved several problems that have threatened the survival of the human race. Science has served as a means of capital accumulation, creating opportunities for producers in the agricultural sector to become dependent on inputs and services that are provided by the corporate sector. Science has widened the agricultural sector by creating functions that directly service the sector but are not necessarily located within the farming unit.

This process was started in the U.S. when most farming activities were mechanized. This created a new and profitable industry for those who were

involved in the locomotive industry. It was strengthened with the conversion of nitrogen into fertilizer. This would be a start of what is now a big farming inputs industry. The key therefore is in transforming a self-sufficient system of production and replacing it with a system that is dependent on external inputs. With this process, two important activities occur. First, as Goodman (1984) has proposed, the production process is no longer restricted to the farm. Several actors operating outside the farm add value to the farm product. By definition, therefore, agricultural activities can no longer be restricted to on farm activities. Second, capital takes center stage in the activities of the key actors becoming the major motive for the initiation of the production process.

Third, as in the case of South Africa, science has served political functions. In South Africa this involved investing in technology that would reduce dependence on cheap African labor for political reasons. International isolation meant that the country sought to be as self-sufficient as possible. According to Thirtle (2000), the significance with which research and development (R&D) was taken can be captured by the ratio of agricultural researchers per million people which is derived from the total number of researchers employed by the universities and research institutes. Data comparing South Africa to the rest of Africa show that there was a very high rate of investment in science in South Africa. During the 30 year period from 1961 to 1991, Sub-Saharan Africa moved from 18 researchers per million members of the population to 55 researchers per million. During the same time South African researchers increased from 371 per million members of the population to 732 per million.

For Roseboom (cited in Vink et al.) agricultural research was linked to the country's development policies. Because these policies involved the distortion of the system through several methods including price protection, the research community promoted technical changes that under competitive markets would not even be considered. These included pushing for structural transformation that meant less reliance on cheap African labor for political reasons. This would involve the state financing the purchase of machinery and the acquisition of more land to utilize the full potential of such machinery leading to overproduction. As evidence of increased productivity and overproduction, Marcus cites the case of the meat industry, which over the 10 year period from 1973 to 1983 had an 83% growth. During the same period, the egg industry had a 98% growth to reach an average of 275 eggs per hen per year. These increases were only possible through capital-dependent production methods. The downside of this, however, was the declining level of employment in the sector.

As the result of the same process, in 1973, 200 million eggs were destroyed and recycled over a nine-month period. In 1974, 5 700 tons of butter were destroyed, 114.5 million eggs, 4.5 million tons of maize, and 570 tons of bananas were destroyed. The destruction in most cases had to do with the fact that the welfare organizations, responsible for providing food aid, could not raise capital to cover the distribution costs, and the producers and distributors were not willing to sell below the controlled price. After public outcry about the wastage, in the years that followed, the products were exported at a loss, while local prices were kept high.

While industrialization increased the volume of production substantially, when the value of the output is compared to the actual capital investment, the returns were not high enough to recoup the costs of the technology. Most scholars have questioned the rationality of this intensive capital investment in South Africa. This has accounted for the development of an agricultural sector which has high credit dependency and high levels of indebtedness.

Challenges to the New Government

The major challenge for the new government of South Africa is how to transform the ownership systems so as to create equity in land ownership. Linked to that is the question of how rural life and agriculture can be made attractive to a generation of young Africans who have had no direct relationship to land. These are pressing concerns in light of the high incidence of homelessness and informal settlements in the metropolitan areas. There is an urgent need for an integrated rural and urban development strategy.

Attempts to address the question of access have resulted in the government implementing a land redistribution program where willing buyers can purchase land from willing sellers with the government providing some form of a subsidy. This has its own problems as those who own the land have inflated the values.

The other plan has involved the redistribution of state land to capable farmers. In most areas this has taken the form of leasing state-owned land for small-scale commercial farming. The citrus farmers that are the subjects of this study are all leasing formerly state-owned farms with the intention of purchasing

them at some point. The problems associated with this arrangement are discussed in chapter 7.

Key Observations

South African agricultural policies for a long time have been subjected to the social policy of apartheid. Consequently, the evolution of agriculture and class relations in general needs to be understood within the context of such developments. The challenges facing the country now within the new dispensation are twofold. First, how can equity in land ownership be achieved? Second, how can agricultural research be made to serve the broader agricultural community? How can the research agenda be changed in such a way that the challenges facing the emergent farmers be given preference? How can linkages be developed to allow similar opportunities for the emergent farmers as for the established commercial farmers?

Part 2: Overview of the Citrus Industry

Citrus belongs to the rue family (Rutaceae). The average tree grows to a maximum of around 10 meters height with a very strong taproot system (Rabobank 1990). It requires subtropical conditions in order to grow. This means that the ideal conditions are warm to hot summers with mild winters (South African National Department of Agriculture SANDA). It is very sensitive to night frost and takes about four years to produce fruit. The citrus products can be consumed as fresh fruit or processed mainly into juice. Oranges constitute about 80% of the citrus varieties. Consequently oranges are the major focus of this

study. The concept 'citrus' will be used to refer to oranges except where specifically indicated.

There are several varieties of citrus products. South African oranges come in two major types: Navels and Valencias. The markets for these varieties differ accordingly. Navels are predominantly intended for the fresh fruit market while Valencia are predominantly intended for the juice industry. However, there is a slight overlap in the two industries. Similarly, growing areas differ in terms of the variety in which they specialize, and in one country different areas can produce different types depending on climatic conditions. The United States is a good example with Florida targeting the juice industry while California targets the fresh fruit market.

The total world production of citrus has increased steadily from 58 million tons in 1995, to a peak of 65 million tons in 1997, to level off at 62 million tons in 1999. Average production for the five-year period has remained at 62 million tons. The top producers in the world in terms of proportion of production are Brazil (35%), the U.S (17%), Mexico (6%), Spain (4%) and Italy (3%) (FAO 1999). The proportion is based on the average over the last five years. While China also produces around 3%, the FAO reports that the records are not official. The distribution of average output for the five-year period between 1995 and 1999 is a significant change from the output levels in 1990. In 1990 Brazil accounted for 25%, the U.S (17%), Spain (7%), and China (6%) (Rababank 1990).

In the Northern Hemisphere the top four producing countries are the United States, China, Mexico, and Spain. Table 1 captures the total world

production over a five-year period to provide some insights to trends in the industry.

Table 2: Summary of Citrus World Production in 1000 metric tons for 1995-1999

Production	1995	1996	1997	1998	1999	Average 5-yr Production	Proportion of World Production
WORLD	58256	61142	65450	63141	61882	61974.2	
AFRICA	3999	4558	4847	4847	4741	4598.4	0.074199
COUNTRY							
Brazil	19387	21865	22961	20732	22772	21543.4	0.347619
United States	10371	10366	11514	12401	8968	10724	0.17304
Mexico	3572	3985	3944	3331	2903	3547	0.057233
Spain	2695	2145	2845	2443	2685	2562.6	0.041349
China	2168	2238	2640	2259	2989	2458.8	0.039675
India	2080	2080	2000	2000	2000	2032	0.032788
Italy	1597	1771	1824	1921	1994	1821.4	0.02939
Egypt	1555	1613	1522	1442	1525	1531.4	0.02471
South Africa	748	890	962	991	1026	923.4	0.0149
Morocco	702	972	804	1104	884	893.2	0.014412
Argentina	760	591	919	984	780	806.8	0.013018
Australia	442	528	500	443	470	476.6	0.00769

Source FAO (1997 & 1999)

Citrus in South Africa

Citrus in South Africa is grown on about 3,500 privately-owned farms and cooperatives. These farms collectively manage more than 16 million citrus trees ranging in size from farms with less than 100 trees to farms with about half a million trees (SANDA). Most of the packing, inspection, and shipping are completed in pack sheds that are owned by the farmers' cooperatives. It is primarily regarded as an export crop. It is a wish of every farmer that his/her products will be acceptable for the export market. The prices fetched on the local market do not allow farmers to recover the costs of preparing the fruit for the market. This includes the costs of cleaning, packing, and inspection.

Consequently, for each bag of oranges that is channeled to the local market, the farmer must pay the cooperative a fixed fee to cover the costs. This is over the costs incurred for on farm activities which include inputs, labor, and harvesting.

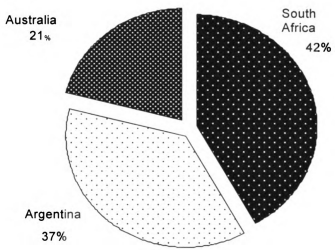
Citrus has been identified as a growth industry in South Africa and its growth rate has been higher than that of other commodities. Evidence of this is the fact that whereas between 1995 and 1998, the general growth rate for agricultural production has been around 9%, citrus has been around 17%. In the fresh fruit sector, citrus had the highest foreign exchange earnings. By 1998 citrus fruit accounted for 48% of the volume of fresh fruit that was exported, with earnings exceeding R850m (around US$200m) at the time (Trade and Industry Policy Secretariat and International Institute for Sustainable Development-TIPS&IISD 1999).

In total production, South African citrus production has grown steadily. In 1995 South Africa accounted for 1.2% of world production and 18.7% of African production. By 1999 this had grown to 1.6% of world production and 21.6% of African production. In the African continent the two countries that produce more citrus than South Africa, Egypt and Morocco, are counterseasonal to South Africa. In 1999 Egypt accounted for 32% of African production while Morocco accounted for 18%. This would suggest that there is no direct competition within the continent.

South African citrus has great potential in world citrus markets because South Africa has a counterseasonal advantage to the world's top citrus producers. In the Southern Hemisphere it has become the largest exporter of citrus as fresh

fruit. With the Brazilian citrus industry committed to juice, South Africa only competes with Argentina and Australia to supply the attractive Northern Hemisphere markets. Of the three countries South Africa has the capacity to produce the most volume. Figure 1 illustrates the production capability of South Africa in comparison with its direct competitors.

Figure 1: Citrus Production of Southern Hemisphere Competitors with South Africa.



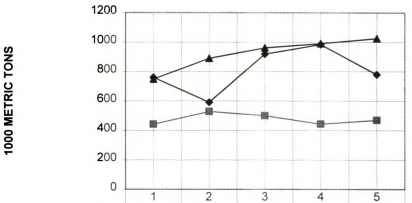
However, the country has not been able to take full advantage of these opportunities. Exports remain at below 50% of the total production with very limited returns for the citrus growers. This is particularly the case with the emergent African growers who are recent entrants to export-oriented commercial farming.

South Africa has become the fourth largest citrus exporter accounting for 7% of world citrus export volume (TIPS&IISD 1999). While there has been a steady growth in the area, there can still be further improvements. In the 1995/96 citrus season 586,780 metric tons of citrus products were exported. By the 1999/2000 season, this had increased to 786,031 metric tons. Of this around 520,000 tons were oranges, an increase of more than 30% over a four-year period.

During the same period, total acreage increased from 48,844 to 54,728 ha, an increase of only 12%, while the harvested area increased from 42,261 to 44,659 ha, representing an increase of 5%. This would suggest that there have been improved production methods and greater compliance with international food and agricultural standards (FAS/USDA).

There still is room for improvement because the export proportion continues to be less than 50% for the small-scale farmers and around 60% for the large-scale commercial farms. For example, while 520,000 metric tons were exported in 1999, production in the same year had increased to around 1.03 million metric tons (FAO 1997&1999). The scope for improvement in the export sector remains very large. Figure 2 captures the steady growth of South African production over a five year period when compared to its direct competitors. While both countries show some fluctuations, South African production has shown a steady and consistent increase. This view should support the idea that with proper management more improvements are possible with this sector in South Africa.

Figure 2: Total Production of Citrus in Argentina, Australia, and South Africa 1995- 1999



	1	2	3	4	5
Argentina	760	591	919	984	780
Australia	442	528	500	443	470
South Africa	748	890	962	991	1026

Importing Countries

The four top consumers of fresh citrus products are Netherlands, France, Brazil, and Japan. Consequently, the European Union has been a major market for the South African citrus products. The major consumers of processed citrus are the United States, the United Kingdom, and Germany (Rabobank 1990). While there are high exports to the United Kingdom, exports to the United States have been very difficult because of the strict phytosanitary standards (to be discussed later).

Countries in the Northern Hemisphere have always been the targets for the South African producers for two reasons. First, the income earned from these countries provides much needed foreign exchange for the country. The South African goods are generally very competitive in these countries because of the weakness of the South African currency. Second, South Africa can exploit the

counterseasonal advantage and ensure the year-round availability of citrus products in the Northern Hemisphere. Consequently, of the total citrus export for each year, more than 60% has gone to three countries in the European Union (Belgium, Netherlands, and the United Kingdom). The countries of the Far East, the oil-producing Arab States, and the countries of the former Soviet Union also are taking significant portions (FAS/USDA).

Domestic Market

The size of the domestic market to a large extent is determined by the size of the export market. Over the years this market has generally fluctuated between 50% and 60% of the production. In 1999 the domestic market had to absorb in excess of one-half million metric tons of citrus. It is a very stratified market. At the high end are the stores that want the fruit packed under their own brand name, while on the low end is fruit sold at the farm gate without proper cosmetic treatment. SANDA reports that 11% of the citrus produced during the 1999/2000 season was sold directly to retailers as either private brand or general brand products. 12% was sold on the fresh produce markets. Most of this would end up in the informal sector, which has increased in significance as a distribution mechanism. About 26% was used for further processing. There are three major types of citrus processors in South Africa. These are the jelly industry; the juice industry, and the soft drink industry. With the exception of the soft drink industry, which is interested in the citric acids from the skin of the oranges, further processing is the least attractive in terms of price. The soft drink industry is sensitive about the level of cleanliness of the skin and the types of waxes that are

used on it. They are generally willing to pay for the costs of providing a good quality skin of the fruit. Because of the abundance of products during the season, prices tend to be very low. This is to the disadvantage of the citrus producers because the more the products of farmer are diverted to the local market, the lower the earnings he/she will get and the higher the level of indebtedness.

An Overview of the Citrus Chain

The citrus chain is a very long and complex chain. As Goodman (1987) has proposed, as the chain gets longer the rewards that go to the growers decrease over time, and they are pressed to increase their productivity and efficiency. Several specialized functions have developed to facilitate the passage of citrus to final consumers. Emphasis here is placed on the evolution and the operations of the export sector. Figure 3 provides an overview of the global citrus chain. The structure of the chain is such that all actors are forced to operate within even if they have difficulty in meeting the standards. This point will be developed in chapter 7 when we address the challenges of small-scale citrus farming.

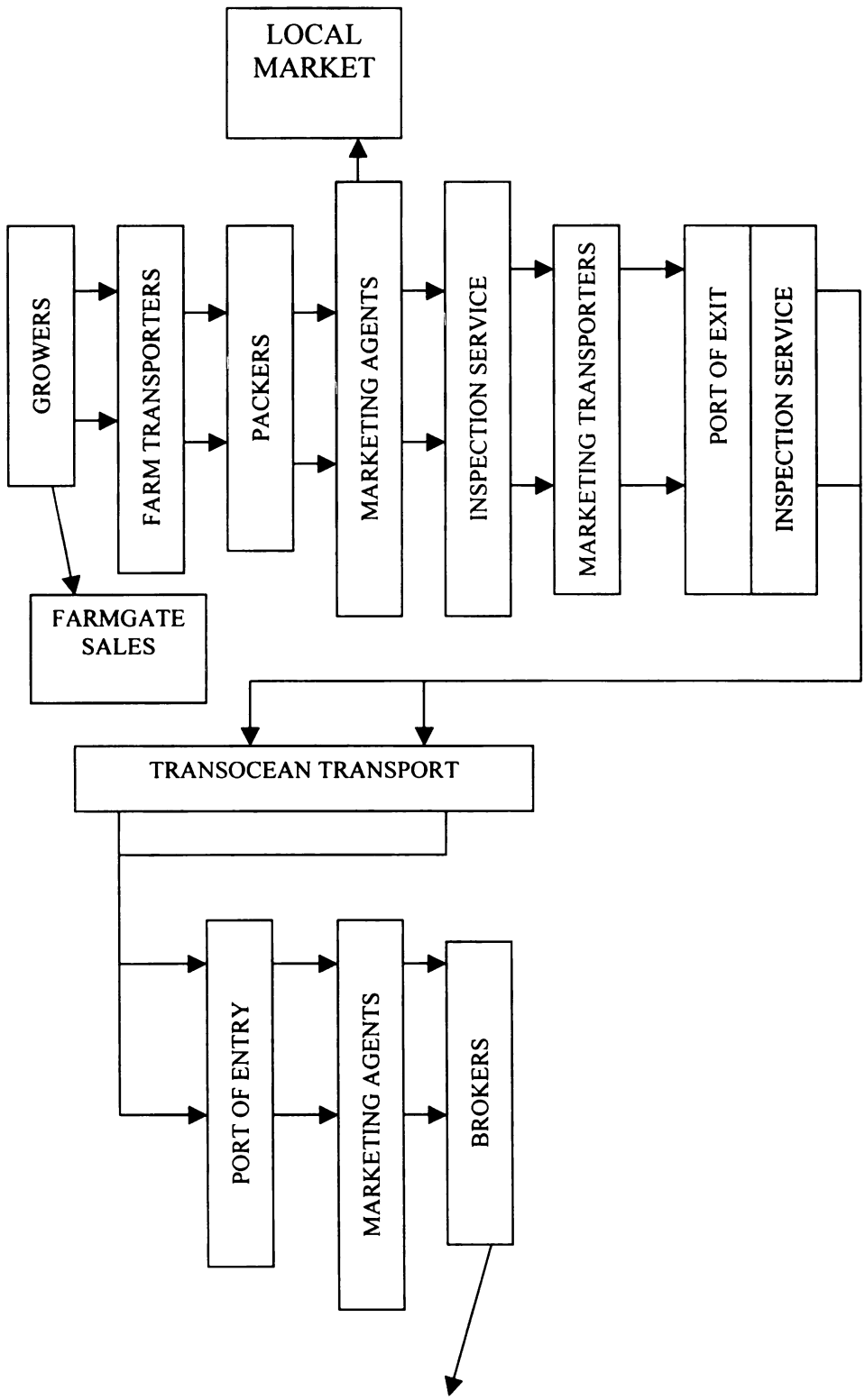
Growing Points

As indicated above citrus in South Africa is grown on about 3500 privately owned farms and cooperatives. Growing areas are very different in terms of weather conditions and production-related problems. Consequently, not all areas can access certain markets.

The Western Cape, which has a Mediterranean climate characterized by winter rains, will be very different from other areas of the country that experience

summer rains. Consequently, only citrus produced in the Western Cape can be exported to the United States, because it would generally be free from Citrus

Figure 3 An Overview of the Global Citrus Chain




SPOT
MARKETS

Black Spot (CBS). Production points in the Eastern Cape including the area that is the subject of the study will generally have a CBS problem.

The Kat River Valley and the Thyume River Valley, which are located in the Fort Beaufort, Alice and Peddie, have a total of more than 40 farmers ranging in size from very small to very large. Measured by the number of farmers who are involved in citrus production and the amount of acreage devoted to citrus farming, this area is one of the smallest citrus-producing points in the country. The key attraction to the scheme is that it has numerous emergent African farmers who are recent entrants to the export trade.

Packing Points

Citrus growers in this region are organized into a farmers' cooperative. The cooperative is run as an independent non-profit company, which is financed by the fees that it charges for the services it, renders. In this regard it is the primary supplier of inputs to farmers. These are sourced from outside suppliers at prices that are much lower than what the farmers would pay if they were purchasing as individuals. Further, the cooperative employs several technical experts who offer technical assistance for the farmers on production problems. In addition, in collaboration with the marketing agents, they develop a marketing strategy for the farmers' products and plan transport logistics for the delivery of the products. The cooperative becomes a custodian of the fruit when it is at the packshed. In that capacity, it is responsible for cleaning, sorting, grading, and packaging the fruit according to the requirements of the marketing agent.

Marketing

For about 70 years, citrus marketing was done by the Citrus Marketing Board, which was formed by the South African Cooperative Citrus Exchange. This was a single channel marketing system in line with most marketing systems around the world including the U.S. With the recent changes in the country, a new Agricultural Marketing Act of 1997 was passed which led to the dissolution of the marketing boards. This set the scene for private companies to compete for the marketing of the farmers' products. After the dissolution of the board, a private company was formed using the same brand name (Capespan) and with more or less the same individuals. As the marketing function has been deregulated, more marketing agents have been introduced. Within the space of four years the number of marketing agents operating in the citrus industry has increased from one to around 40. However around 70% of the fruit is still handled by Capespan (TIPS&IISD 1999).

Marketing agents gather information on the availability and quality of the fruit in the region. This involves several site visits to the production points to observe and evaluate the production practices. Following on the information gathered on the farms, the marketing agents will offer to market the farmers' fruit to international markets.

In some cases the marketing agents will provide loans to the farmers for the purchase of the inputs that are necessary for the growing season. In such cases, the loans give the marketing agents rights over the year's harvest. The agents follow the production practices of the indebted farmers carefully to ensure

that quality products are produced so that the loans can be repaid. However, the harvest is not collateral for the loan, and, as such, if there is a disaster that destroys the fruit, the farmer will still be liable to repay the loan.

Marketing agents will liaise with the growers on specific needs pertaining to the markets that they want to target with the each farmer's products. They will also monitor the pack house activities to ensure that the fruit is packed according to the specified requirements. They also liaise with the Inspection Service to ensure that the products meet both the South African standards for export and the importing country's standards for imports.

Marketing agents are central in facilitating transportation logistics from the pack house to the harbor by road and from the harbor to the importing countries by sea. Each marketing company will have several representatives at key points of the production and distribution chain to ensure that the products retain the expected condition of high quality. This means that officials in a particular area will monitor the activities on the farms, they also will spend some time at the packhouse, while a larger team will be at the port of exit.

For shipping, whether by road or by sea, the marketing agents will pool the products from several farmers who use the same packhouse for efficient utilization of space in a truck or ship. Consequently, the agents have developed a complicated tracking system that allows them to account for the sources of all the fruit that they distribute. This system becomes useful when there are rejections of some products along the chain. They are able to intercept all the products of the farmers in question.

Fruit Industry Brokers

Brokers are not located in South Africa. Their activities involve analyzing the market conditions for citrus throughout the world and deciding how to strategically source such that their customers have a year-round supply of citrus products. In the process they decide which products to source on contracts and which products to source on spot markets. None of the small-scale emergent African citrus farmers has been able to get a direct contract from either the brokers or from a retailer. In the region, only one well-established commercial farmer has been able to obtain a contract from a retailer in the European Union for direct supply. Therefore, the brokers sell citrus products from this region on spot markets.

Rabobank (1990) describes the process of collecting and distributing citrus fruit as an expensive and specialized operation, which requires an extensive communications network. The chain is structured in such a way that citrus growers join forces in cooperative arrangements for better logistics, planning, sales, and marketing. However, these producers' organizations often do not have their own sales organizations in the consuming countries. They use middlemen who have access to several customers in the consuming countries. Such middlemen are interested in ensuring a continuous supply to their clients all year round. They also structure their activities in such a way as to maximize their own profitability. This arrangement is not good for the growers, because they are the ones who bear all the risk until the fruit is purchased.

Key Observations

The citrus industry in South Africa has great potential. The prospects for growth are linked to the fact that South Africa has a counterseasonal advantage with most of the major citrus producers around the world. Further, the major producer in the Southern Hemisphere specializes in the growth of Valencia, a variety that is more suited for juice. This leaves South Africa with a few other counterseasonal producers.

The scope for growth in this industry lies in improving the export capabilities of the emergent small-scale African farmers. Meeting the export standards continues to be a challenge for this group. However, farmers' inability to meet the standards should be viewed within a wider context of problems that are faced by the farmers and the way in which the citrus production chain is organized.

Conclusion

In this chapter we have identified two issues that serve as a backdrop against which the study should be understood. First, the legacy of "Apartheid" continues to affect the agricultural sector in South Africa. That legacy explains why some farmers are fully commercial while others remain at the small-scale level of operation. Second, South Africa needs to take full advantage of the counterseasonal advantage that it has with the major citrus producers. To do that it needs to stabilize it export volumes at levels that are higher than the current levels. Small-scale producers have the lowest export level and should be a target group for attempts to improve exports. These two issues are important for understanding the problems faced by some actors within the citrus chain.

CHAPTER 5

Systems of Coordination for the Citrus Chain

Introduction

In chapter 4 an overview of the South African agricultural sector was presented. Linkages were made between the country's past "apartheid" policy and the dualistic agricultural production system. Further, the significance of the citrus industry as a growth subsector was highlighted. Chapter 4 forms an important background for understanding agricultural developments in South Africa.

Chapters 5 to 8 are devoted to presenting data from the observations, interviews and discussions of the role of standards in the global citrus chain. In this chapter we develop a theoretical construct that explains the role of standards in the entire chain. The analysis of the data shows that in commodity chains standards are used by actors as systems of coordination. They define responsibilities and expectations, and they are used to measure risk. These need to be understood within what I have identified as the broad aims of the citrus chain, namely: all actors saw the objective of the chain as being to ensure the marketability of products. All raised the issue of concern for safety and they also voiced the question of traceability. The three broad purposes of the chain, are integrated in the explanation of the role of standards.

Using Standards to Define Responsibility

Each actor in the commodity chain has responsibilities in the first instance to the chain as an abstraction and to actors along the chain. Each actor has an interest in ensuring that the chain is working efficiently. This includes ensuring

that each actor understands his/her responsibilities to other members of the chain. Sako, (1995, cited in Dolan and Humphrey 2001) has indicated that firms rely on their partners to perform their roles competently. If there has been an inability to reach the required level of performance, there can be serious repercussions in terms of both the reputation of the chain and decreasing customer loyalty. Actors therefore need to understand their responsibility within the chain and to other members along the chain. In this study, the understanding of such contributions was evaluated by how the actors explained their roles and responsibilities.

The nature of commodity chains is such that there might be no contractual obligations outlining these responsibilities. In fact Busch (2000) has adopted the Convention Economics explanation, which proposes that the nature of the relationship between the transacting parties might be based on convention and trust. If instead, a contract is formulated, it may undermine the trust, which is the foundation of the relationship. In the absence of contracts to explain responsibilities, the study provided the actors with opportunities to provide their own understanding of what their roles in the chain are in an environment where they would not be pressured by the other members of the chain. This would give us an opportunity to translate what Busch (2000) following Becker (1982) has referred to as a "constitutive convention" into accepted responsibility with standards as a yardstick against which to interpret the explanations.

Further, ensuring that the actors understood their responsibility to the chain would provide an opportunity to evaluate the nature and extent of accountability among the actors. Bingen and Siyengo (2002) have proposed that

to improve the understanding of the structure and operation of the food production and marketing system, it is important to be familiar with the systems of accountability and control within the chain. Accountability will come into play because standards within the chain can be viewed as signposts representing agreed upon rules concerning both the production process and the product characteristics.

In the citrus chain, the role of standards in allocating responsibility differs from Brunsson and Jacobson et al.'s (2000) view. Their view is that most standards are optional and voluntary. The observation in the citrus chain is that where access to lucrative markets is through third parties, such parties might make participation in the chain dependent on meeting the standards that they have set. In such situations, for the members of the chain, the standards cannot be optional, because the alternative is to have no access to the sought after markets.

This section addresses the question of what the actors saw as their role in the citrus chain. The interpretation has been structured in such a way that standards are central in the definition of responsibilities. The general responses, from the participants in this study, were that all the actors want the products in the chain to be marketable. They want the products to be safe in terms of food safety considerations. They also were concerned about the traceability of the products. The major responsibilities are distributed in the following manner: the inspection service sets, communicates, and enforces standards; the marketing agents are involved in research, innovation, and training. The farmers' cooperative provides

technical advice and training, and serves as a clearinghouse. The growers are primarily the implementers of the guidelines that are set by the other actors.

Using Standards to Define Responsibility: The Inspection Service

Two concepts capture the definition of responsibility of the inspection service in the citrus chain: "set and enforce." The members of the inspection service explained its responsibilities as the setting, communication, and enforcement of the standards. The inspection service is a custodian of the standards for all perishable products. (This is further explained in the next chapter.)

In formulating and setting standards, the inspection service works closely with the marketing agents to ensure that the information they have gathered from international markets is carefully incorporated such that there are no contradictions between the specifications and the inspection service guidelines. In setting and enforcing standards, the inspection service adopts an exclusively technical view. They operate from the perspective that standards should communicate important information that the consumer will need in order to make a decision about the products.

Further, the inspection service works closely with the National Departments of Agriculture, Health, and Trade and Industries to ensure that the international conventions to which South Africa is a signatory are captured in the standards. Food safety concerns are the responsibility of the National Department of Health, and the issues relating to plant protection are the responsibility of the National Department of Agriculture. Busch (2000) has indicated that it always is

interesting to note who is absent when negotiations about standards take place. The negotiation sites are an expression of the power relations within the chain. In the citrus chain, therefore, power is located in the government institutions and, as we will see in the next section, the marketing agents.

Using Standards to Define Responsibility: Marketing Agents

All marketing agents viewed their main purpose as finding markets for the farmers' products. This function has become very complicated because of complex requirements that have been put in place either to ensure fair trade or to protect consumers from possible harm.

The marketing agents have similar responsibilities to the farmers and the farmers' cooperative. This responsibility centers around the provision of accurate information to enable production on the farm to take place and to allow the evaluation of the farmers' products to be conducted effectively at the packhouse. To be able to perform these tasks, the marketing agents are constantly involved in research trying to understand the market requirements, consumer needs and general trends in the markets. They are constantly involved in comparisons trying to determine what will work or not work under the South African conditions. One should note that while the marketing agents are presented as one homogenous group, several companies have now joined the citrus chain as marketers, and their operations are very different. Earlier I explained that in this sector there is a dominant company, which is an outgrowth of the era of single channel marketing. That company has a very established infrastructure that involves research and extension work. It also has been recognized for its ability to open new markets,

consolidate some, and build new alliances. Consequently, this agent has the capacity to influence the production practices of the farmers (Mather 1999). There are other actors including the U.S.-based multinationals that are dominant in the international fresh fruits and vegetables markets. There are marketing agents that are based in Europe who are exclusively servicing the European and Asian markets. Finally, there are small-scale operations that are recent entrants into the trade.

All agents constantly try to lobby the inspection service and the government in formulating standards that, they say, will make South African products competitive in the international markets. They regard themselves as sources of both information and innovation in the industry. In this regard they offer training on new technology in dealing with pre-harvest and post-harvest handling of the products. Their activities are captured in a statement by one of the representatives of a dominant marketing company:

> ... I tell you we know what sells in the international markets. We know the preferences of the British, Canadians, Saudis, Japanese, the Dutch, the Americans, you name any nationality. We have sold something to them. We know what they will take in their ports. Consequently when we tell your guys to do things in specific ways (referring to the small scale producers), it is not because we want to be mean. We also have our name to protect. We will not just ship any orange across the oceans knowing what its fate will be. (Participant 16 -Marketing agent, July 17th, 2000)

For food safety concerns, the marketing agents also are involved in similar activities. They research the best means of pre-harvest and post-harvest handling. They develop their own guidelines that take the South African conditions into consideration. They enforce the guidelines both at the farm and packhouse levels. In line with this they have developed several guidelines, which are circulated to

all packhouses that are interested in utilizing their marketing services for assessment.

In this system the packhouses need to be accredited by the marketing agents before they can pack fruit for them. The three key foci of accreditation are the packhouse equipment and process management; packhouse health, safety and working conditions; and documentation of the quality systems. The ratings of the packhouses are full compliance, acceptable compliance, partial compliance, and no compliance. The rating system for packhouses is congruent with market requirements for several importing countries. Some countries will not accept goods if the packhouse is not in full compliance on a particular aspect.

Setting clear accreditation criteria for packhouses and publicizing those, is a good example of integrating standards into a company's strategy to gain market advantage. Reardon et al. (2001), have proposed that within the era of post-Fordist production principles, companies want to use standards to differentiate their products. Further, they also have indicated that rather than merely focusing on issues of measurement as the technical view had suggested, there has been a shift to include issues of credence as well. For Reardon et al. issues of credence are those issues that are known through sensory inspection or observation in consumption. Increasingly some consumers want products that are produced under environmentally safe conditions. They want to support sustainable agricultural practice. They are concerned about issues of fair trade. They want to ensure that the working conditions of the workers producing the goods are fair. All these are captured in the use of the concept credence. If companies are able to

utilize information on these issues and advise consumers of their practices, they may be at an advantage compared to other producers or marketers.

The marketing agents also have developed specific guidelines for farmers. These are in line with notions of "best practices" that are developed by the farmers' cooperative, which in turn are informed by the Euro- Retailer Produce Working Group Good Agricultural Practices (EUREPGAP) (see below).
With respect to traceability, the marketing agents work closely with the farmers cooperative to develop systems that will be effective in ensuring full accountability for all products. This is important for the agents because for the longest portion of the products' life in the chain, they are the custodians. Should anything go wrong they need to be able to account for the wrong and be able to further investigate the cause and the impact of such an occurrence.

They are responsible for enforcing a system of using the proper accounting measures that will inform those who manage the flow of goods along the supply chain of the source, the inputs used, the packhouse used, and the packing date of all the products in the chain. These activities are in line with what Haywood et al. (1998), have referred to as "governance systems in commodity chains." Governance systems refer to sets of norms that transcend the chain governing the relations among the units that constitute it. Perry et al. (1997) use the concept "quality management initiatives" to refer to similar processes. The main assumption of this view is that it is better for quality to be built into the production practices and for management to develop monitoring mechanisms. All believe that if all the principles of the total quality management initiatives are

applied or governance systems are in place, customer expectations will be central to the activities of everyone along the chain.

Over and above the responsibilities to the farmers and the farmers' cooperative, the marketing agents have responsibilities to the Inspection Service and the government. The agent needs to ensure that the company specifications are in line with the systems of regulation that are being implemented by the inspection service. The way the system is structured is such that the marketing agents are able to influence the development of the industry standards in line with the information that they gather from the international markets.

In cases where the marketing agent is a South African company, the agent will understand that their brand becomes a representation of South African products, and as thus carries a very heavy burden. The reliability of the agricultural sector in international markets will be evaluated by the products that have been exported from the country. Reliability in this case is used to refer to the country's ability to meet international agricultural conventions. Mather (1999) has proposed that the dominant marketing agent in citrus is viewed as marketing a "South African crop" (see below).

The marketing agents were very conscious of this responsibility. Several expressed the view that they are doing their best to ensure that South African products are taking their rightful place in the international markets as quality products. For the well-established multinationals, this did not seem to be an issue at all. Their only concern seemed to be to source the best available products to build their brand name without responsibilities to the local government.

Using Standards to Define Responsibilities: The Farmers' Cooperative

The cooperative has responsibilities to several actors in the production chain. First, it has responsibilities to the farmer. The success of the cooperative is linked to the success of the farmers. In this regard the cooperative provides several professional services to its members. These range from technical advice to centralized sourcing of inputs, sales services, and financial services. It is in the interest of the cooperative that farmers produce quality products because that will sustain the cooperative.

On the technical side the cooperative works closely with some of the core marketing agents and has recently developed notions of "best practices," which serve as a yardstick to evaluate the farms and production practices. These guidelines cover the following issues: record keeping, site history, soil and substrate management, fertilizer usage, irrigation, crop protection, harvesting, post harvest treatments, waste and pollution management, and worker safety.

Within each category there is a clear explanation of what constitutes good practice and what does not. Farms are audited by the cooperative and the prospective marketing agents and are graded in terms of their compliance levels. The level of compliance has consequences for their accessing of certain countries in international markets. It also has consequences in terms of which marketing agents will be willing to market the farmers' products. It is interesting to note that the farmers' cooperative notions of "best practice" are in line with the marketing agents' guidelines for the accreditation of prospective suppliers and with the

Euro- Retailer Produce Working Group (EUREP) guidelines on "Good Agricultural Practices" (GAP) (The Citrus Grower 2000).

Developing definitions of "best practice" is in line with Busch's view that standards have become part of the moral economy. They define what is good and therefore desirable. They also define what is wrong and therefore undesirable. The definition of best practice is an example of standardization of production practices. There also is a relationship between the locally-developed notions of good farming practice and internationally-developed concepts of best practice.

The concerns for safety and traceability feature prominently in the guidelines. There is a general understanding that, in order for the products to be competitive or marketable, safety and traceability need to be central quality components. As indicated earlier, the cooperative working with the marketing agents, develops the safety and traceability procedures. The cooperative is then responsible for educating the farmers about the benefits of adopting the "best practice" guidelines, if they want to access international markets. They also are responsible for enforcing the procedures.

Notions of "best practice" are seen by the cooperative officials as part of "total quality management," which suggests that the cooperative has a role in the enforcement of standards. They play a dual role in one action. They advise farmers on best practice, but the very act of advising becomes an enforcement action. Some of the tensions that are part of the day-to-day activities in the chain are captured in this short account by one of the senior managers at the farmers' cooperative:

> One of our biggest problems is that some of the farmers believe that they are competent farmers and do not take the advice and training seriously. They know that they can grow tasty citrus. They want to do things their way. They really want to exercise their authority in their farms and hate it when we tell them to do things differently. I think the race issue comes in too but it is too hot to touch. Almost all the professional staff and management of the coop are white. Not all the farmers are happy with that. Our suggestions sometimes are viewed as impositions. Most of them can get away with doing things their way but some will miss the very fundamentals and lose out. It is a very competitive market. (Participant 19 – Official of the Farmers' Cooperative, July 19th, 2000).

The cooperative also has responsibility to the farmer in terms of being the source of the inputs. The cooperative needs to shop around for the best available deals in production inputs that are acceptable to the international markets. This relieves the farmer of the tedious task of comparing prices from several input suppliers. It also relieves them from comparing the chemical make-up of the applicable inputs to see if they meet the required standards. They can depend on the cooperative for ensuring that what they use is not in violation of the set standards. Proper usage still remains the responsibility of the farmer.

Finally the cooperative also has the responsibility of attracting marketing agents to the region and providing facilities that they will need to evaluate the quality of the farmers' products.

Using Standards to Define Responsibility: The Growers

The obvious role of the growers in the citrus chain is growing the fruit; however, the productive activities are structured in a way that establishes specific obligations between the growers and several actors in the chain. Such relations

and obligations are more effective in explaining the responsibilities of the growers in the chain.

This study of the citrus chain provides insight into the operation of GCC. In general, GCC provide a very practical application of the shift away from production-driven commercial farming to market-oriented farming. Consequently, important decisions have been removed from the farmhouse to another location. Ribbon and Raikes (2000) have observed that global trade in fresh fruit and vegetables was moving towards being organized along the lines that led to the domination of the consumers. In these chains there is some concentration in trading and a shift in control downstream from wholesaling to retail. On the other hand, Mace (1998) has observed that the trend of shifting control downstream is not only limited to fresh fruit and vegetables but has been extended to other commodity chains including coffee.

Earlier we addressed what Gereffi (1994) has referred to as the buyer-driven GCC. What is common in the accounts provided by these theorists is that in buyer-driven and consumer-dominated GCC profits are concentrated in the activities of research, design, sales, marketing and financial services. Such activities are removed from the farm and tend to be located in countries that are part of the core. This is true with the citrus chain as it is with other chains. The difference is that the services normally associated with companies that are located in the core also are provided by locally-based companies.

What further puts the growers at a disadvantage according to Mace (1998) is the perishability of the products. Given the points raised above, one can

understand that the nature of the responsibility of the grower in GCC is very tricky. The grower is free to perform as expected by the marketing agents and the farmers' cooperative and thereby stand a chance that his/her products will be accepted for marketing purposes. The farmer might also choose not to follow such guidelines and therefore indirectly drive himself/herself out of the chain. Therefore, the farmer's definition of his/her responsibilities must be in line with the expectations of the other actors in the chain, especially the farmers' cooperative and the marketing agent.

In their study of trade in fresh fruit between Africa and the United Kingdom (UK), Dolan and Humphrey (2001) have accounted for the evolution of the systems of governance. They have observed the changes that have taken place in the structuring of the GCC. Initially, the UK supermarkets were dependent on wholesalers, who in turn were dependent on several importers who worked with several exporters from several countries in Africa. At the end of the day, it was not easy to clearly account for the source of all the products in the chain. The system that is currently in place involves a situation where the supermarkets deal with selected importers and have the opportunity to "specify the product parameters" before the production process commences. Such parameters would, in turn, define the growers' responsibilities in terms of the parameters set by such supermarkets.

In the case of citrus in South Africa, Mather (1999) has noted that the dominant marketing agent is generally viewed as selling a "South African crop" and not the produce of some 1200 independent growers because the growers'

production regime on the farms is fully configured by the company. This is in spite of the fact that no farmers have formal contracts with the company, except in cases of input financing. This suggests that the trend in global food chains is the transformation of the growing function to be largely in line with the expectations of the marketers. This is captured in the comment by one of the farmers:

> ... sometimes you can easily get confused. They tell you how to do everything as if you cannot farm. They treat us like kids. We know what we are doing. We are business people just as they are. They tend to believe that their ways of doing things are necessarily the best. ...They do not give us any freedom to do what we know. Our oranges are among the best in the country, and they know it. Once you taste one of our oranges you will want more. For them that does not matter. They focus on the skin. What if the taste is not so good? Consumers will not buy again. (Participant 6 – Small-scale farmer, July 3rd 2000)

The growers have direct responsibilities to the farmers' cooperative, the marketing agents, the government, and the consumers. The key responsibility of the grower to the farmers' cooperative is the timely delivery of quality products that would allow the farmers' cooperative to start its business of cleaning, grading, and packing. However, there are standards that define the condition of the products before they are delivered to the packhouse (these are discussed in the section on production practices).

The grower also is responsible for providing the packhouse with the information that can be used for the traceability of the products. This includes the orchard code, the farmer code, the date of the harvest, and the record of the materials used in the particular orchard. Standards are used to reconcile the information that the packhouse already has on the farmer and his orchards with

the information that is provided at the time of harvest. This corresponds with the concerns for traceability.

The responsibilities that the farmers have to the marketing agents are similar to those they have to the farmers' cooperative. Over and above that, some farmers might have entered into agreements with some agents for the financing of inputs and therefore have an obligation to deliver the products for the agents to sell. They need to understand for what markets their products are being targeted and apply the standards that are specific to those markets. The marketing agent informs the farmers beforehand so that they may be ready at the time of delivery.

In the case of the government, the farmer is expected to operate within the scope of the legal provisions in which the license is granted. This includes ensuring that the products are free of diseases that require quarantine. In international markets, standards are negotiated by the trading governments. An error of one farmer within the exporting country reflects badly on the government's ability to implement the policies agreed upon. To a large extent, licensing arrangements are determined by the farmers' records. The licensing of some farms will from time-to-time be revoked for a number of reasons.

The management of Citrus Black Spot (CBS) is a good example where the export licenses had been revoked until a government audit proved that adequate measures were taken to deal with the problem. Following the rejection of the South African citrus products because of CBS in 1999, it became clear to the government that the international standards on CBS had changed. The National Department of Agriculture introduced a system of orchard registration and

accreditation. Farmers were asked to respond to a questionnaire that sought information about their farms. On the basis of their responses and after follow up inspections, the department would decide on the likelihood of the reoccurrence of CBS and decide on whether or not to grant an export permit to a CBS sensitive market (The Citrus Grower, 2000).

Finally, in commodity chains the driving force behind production is that all the actors are producing what is presented as "consumer wants." How consumer preferences are created is not addressed. By participating in the chain, the farmers undertake to address the consumer needs. The expectation is that this would be done in a manner that would not cause any harm to the consumer. Most of the standards that have been developed are designed to make the product attractive to the consumer and to ensure that consumers are not injured in consuming the product.

These responsibilities capture the essence of commodity chains. Participation can be viewed as involving the use of both free will and coercion. Actors can choose to operate outside the established commodity chains. In that way they might risk greater market uncertainty. They might also choose to be part of the chains and therefore subject themselves to systems of governance and regulation within the chains (Haywood et al. 1998).

The Relationship Between Responsibilities and Expectations

The notion of expectations explains the actors' interpretations of the responsibilities of other actors in the chain. There should be similarities between actors' perceptions of their responsibilities and the expectations that other

members attach to such actors in the chain. If not, that would be a suggestion of problems with either the definition of tasks or with the discipline of the actors. Busch (2000) has proposed that standards have the capacity to discipline those who are subjected to them. Using the case of the Green Revolution, he notes that its success was largely dependent on the discipline of all the actors from fertilizer manufacturers to machinery designers. The findings of this study suggest that if the actors are disciplined, it is possible to anticipate their behavior and that explains the link between responsibilities and expectations. All actors can expect certain kinds of behavior from others because they assume that everyone operating within the chain has been disciplined.

Further, Busch notes that trying to discipline workers into following prescribed principles of production has always been riddled with conflicts. He cites the problems associated with the application of the Taylorist principles as an example. Braverman (1974) has explained how the fundamentals of Taylorism were designed to wrest the control of the labor process away from the workers in favor of management and how the workers resisted such attempts. This therefore suggests that disciplining actors is not simple. It often leads to tensions as some production decisions are removed from the direct producers. This principle also applies in the fruit chains.

Defining Expectations: The Inspection Service

The position of the inspection service in the citrus chain is unique because it does not require any special cooperation from the members of the chain to be

able to perform its functions. For its evaluations, the inspection service is dependent on the tests that it conducts on the products.

By the time the products reach the inspection station, they will have labels that capture all the necessary information about the fruit to be inspected. If the tests prove that there is a problem with the harvest, it is possible to recall all the fruit that has been packed from the orchard or from the farm in question depending on the severity of the problem.

The service expects input from the marketing agents in defining the preferred standards because the agents are more in touch with the consumers and understand the international trends and the changing consumer preferences. Also the agents develop their own specifications. There should be no contradiction on the basics of such specifications and the standards.

Defining Expectations: The Marketing Agents

The marketing agents expect that the actors who are part of the chain will conform to the guidelines and behave accordingly. In that way the relationship between the various members of the production chain will be mutually beneficial. Marketing agents expect the farmers' cooperative to ensure that the packshouses gain accreditation certifying their being in full compliance with the set criteria. In this way they will be able to pack for all the markets to which the marketing agent exports. Farmers are expected to adopt the notions of good practice so that their products can be accepted in all markets. The marketing agent will from time-to-time evaluate whether the expectations are met and make decisions about a business association with either the farmers or the packhouses.

Defining Expectations: The Farmers' Cooperative

In order for the cooperative to work effectively, it requires the cooperation of the other key players in the commodity chain. From the farmers, they expect that there will be timely delivery of acceptable products that would enable them to sustain their business activities. They also expect that farmers will adopt the principles of best farming practices and will provide information that has to be used to enhance traceability.

Further, as part of the guidelines for the formation of the cooperative, all farmers are expected to bring all their produce to the packhouse for cleaning and packing. The farmers are not expected to have any sales at the farm gate. Farm gate sales are regarded as the selling of "raw and dirty" fruit. The fruit needs to be cleaned using acceptable chemicals.

From the marketing agents, the farmers' cooperative expects access to technical information that will enable them to design training courses for the farmers. They expect to have access to the information gathered by the marketing agents in so far as the international markets are concerned.

Defining Expectations: The Growers

This explains the expectations that the growers have of other members in the chain. These expectations are supposed to be in line with the other actors' understanding of their responsibilities.

The Farmers and the Farmers' Cooperative.

Backward linkages suggest that the farmers have a relationship with the farmers' cooperative as a supplier of inputs. The expectations are that the inputs

that are recommended and supplied are in line with the prescriptions of the marketing agents and the international markets. Further, the farmer uses the farmers' cooperative as a source of technical assistance. Thus, the cooperative is under pressure to keep abreast of the latest developments within the industry. It also serves as a point of contact for all the farmers and will as such be responsible for dispersing information that is critical to the success of the farmers, especially concerning the export guidelines.

The Farmers and the Marketing Agents

Ribbon and Raikes (2000) have observed that in most African countries the relationship between small-scale farmers and the marketing agents has always been fraught with tensions. They note that in most African countries export agriculture was introduced through parastatals or state-backed cooperatives supplying a combination of research and extension, inputs, and seasonal credit. These would be recovered through a monopoly of the marketing function. In most cases, research and extension took extremely prescriptive forms backed by compulsion. Farmers were regulated on such things:

> "...as plot size and shape, methods of cultivation, input regimes and where and in what form the crops should be delivered" (p72).

Traces of this relationship continue to this day and in cases where standards are used as a coordinating tool, they are used to achieve the same results.

The farmers expect that the marketing agents will be willing to handle their products. This means that there would be no unnecessary exclusion of the

farmers' products if they meet the requirements that are laid down. Further, each farmer expects that the relationship between himself/herself and the marketing agents would be guided by principles of honesty and fairness. This implies that the basis for the evaluation of the farmers' products should be objective standards. In addition, the price offered should be market-related and in line with the standard that has been set.

The points raised above are important for two reasons. First, the question of an acceptable standard is itself not entirely cast in stone. It also depends on the general standard of harvest for the year in question. In a good season, what might normally pass as class one might be graded as class two because the general quality is very good. Similarly, in a year where the harvest is not good, what could normally pass for class two might be graded as class one because the general quality for the season is not very good. Fairness is significant in such cases.

Second, each farmer would have an idea of the current market price and the terms of payment before an offer is made to him/her. He/she will expect the same treatment as the other farmers including large commercial farmers.
It also should be noted, following Mather (1999), that the agents have access to markets with different demands for quality. Consequently, they have a coordinated global strategy that allows them to supply some markets with better quality while the less lucrative markets are supplied with poorer quality products. Farmers need to know exactly to which markets their products will be sent.

Understanding the Nature of Risk in the Citrus Production Chain

In trying to understand the nature of the risks with which the actors are confronted, three interrelated questions can be raised: First, what are the risks confronting the actors? Second, how do the actors measure such risks? Third, what steps can be taken to reduce the threats imposed by the risks?

Exposure to risk has been cited as one of the reasons for engaging in business (Dolan and Humphrey 2000). However, the willingness to be exposed to risk is not open-ended and requires careful understanding of the nature of the risk to which one will be exposed and the possible remedies for such risks. Where there is a relationship that takes the form of a chain, it is important to understand the location of specific risks in the chain to understand the challenges associated with addressing them.

Almost all the participants in this study were concerned about their reputation. While reputation expresses itself differently among the different actors, it still is a central concern for all actors. Jones et al. (1997) have proposed that reputations that actors have in any network have economic consequences. They use the concept 'reputation' to refer to estimation of one's character, skills, reliability, and other attributes important to the exchange relationship. In business, parties are generally concerned with information about their own reputation and the reputation of others, especially those with whom they want to do business. In situations of what they refer to as "customized exchange," parties work through whatever problems they have until they develop a common understanding of obligations and expectations. Once reputation is built, it reduces behavioral

uncertainty by providing information about reliability and goodwill of actors. It also discourages deceptive behavior, thereby strengthening the relationship.

Food safety concerns serve as a good example of a test of reputation. Friedland (1994) has indicated that the major challenges faced by global trade in fresh fruit and vegetables are food safety concerns, especially in situations where chemicals and other artificial stimulants are used. The problem is complicated by the fact that products are produced in different countries, using different standards. Commodity chains have developed complicated systems of traceability for fruits and vegetables. The aim is to be able to fully account for the products that are being moved along the particular production, distribution and consumption chain. Actors build or destroy their reputation in the chain by either following the accounting procedures or disregarding them. How the risks described above are handled will distinguish stable chains from unstable chains, and the reputation of all the actors will always be at stake.

The section below explains the concerns of each actor for the reputation of his/her unit. The inspection service is concerned with protecting its seal of quality, the marketing agents are concerned about their brand, and the farmers' cooperative and the farmers want to build a good reputation with the marketing agents, the government, and the customers.

Measuring Risks: The Inspection Service

The major risk that the inspection service must address relates to its reputation as an effective inspection service. In order for the South African products to be marketable in international markets, they specifically need to be

viewed as safe for the consumers. Some of the standards are designed to promote food safety along the chain. If the inspection service does not pick up food safety related problems at their checkpoints, it might risk losing its credibility as a responsible inspection service.

The risks to which the service is exposed can be measured historically by looking at what happened in the past in cases where there were errors on its part. They can also be measured by the rate of acceptance and rejection at the port of entry in the importing countries. The higher the rejection rate, the more likely it is to lose respect among inspecting authorities in the world. The lower the rejection rate, the more its seal of quality will be respected among the countries that are trading partners.

Measuring Risks: The Marketing Agents

The major concern for the marketing agents is the promotion of their brand. Marketing agents want to maintain their brand's reputation, representing good quality. Each time they make a decision about the fate of farmers' products, they use a standard that has been set for their brand. Business success depends on the protection of the brand. The brands that the marketing agents carry are believed to be tailor-made for the consumers. Agents are generally regarded as having credible information about the needs of the consumers and the direction of the trends that consumers are following.

The success of their brand will also depend on how well their brand regularly meets food safety standards. The fewer cases of food safety violations

the brand has, the more stable it will be in international markets. The higher the cases of food safety violations, the less stable it will be in international markets.

In line with the points raised above, the marketing agents are generally selective about what they are willing to export. They exercise vigilance to ensure that the products that carry their name are in line with the specifications that they had disseminated.

Marketing agents carry the burden of devising systems of traceability that will be efficient but not cumbersome and, that would allow every actor in the chain to be able to determine the origin of all the products should the need arise. If that is not done, the agent indirectly must assume responsibility for untraceable products.

Measuring Risks: The Farmers' Cooperative

The major risk factor for the farmers' cooperative is its reputation with the other actors in the production chain. The officials want to retain a reputation that the fruit that passes through their packhouse meets the quality standard. This is significant if they are to ensure continued support and business from their business partners. Among the key actors with which the cooperative wants to maintain a good relationship are the marketing agents, the government, the inspection service, and the governments of the importing countries.

The traceability code that applies in the fruit industry not only captures information about the grower who has produced the fruit, it also captures information about where and when the fruit was packed. This implies that if there

were consistent standards related problems originating from a single site, with time they would lose their credibility.

The cooperative also is concerned about the status of its license with the government. According to the management of the packhouse, it is possible for the government to revoke the license of a packhouse if the products that are packed in there are an embarrassment for South African products in international markets.

Therefore, the cooperative measures the risk that it must to take in relation to standards in terms of the possibility of having its license revoked and its operations closed if they are perceived not to be sufficiently strict in the application of the standards. In deciding what is acceptable or not, the cooperative officials claim that they are guided by the rules, but it is mainly their experience that facilitates the process.

The steps that they take to manage risk in their operation are designed to ensure vigilance, traceability of products, actions of the staff, and overall accountability. At the packhouse there is a high level of vigilance among the workers. There are several checkpoints to ensure that the standards applied by the workers are the same. They also work on a system of projections to countercheck the accuracy of their system. Using the information gathered during farm visits, certain projections are made about the percentage of products that will be of acceptable quality. Such projections are revisited to see if the grading process confirms the projections.

Measuring Risk: The Growers

The key risk that the growers need to measure is the probability that their products will be exported. The significance of the activities that take place on the farm is measured in terms of their capacity to improve the exportability of farm products. Consequently, each farmer wants to ensure that the standards for the export of the fruit are all met. The difference in the earnings for export products and local products is the motivating factor. Farmers are not able to recover the costs of their operations from the local sector alone.

Among the determinants of exportability are the ability by the farmer to provide a written account of the inputs that were used as well as the volumes and the dates in which the inputs were used. This is dependent on a proper on-farm recording system that must be accessible for inspection. This has become very significant with the concerns for traceability of products.

Also linked to exportability are concerns for food safety. As will be discussed later, there are certain food safety considerations that all farmers are expected to uphold. If there are violations that can be proved, the product will lose its export status and might not even be considered for the local markets. If the violations are only picked up in importing countries, they might create more problems for South African fruit in general as they would be evidence of laxity in the inspection service. Both ways, the farmer will be at a disadvantage.

Experience was seen to be the major measure of risk. Farmers knew exactly what happened when the standards were not met and the products were rejected. Most have been through the process and were willing to share the experiences of the financial strains that resulted from inability to export enough

products. Some knew what happened to fellow farmers in previous seasons. What seemed to be the most significant issue was the magnitude of the rejections. Farmers seem to accept that not all of their products would make it to the international market, yet they needed to be certain that they are able to export enough products to cover their production costs, make some profit, and remain in business.

Steps that are taken to ensure that the threat of a rejection is not of large magnitude include ensuring adherence to both the standards that are set and to the specifications of the marketing agent. This implies that production practices need to be in line with the prescriptions of the marketing agents.

Conclusion

In this chapter two key questions have been answered. First, the chapter has answered the question how do international standards structure the citrus chain? Second, how are standards developed and communicated? It has proposed that in commodity chains standards are used as systems of coordination. They define responsibilities and expectations, and they are used to measure risk. At each level of the production and distribution chain, actors use standards to define what they do. The key responsibilities are distributed in the following manner: the inspection service sets, communicates and enforces standards. The marketing agents are involved in research and technological innovation to improve both pre-harvest and post-harvest handling. Such innovations are then built into the standards. The agents also develop accreditation criteria for prospective chain participants both at farm and at packhouse level. The farmers' cooperative

provides technical advice for the farmers and develops and trains farmers in "best practices." The growers are responsible for implementing best practices and to record their activities for the traceability requirement.

Defining expectations appeals to the discipline of the actors along the chain. If the actors are disciplined, their actions will be predictable. Actors will know what to expect from each other. This implies therefore that disciplined actors will know what their responsibilities on the chain are and other actors can anticipate the necessary action.

Measuring risk has to do with concerns for reputation and credibility of the chain, the actors, and the products. Actors measure each other for credibility and reputation. The ultimate measure is consumer confidence on the products in question.

Further, the chapter proposed that understanding responsibilities, expectations, and risks are in line with the concerns for the marketability of the product, as well as for food safety and traceability of the activities surrounding production and distribution of the fruit. Finally the chapter indicated that the relationship between the actors is not as smooth as all would prefer, but all realize that they need each other's cooperation to make the chain sustainable.

The effectiveness of any system of regulation depends on the systems that have been designed to enforce it. In the next chapter we will examine how standards are enforced within the global citrus chain.

CHAPTER 6

Enforcing Standards Along the Citrus Chain

Introduction

In chapter 5 we proposed that in commodity chains, standards are used as systems of coordination. They are used to define responsibilities and expectations, and also are used as measurements of risk. This chapter explains how they are enforced. It provides an explanation for why we proposed that standards have become the central tools of regulation. It also explains why we proposed that the consideration of standards is at the forefront for all the actors and why they need to be constantly conscious of such standards.

Secondly this chapter provides a summary and interpretation of standards within the citrus chain. It identifies two broad categories of standards that are operational within the citrus industry. Industry standards are set and enforced by the inspection service. Government standards are set the Departments of Health and Agriculture.

Understanding Enforcement

The key to understanding the proposals raised above is that the enforcement of standards is built into the entire citrus chain. The enforcement is structured in the following way: The production inputs that are used by farmers are subject to approval from the marketing agents and the government. The departments of health and agriculture audit the farms. Marketing agents and the officials of the farmers' cooperative monitor the farmers' production practices to ensure that the farmers are following the prescriptions. Marketing agents and

government departments subject packhouses to audits. The products that are exported are inspected by an independent inspection service at the packhouses and at the port of exit.

There are numerous actors involved in the enforcement of standards. The first decision made by the graders of the farmers' cooperative is whether the fruit is of export or non-export quality. The basis on which the decision is made is the information that has been gathered during the growing period and the condition of the fruit when it reaches the packhouse. The officials of the farmers' cooperative need to determine whether the products can make the grade for the export market, given the production practices at the farm in question. Second, given the stringent inspection criteria of the inspection agency, what is the likelihood that something in contravention of the regulations will be caught by the inspection service, thereby leading to the repacking of the fruit.

The agents and the cooperative officials were quite firm in indicating that they saw their role in the enforcement of standards as being driven by mutual interests that they shared with all the actors in the citrus chain, namely that they wanted to give the best service to the farmer. They believed that they shared a common goal with the farmers to help them produce quality products that can be exported.

In spite of sharing a common goal with the farmers, the nature of the coordination of the chain is such that the agents can decide which products they would be willing to sell. This in turn gives them enormous power to exert influence over the farmers. The farmers' cooperative, on the other hand, is

interested in maintaining the reputation of the cooperative as having farmers who are productive and want to succeed in the export business. In this way they are selective in what they accept for packaging for the export markets. Therefore, in most cases the officials of the farmers' cooperative work in cooperation with the marketing agents.

Following Busch and Juska (1997), the findings of this study prove that the farmers are able to recognize their dependence on the chain for survival. They seek to conform to the standards and accept the systems of enforcing them because they do not have other attractive options for their produce. In explaining the nature of commodity networks, Busch and Juska have observed that actors become enrolled in networks when such networks represent a better choice when compared to the alternatives. Furthermore, the range of choices open to anyone at any given time is a function of whether there are other networks available. In the citrus industry there are no other networks available. Therefore, conforming is linked to the fact that the citrus producers have come to accept that their choices are limited, and the limitations are viewed as natural.

An examination of the data suggested three operational principles that are used to monitor compliance. These are unrestricted access, centralized sourcing of inputs, and a well-developed tracking system.

Unrestricted Access to all Production Points

In terms of this principle, all the facilities where production takes place need to be accessible to all the members of the citrus chain. This principle applies

more to farms where production starts and the packhouses where the products are cleaned and packed than any other points along the chain.

Unrestricted Access to the Farms

The farms are accessible to the Department of Health. This department is responsible for issuing a confirmation that the sanitary requirements (hygienic conditions) at the production site are met. This would include such things as the number and the location of the restrooms on the farm. It includes a confirmation that the water used for irrigation is from a safe source. It might also include ensuring that the farm is protected from animals. The argument advanced is that how these issues are addressed on the farm might lead to food safety hazards for the products that are produced there. There also is a strong link between sanitary and phytosanitary conditions. It is not easy to differentiate between the two because most unhygienic conditions might cause disease. The Department of Health issues a certificate of clearance for all the farms that are perceived to meet the basic hygienic conditions. This certificate will be withheld if there are aspects of farm organization with which the department is not comfortable. This derives from the regulations governing the export of food items to other countries. The Health Department does not need the farmer's consent to conduct the inspection of the farm. Farmers need to apply for the license and, therefore, will be anxious that this inspection takes place as soon as possible. It is in every farmer's interest that the inspection be conducted as quickly as possible because it is the first hurdle that he/she must pass to be considered for export opportunities. The

marketing agents and the officials of the farmers' cooperative anxiously await the issuing of the certificate.

The farm is also accessible to the Department of Agriculture. The plant protection unit of the Department of Agriculture has the responsibility of restricting the spread of plant diseases in the country. The department is a signatory to the International Plant Protection Convention and, therefore, has a responsibility of preventing the spreading of local plant diseases to other countries. Further, the department is the primary agency for the implementation of the WTO agreements that involve sanitary and phytosanitary considerations. The specific focus of the department are plant diseases.

Accessibility means that the officials must be able to view farm records. This includes ensuring that the farmer has properly recorded all the regulated on-farm activities. The recording of activities is checked against the input purchases made from the farmers' cooperative. It further includes monitoring the usage of the chemicals. The officials have access to the land and take some soil samples to evaluate the usage of chemicals and test for soil fertility. They also test the trees and the fruit for residue levels. The samples taken from the farm are sent to the departmental laboratories for analysis.

The farm also is accessible to the officials of the farmers' cooperative and the marketing agents. Both have access to the farm as providers of technical advice. More importantly, however, they want to know the prospects of the marketability of the farmer's products and the likelihood that the farmer's products may be included in the marketing plan for the season in question. The

issues to consider are the same as will be considered by the Departments of Health and Agriculture. Their judgment will be determined by the general production practices followed on the farm and the general quality of the fruit.

Unrestricted Access to the Facilities of the Farmers' Cooperative

The facilities of the farmers' cooperative are accessible to the farmers, the Department of Health, the Department of Agriculture, and the marketing agents. For the system of coordination, it is the accessibility to the marketing agents and the government departments that is more important. The Department of Health is concerned with the hygienic conditions of the packhouse, while the Department of Agriculture is concerned with the management of the inputs that are used by the farmers and issues relating to storage and record keeping.

The marketing agents will audit the packhouse to ensure that it meets the standards to pack fruit for the markets that the agents service. Typically a single packhouse will be audited by several marketing agents. They also need to ensure that the officials of the farmers' cooperative (who will be responsible for grading and packing the fruit) understand the agents' specifications. Further, they want to ensure that there is consistent interpretation of the general guidelines that are enforced by the inspection service.

They also have access to the records of the inputs purchased by the farmers. They check that against the records on the size of the farms and decide if there might have been overuse, adequate use, or inadequate use of the inputs. According to the agents, they use that information to plan a marketing strategy for

the season. They are likely to make tentative predictions about the quantities of fruit that may be of export quality, all other things being equal.

Unrestricted Access in Perspective

The major implication of the principle of unrestricted access is that the activities of all the members are monitored. Any behavior that is regarded as unacceptable renders the party liable to exclusion. The stakes involved in following the rules are much higher for the farmers than for the other members of the chain. This is in line with what Perry et al. (1997) have referred to as "total quality management." They explain it as the diffusion of new quality and marketing strategies into the primary sector. They believe that it has very transformative influences on how quality management is handled in commodity chains. In the case of the citrus chain we see that quality is guaranteed by tightly monitoring what happens within the chain, and standards have become useful tools for monitoring what happens at all the stages of production and distribution. Furthermore, the application of the principle of unrestricted access shows the relationship between the outcome-based and process-based standards (Farina and Reardon 2000, Reardon et al. 2001). Outcome-based standards refer to product characteristics at a given point in the production chain. Process standards refer to the characteristics of the entire production and distribution chain.

There have been several suggestions that the new sets of standards that are applied in the agrifood sector have slowly led to a shift away from outcome-based standards towards process based standards because product standards were popular previously in the era of Fordist production principles where emphasis was

on homogeneity of products. Standards were linked to creating uniformity (Busch 2000). With the shift to differentiated markets, emphasis now is put more on the process (Reardon et al. 2001)

The findings of this study suggest that the two types of standards are closely linked and that it is not possible to focus on one set without influencing the other. The inspection of citrus products represents the application of outcome-based standards at the point when the products are ready for shipping. The outcomes that are expected are to a large extent dependent on the preceding processes that have taken place. If, for example, no adequate holding period was observed as part of the pre-harvest treatment (process-based standard), the fruit will have unacceptably high levels of chemical residues at the inspection point and, therefore, not meet the outcome-based standard. For the citrus farmers outcome-based standards force the farmers to structure their activities to be in line with the expectations of the inspectors.

Single Source of Inputs

Farmers realized that the cooperative had an advantage of scale in sourcing inputs over each farmer acting individually. Further, they were aware of the fact that buying from the cooperative relieved them of the responsibility of sorting through several types of available inputs, some of which might contain unacceptable chemicals. Such actions have become the responsibility of the cooperative. The cooperative uses this leverage to direct farmers to certain products and not to others. What is available for the farmers to purchase from the cooperative will be what the officials of the farmers'cooperative and the

marketing agents recommend. This means that the cooperative has control over the chemical usage in the region and can be indirectly viewed as monitoring soil fertility.

To achieve this objective, the farmers' cooperative needs to have access to at least three documents: (1) Publication by the National Department of Health that specifies chemicals that are banned in South Africa, (2) Publication from the National Department of Agriculture that lists the levels of tolerances of most countries with which South Africa does business, (3) Notifications on phytosanitary requirements of some of South Africa's major customers. Most of the participants did not regard this as power over them. They regarded it more as a service that is geared towards making them efficient producers. I believe that the chain is structured in this way to ensure tight control directly at the point of production.

Tracking System

One of the major achievements of the South African fruit industry, especially the citrus industry, has been to develop an elaborate system of tracking that allows the officials monitoring the flow of the products along the chain to have access to information about the products that are within the chain at any time. The computerized system is capable of storing information about the farmer, about the farm, and the various orchards within the farm. It stores information on the inputs used and the general record of the farmer in terms of meeting the standards.

Each farmer has a number that identifies all the products originating from his/her farm. Further, each orchard has a code that is attached to the farmer's code. These are developed into a bar code recording the type of fruit and the day it was packed. If there are packaging problems that can be traced to a particular day, all the packages packed on the day in question can be recalled. If there are problems with an orchard of a particular farmer, all the products from that orchard can be easily identified and recalled.

With the three operational principles discussed above, the officials are able to monitor the activities of all the actors and to provide traceability for the products that are within the chain.

Enforcing Standards: The Actors

The enforcement of standards is a function of two major actors in the chain. The farmers' cooperative and the Inspection Service.

The Farmers' Cooperative

It is not possible for the marketing agents to attempt to enforce the standards because of the enormity of the tasks. For that reason, the enforcement of standards at the packhouses is primarily a function of the farmers' cooperative. The marketing agents are welcome to oversee the process and to object to decisions with which they are unhappy. The cooperative becomes the custodian of the fruit once it reaches the packhouses. They are responsible for cleaning, waxing, grading, and packing the fruit.

During the field observations, the marketing agents did not have any disagreements with the officials of the farmers' cooperative on the quality

standards that were applied. Arguments would only ensue where one agent's sticker was accidentally put on another agent's consignment. This often led to delays, as there was a need to remove all the stickers and paste on the correct stickers.

One key demand at this level is that the fruit does not have any foreign matter. In other words, the goal is that the results of the tests done at the government laboratories, testing for use of prohibited chemicals, high residue levels and plant disease, will be negative. It is important to note that the farmers' cooperative does not conduct any tests on the premises. The only basis for its enforcement of standards is external quality of the fruit. The outcome of the enforcement process will be allocation of some fruit to the three export quality classes and the fourth group will be channeled to the local market using a different grading system.

Sorting for size is first done both manually and electronically, at several stations. Second, there are several evaluations of the external qualities of the fruit, using ordinary labor. The cooperative uses a system of samples to show the workers what to look for. Typically in one station one will be looking for blemishes, another for disease, and another for general damage. Each line has several checking stations staffed by three to four workers. Typically, an orange would go through four to five stations before being packed. This is done to ensure that whatever is missed at the first checkpoint is not missed at the subsequent points.

The Inspection Service

Unlike the other actors in the chain, the inspection service does not have any prior knowledge of the products that are submitted for inspection. Therefore, for all the decisions it takes, it depends on the results of the tests that it conducts on selected samples at the packhouse or the port of exit. The outcomes of the tests determine the suitability or lack thereof of the products. There is a sampling method used to identify packed cartons of the fruit on which to conduct tests that are outlined in the standards and regulations.

Pinch (1993) has proposed that testing needs to be understood within the context of social and political relationships that are embedded within society. He has observed that in testing there always something at stake. There tends to be a lot of expectation that is built around the outcome and in some cases such outcomes may be witnessed by others. For those reasons, tests have become a powerful means of legitimizing whatever processes that have been adopted. They create a mythical reality that of objective principles are being applied.

Pinch's concept of a "similarity relationship" can be applied to explain the testing of products within the citrus chain, both by the National Department of Agriculture and by the Inspection Service. The concept proposes that tests depend crucially upon the establishment of a "similarity relationship." By this he means that there has to be an assumption that the state of affairs pertaining to the test case is similar in crucial respects to the state of affairs pertaining to the actual operation of whatever is tested. Consequently, in conducting a test on a product, the discipline of the user is also being tested. This in turn implies that there is a

certain version of the user that has been incorporated as part of the system and attempts are made to weed out the undisciplined users.

This concepts suggests that when farmers' products are inspected, the aim is to develop a notion of an "ideal farmer" who follows "ideal production practices" to produce "ideal goods." As Busch (2000) has proposed, standardizing products implies standardizing people as well.

The Inspection of Fresh Fruit and Vegetables in South Africa

The Perishable Products Export Control Board (PPECB) inspects all export bound perishable products in South Africa. This is an independent private non-profit company that was started by the perishable industry and later was accredited by the government as an independent inspecting organization. The company was started in 1926 and now has representation in all the centers where perishable products are exported. Recently, it has recently established an office in Europe to deal with assurances and problems at one of the major ports of entry for the South African goods.

Its board of directors is appointed by the industries within which the individuals operate and all the sectors that deal with perishable products are represented on the board. Those industries are the subtropical industry, the deciduous, the marine, the citrus, the vegetable, and the meat industries. Interestingly on the board of directors the citrus industry has two representatives, one of whom is African. This can be interpreted to mean that the role of emergent African farmers is recognized by the industry, and attempts are being put in place to find means for representing their concerns.

According to its management, the company is run on sound business principles and finances its activities from the levies that are charged for the inspection service. Currently citrus products have a levy of R5.60 per export pallet. The company believes that inspection is an essential service to boost the image of the South African perishable products in international markets. They believe that they are adding value to the products by providing quality and food safety assurance within the supply chain.

PPECB's status as a government assignee to execute the inspection function was achieved through the passage of two acts of parliament: The PPECB Act (Act 9 of 1983) makes provision for the PPECB to exercise "control of Perishable Products intended for export from the Republic of South Africa." In terms of this act, the functions of PPECB are summarized by the company as follows:

- control export shipments of perishable products from SA
- determine vessel suitability and assign products to class of accommodation required
- determine various products' export volumes and related particulars
- determine shipping capacities, services opportunities and sailing schedules of shipping lines
- arrange provision of port facilities and shipping space as required
- research and make recommendations regarding handling, conveyance and cold storage procedures for perishable products
- promote uniform freight rates
(www.ppecb.org.za ,2003.)

The Agricultural Products Standards (APS) Act (Act 119 of 1990) gives power to the PPECB to exercise "control over sale and export of agricultural and related products." In terms of this brief the company summarizes its functions as follows:

Assignee of government to execute the act with regard to export of certain perishable export products, i.e.:

- control over sale of products
- control over export products
- control description of products
- investigation and sampling
- appeals
- regulations

(www.ppecb.org.za, 2003.)

For the purposes of this discussion it is the APS Act which is of more relevance because it prescribes the legality of the inspection service in the perishable industries in the country. More specifically, it is the last four areas on which I will concentrate as they directly deal with standards.

Control over the Description of Products

This function in real terms implies that the PPECB has the power to develop and enforce classification schemes such as agricultural grades. I see this as the standardization function of the inspection service. It involves providing clear description of the products and the methods that will be used in evaluating them. The document that is produced cannot be entirely unique. It must conform to commonly-held conventions by the trading partners. From reading the document a prospective buyer should know the difference between a class one as opposed to a class two orange.

The responsibilities that are assigned to the company by the government and the industry make this company very powerful in the export of perishable products. They have become the authority in defining what is exportable quality or not.

Periodically they prepare a new set of standards, which might include revisions of some aspects of the previous publication. The documents that are produced describe all citrus products. Section 6 of the document is devoted to oranges. The classification of navel oranges will be discussed below.

Citrus Standards in South Africa

We can divide the standards that are applied in the citrus industry into two broad categories. First, there are standards that focus on specifying the quality factors of the fruit. These standards are set and enforced by the inspection service. They represent the guidelines that are developed by the industry itself. The marketing agents, as indicated above, play a central role in the development of these standards. We identify these standards as the industry standards. Second are the standards that are applied by the Plant Health and Protection unit of the National Department of Agriculture. These standards focus specifically on the international agreements to which the South African government is a signatory. We term these government standards.

Industry Standards

According to the official South African Standards for citrus, approval for the export of citrus will be granted if several conditions are met. The conditions are as follows: the fruit must comply with the applicable quality standards that are prescribed. It must be packed in containers, which comply to the requirements that are prescribed. It must be packed in the prescribed packaging material. The containers must be marked or labeled in accordance with the applicable marking requirements. Samples for inspection must be drawn in accordance with the

requirements. The fruit should comply with the requirements with respect to chemical treatment. The fruit must be presented for inspection in accordance with the regulations regarding control of the export of citrus fruit. An inspector must be satisfied that all the requirements have been met.

Of all the conditions listed above, two apply directly to the farmer: quality of the fruit and its chemical treatment. Even though there are only two requirements, they are very complex and have far reaching implications for how the farmers structure their production practices.

For the farmer, industry standards cover five broad areas of concern for the industry - classification, cosmetics, food quality, food safety, foreign matter, and inspections. Standards for inspections are discussed later in this chapter, under the section that deals with the inspection service.

Classification

Two standards cover classification. First, the grades identify the categories of products that are of export quality. The standards recognize three such grades - the Extra Class, Class 1 and Class 2. The three classes are distinguished largely in terms of the size and the cosmetic appearance of the fruit. In general, the industry has other grades as well, but because they are not of export quality they are excluded from the document that deals specifically with products destined for export. The actual classification of fruit into any of the classes depends on a collection of factors that describe its quality. In other words, it is dependent on its standing on all the quality items that are discussed below.

Second, the size provides a measurement of the equatorial diameter of each fruit which is then used to allocate the fruit to a predefined size grouping. Export quality citrus can come in any of the 14 sizes that are specified in the standards. The largest is Size 0 and has a diameter of 100mm or more. The smallest is size 13 and has a diameter of between 53 and 60mm. This suggests that no fruit with a diameter of less than 53mm can be exported. The sizes and the diameters do not follow any systematic interval and most overlap. For example, size 12 has a diameter requirement of 56 to 63mm, and size 11 is 58 to 66mm. The final determination of the size will depend on the size of the majority of the fruit in a carton.

The significance of these sizes is that they are used to target markets. According to the marketing agents, consumers around the world differ in terms of the preferences of the size of the fresh fruit and are targeted accordingly. Farmers have access to the information on preferences of the markets and often will try to monitor the size of their fruit to ensure that they have access to the most lucrative markets.

The size of the fruit also is an indication of the general state of health of the fruit. Some fruit may be underdeveloped and appear unusually small; some might be deformed and not be in line with the usual shape of an orange. These also might be signs of some plant disease.

The sizes also are used to ensure uniform packing at the packhouse. The expectation is that fruit of the same size will be packed in the same carton to ensure uniformity of size.

Cosmetic Standards

Cosmetic standards cover the external condition of the fruit, such as blemishes, color, damage and greening. The requirements need to be read in conjunction with specifications for maximum permissible deviations for each class. For the marketing agents and the farmers' cooperative, this is the major test of the suitability of the farmers' products. Appearance is a key decision factor for fruit consumers. It is what makes the product attractive or unattractive.

Blemishes and Damage

Blemishes can be a signal of several problems with the fruit. They can be signals of damage from frost, hail, wind, or birds. They also can be signals of the presence of pests in the fruit as in the case of scale. Scale refers to marks on the skin of the fruit that look like a ringworm. These lead to the unfortunate degradation of the quality of the farmers' products.

The standard for blemishes and damage is that the Extra Class will have no blemishes. Class 1 and Class 2 can have very small patches of blemish not covering more than 1% of the fruit. The way this standard is applied is that graders are given color pictures of the tolerable levels, and they are told to be on the lookout for anything larger than what is on the picture. The pictures constitute part of the standard, and there is general reference to the pictures in the standards.

This should be read in conjunction with the maximum permissible deviations which specify that blemishes, wilt, shriveling skin defects, which include skin burn, sunburn, rough, coarse, thick ribbed or ridged creasing, and

other types of skin damage, all added together, may be tolerated to the limits of 5% of the inspection sample for the Extra Class and 15% for Class 1 and Class 2.

Color and Greening

External quality of the fruit also is evaluated in terms of the color of the fruit. Some of the fruit will not take the normal color of an orange, a process that is referred to as "insufficient external color development."

The standard for color is the same for all three classes. The inspection service uses picture guides to assist graders to identify the suitable color oranges. The standard needs to be read in conjunction with the maximum permissible deviations which specify that insufficient external color will be tolerated to the level of 5% per inspection sample for Extra Class and 6% per sample for Classes 1 and 2. Greening disease is not tolerated for the Extra Class and for Classes 1 and 2 there is a tolerance of 2.5%.

Food Quality Standards

The juice requirement and the number of seeds that are permissible within the fruit constitute food quality standards. These are both part of the internal qualities of the fruit.

Juice Requirement

To test for the juice requirement, four measures are necessary. First is a measure of the juice content of the fruit. Second is the measure of the total soluble solids content. Third is the measure of the acid content of the fruit. Finally is the measure of the ratio of the total soluble solids content to the acid content. All the tests require the use of special measurement instruments.

The juice requirement for all classes of oranges is as follows: 42% is the minimum juice content. There is no maximum specified. The minimum ratio between total soluble solids content to acid content is 7.0:1. This must be read in conjunction with the maximum permissible deviations, which specify that for Extra Class there will be no tolerances for granulation and drying out. However, for Classes 1 and 2 there will be tolerances of up to 2% if major and minor granulation combined do not exceed 20% of the inspection sample.

What is important about the food quality standards is that the farmer knows beforehand how to achieve the required balance. According to the farmers, the particular standard calls for the monitoring of the irrigation of the fruit especially during the period preceding harvest. According to them there is a relationship between the amount of water the plant absorbs and the ability to reduce acidity in the fruit and to generate the required juice content. The farmers' cooperative conducts tests before harvesting their fruit to ensure that they meet the juice requirement.

Seeds per Fruit

The standard for export quality navel oranges is that the fruit will be seedless. All classes do not have any tolerances for mature seeds. However, this standard must be read in conjunction with the maximum permissible deviations, which specify that in any working sample of 12 fruit there will be no fruit with mature seeds. Provided that one fruit may contains a maximum of 5 seeds and if the number is exceeded, a new sample must be drawn. This is unique with the navel oranges as the other varieties have some allowances.

Food Safety Standards

Food safety is addressed at two levels in the citrus chain. It is part of both the industry standards and the government standards. Parts of food safety that are addressed by the industry include decay and pest management. The standard is that decay will not occur on fruit that has been graded as Extra Class. The tolerances for Classes 1 and 2 are 1.5% of a carton and not more than 10% of a container. Similarly there are limitations for the factors that can cause decay; these include major injuries, minor injuries and skin weakness. The Extra Class has limitations of 0% for the major injuries, and 2% for minor injuries and skin weakness. Class 1 and 2 have 3% tolerances for major injuries and 5% tolerances for minor injuries and skin weakness.

Second are cases of superficial fungus regarded as some residue from scale disease. The standard is that for the Extra Class there will be 0% tolerance, while for Class 1 and 2 there will be tolerances of 2.5%. In the case of arthropod infestation, the tolerance for all classes is 3%. The standard for other organisms that are viewed as possibly harmful to human beings is that all classes have tolerances of only one per inspection sample, regardless of the size. Finding more than one such substance or specimen is a basis for rejecting the fruit.

Foreign Matter

The standard for foreign matter specifies that any person intending to export fruit in any season shall first apply to the chief executive officer of the inspection service before the first fruit is submitted for inspection. In the request the applicant is expected to furnish the chief executive with a certificate certifying

which chemical remedies have been used both during the spray program on the citrus trees, and as post harvest treatment and confirming that the chemical residues do not exceed the prescribed maximum residue limits. This must be read in conjunction with the provision that the chief executive may grant permission for fruit with higher maximum residue limits to be exported to a country where such higher limits are permissible with the provision that the exporter signs an affidavit in which it is declared that the fruit with higher maximum residue limits shall be exported only to the country where such limits are permissible.

Government Standards (Regulations)

The government's responsibility in the citrus sector, and indeed in all sectors, is to ensure that the agreements to which that the country is a signatory are observed. Food safety has become central in most of the agreements to which the government is a party. This has always been a concern in the farming sector, especially with the high rate of chemical usage in the industry. Food safety considerations in the fruit industry can be categorized into three. First, there is use of prohibited chemicals, which will lead to the presence of unwanted residues.

Most farmers seem to understand the significance of staying away from prohibited chemicals if they want to export their products. The question of "prohibited chemicals" is market specific. Some markets reject the use of some chemicals on food items irrespective of handling. An example of this is the Japanese market, which rejects the use of petroleum based sprays and waxes on the fruit. The South African Department of Agriculture keeps a database of

chemicals that are rejected by the key markets. Farmers have access to that information year-round.

Second, there is either overuse of acceptable chemicals or non-recognition of the recommended holding periods after the application of the chemicals. This leads to high residue levels. The National Department of Agriculture operates several analytical laboratories, which are used by the exporting farmers and their agents. These are used for chemical residue audits for samples of the plants that are intended for the export market as part of an official regulatory system. According to the department these are intended to:

> support the regulatory system to provide an indication of the levels of chemical residues for compliance with international standards with regard to bilateral agreements between governments and South Africa's commitments to the WTO/SPS agreement. As a member country of the Codex Alimentarius, South Africa is committed to the international standards for protocols and procedures accepted by this organisation. (National Department of Agriculture 2003)

Third, there is the focus on the sanitary and phytosanitary conditions in the farm. All exporting farmers are expected to apply for a phytosanitary field inspection of citrus plants, including propagation materials and plant products that are intended for export. In the application, they need to specify the products that are produced and indicate the country targeted for export. The farmer should attach to the application form a copy of the phytosanitary requirements of the importing country's plant health division (available through the farmers cooperatives across the country). According to a government official this is intended to ensure that the farmer is already familiar with the requirements of the markets that he/she is trying to target.

An inspection is conducted by a representative of the plant health and quality unit of the National Department of Agriculture before harvesting is started. This leads to the issuing of a phytosanitary clearance certificate for the farm, which together with the export permit, allows the farmer's products to be exported.

Further, for each consignment that marketing agents export, they require a phytosanitary certificate which clears the entire consignment. With this application they need to provide information on the disinfectants that were used in the fruit, the date of application, the name of the active ingredient in the chemical, the concentration of the dosage, the duration and the temperature at which the chemicals were applied, and the method of treatment. Attached to the application will be the approved treatment procedures from the importing countries.

Investigations and Sampling

The credibility of any system of inspection is dependent on how tightly it is designed to eliminate loopholes. Two realities confront the designers of any inspection system. First is the reality that the high volume of the products means that not all products can be physically inspected. Second, and related to the first, is how would one go about creating a system that can capture a representative sample of the products that are submitted for inspection.

The APS Act explains the way in which sampling, inspections, investigations, and appeals should be handled. Subsection 12 of the Act proposes ways of ensuring that the samples chosen are representative of the products that are to be exported. Among the key requirements outlined in the act are that at

least 2% of each consignment should be inspected. Further, with each opened box in the consignment, at least 50 oranges should be examined. The maximum number of oranges to be packed in a box is about 50. These guidelines apply to the packhouses where the consignments are smaller and easier to manage.

At the port of exit, the sample must consist of at least 25% or two containers of each consignment, whichever is the greater. The selections are supposed to be taken in such a way that equal quantities are chosen from the front, middle, and back of the container. In this way the belief is that the samples chosen will be representative.

It is important to note that, in this sampling method, the unit that is used as a basis for inspection is not the farm but a consignment of citrus products that have already been approved for export by the farmers' cooperative and the marketing agent. Typically, a consignment will belong to one marketing agent but will represent pooled products from several farmers. It also is important to note that at this point, the inspection service has the power to stop the shipments. This implies that the real power in the administration of the system of standards in the fruit industry lies with the PPECB.

At the packhouse the inspection service is the last stop for the fruit before it is loaded to a truck that takes it to the harbor. In cases where the inspection service finds reason to stop the shipment, the consignment must be reversed and repacked for the local market. This is an involved task as the local market products are packed in bags while the export products are packed in cartons. Repacking one truckload might be a full shift's work, which would be very costly

for the farmers' cooperative. This explains why the cooperative is strict with its own monitoring and inspection systems.

Inspections

Inspections are covered in 11 sub-sections of the Act (from Section 13 to Section 23, inclusive). Each section explains how a particular aspect of the standards is to be inspected. This involves explaining the methods for conducting the inspection and identifying the tools that have been designed to conduct the tests. Furthermore, the sections provide technical information on the actual procedures for conducting all the tests that are necessary. The section covers tests for both the external and internal qualities of the fruit.

Section 13 explains the procedure to be followed in determining the extent of scale in the fruit and the tolerance levels for each class of oranges. Using the size references and the diameter of the fruit as a guide, this section provides details of the tolerances within each class. There is a positive relationship between the size of the orange and the maximum amount of scale per fruit that is tolerated.

Section 14 explains the procedure for determining frost damage, granulation and drying out of the juice vesicles. These three are all administered in one test, which involves cutting the fruit to a given depth and checking the juice sacs. The depths will differ according to the varieties.

Section 15 provides information about the juice requirement. This is the same as the juice requirement discussed earlier. However this section also specifies that once the four tests are completed, the average score will be deemed to be a measurement of the juice requirement.

Further, 66.6% of the working sample must comply with this requirement for the consignment to be approved for export. There is an opportunity for a second sample to be drawn if the first sample does not achieve the objective. After the second sample, the fruit cannot be exported.

Sections 16 to 19 explain the procedures for conducting the tests associated with each of the conditions mentioned above. Section 16 focuses on juice content. Section 17 focuses on total soluble solids content. Section 18 focuses on acid content. Section 19 focuses on the ratio of the total soluble solids content to the acid content. As indicated earlier, Sections 16 to 19 are very technical explaining the nature of the tools that will be used in conducting the tests as well as the methods for conducting the tests, the conditions under which the tests should be conducted, and the role of time in the conduct of the tests.

Section 20 explains the way in which the number of seeds per fruit will be determined, and how to deal with cases where the number of the seeds is higher than the expected threshold. It is important to remember that the navel oranges are marketed as seedless, and therefore, there are no tolerances for seeds in that variety.

Section 21 explains the process of determining the diameter of the fruit. The diameter of the fruit in the consignment shall be determined by measuring the equatorial diameter of all the fruit in the sample. The average diameter will be regarded as a diameter for the entire consignment.

Section 22 covers uniformity of size of the fruit, proposing that the average of both the equatorial and polar diameters need to be measured. The

equatorial diameter is supposed to be larger than the polar diameter. If that is not the case, then the fruit is not "uniform in size."

Section 23 covers general deficiencies, providing the use of sensory means and the color prints to check for any other deficiencies that are not fully covered by the standards.

Appeals

Subsection 4.2 of the act specifies that each exporter requires a license to export his products. This section specifies the conditions under which the license will be granted. Over and above the license that is granted by the Department of Health, which is based on the inspection of sanitary and phytosanitary conditions at the farm, an application needs to be made to the chief executive officer of PPECB by all who want to export their products. The application needs to clearly specify the "chemical remedies that were used during the spray program on the citrus" and the "chemical remedies that were used on the fruit as post harvest treatment." This section makes a provision that chemical remedies cannot exceed the prescribed limits. In cases where the chemical residues are found to be above the required limits, the export license will not be granted for the consignment. Two options are possible, as most of the high chemical residues are a result of an inadequate observation of the holding period, the fruit can be held back until another test has been done to determine the residues. The other alternative is that the consignment may be redirected to the local market. This would involve the repacking of the fruit, which is a very costly exercise. It is important to note that the option of keeping the fruit and storing it until a favorable test is conducted

will be applied only to fruit that would be rejected on the grounds of higher residue levels and not to fruit that does not meet external and internal standards.

Enforcing Standard at the Port of Exit

As outlined in the functions of the PPECB, the activities of the inspection service at the port of exit are twofold. First is the inspection of the products that are to be shipped. This inspection is exactly the same as the inspection that is conducted at the packhouse. The difference is that there are several testing stations, and the samples that are drawn tend to be larger because of the larger quantity of consignments. The real aim of this inspection is to determine the effects of transportation from the packhouse to the harbor because it is not part of the cold chain. From some packhouses, the fruit is transported by unrefrigerated rail trunks to the harbor; from others, as in the case of the farmers who are the subjects of the study, fruit is transported by truck to the harbor. The distance is between four and five hours of truck driving time. On arrival they are not stored in the cool rooms until they it is near time for shipment.

They are inspected around 48 hours before they are shipped and are immediately placed in a controlled temperature environment. It is only at this point that the cold chain begins. This is an important time because it coincides with the confirmation of the loading time from a ship that is on its way to the port. By that time the ship engineer will have received a fax specifying the space needed. Storage rooms need to be pre-cooled to the desired temperature 48 hours before the ship docks.

International Standards

The South African standards for citrus are very silent about international requirements. However, in comparing them with standards of the other countries, one finds many similarities. Also international buyers increasingly are putting pressure on exporters to apply standards that are familiar to the importing countries. In most cases this involves the adoption of standards that require third party certification. PPECB has started a drive to educate the farmers about the significance of obtaining third party certification to facilitate their business with certain countries of the Northern Hemisphere. For example, European buyers increasingly are requesting that the products that they import into Europe be from exporters who have received EUREPGAP Certification. This, in turn, ensures that their products will not be unnecessarily delayed on arrival in Europe. South Africa exports about 67% of its citrus products to the European Union.

PPECB has been accredited as a third party certifier according to the EUREPGAP guidelines. In an attempt to put pressure on farmers to obtain third party certification, PPECB has a list of all the EUREPGAP certified farmers on its website. This serves as an incentive for all the farmers to want to be certified. The European buyers have access to the information and would prefer to do business with those suppliers that have already been certified.

This is an interesting paradox because the EUREPGAP standards are not compulsory nor are they imposed by the buyers, yet, increasingly, the farmers not adopting them are going to be marginalized. It is also important to note that none of the small-scale farmers in the Eastern Cape Region where the study was

conducted have as yet been posted on the PPECB web page as meeting the EUREPGAP standards.

Setting Standards

In our discussion we have identified several types of standards: standards that address the safety of the plants, standards that address food safety concerns, and standards that address consumer preferences. The responsibility for formulating the standards along the lines explained above is distributed among several actors. The Department of Health is responsible for formulating the sanitary and phytosanitary standards for the farms and packhouses. The Department of Agriculture is responsible for formulating standards on plant protection and the storage of chemicals on the farms and in the farmers' cooperative facility. The marketing agents are responsible for formulating standards that directly deal with the market situation to which they find themselves exposed.

Changing International Preferences

Standards should not be viewed as static. They change continuously in response to several developments. In the citrus chain, what appears to drive the process of change are the requirements set by the consuming countries. Sometimes, such changes are clearly communicated, sometimes they are not, and that leads to perceived inefficiencies on the part of the chain. In addition, there also is variation in the application of standards when supplies are short in the consuming countries. In such cases, failures to meet standards may be overlooked. However, in other cases rule violations may be used to drive down the price.

To illustrate the point raised above we can use the reports of rejections and interceptions that were used in the opening chapter. What is not mentioned in the reports on these interceptions and rejections is the fact that in the case of the European Union, the consuming countries unilaterally changed standards without properly advising the exporters. Following on a position adopted by the U.S., (a citrus producing country), not to allow products with traces of CBS, the E.U. decided to follow suit without advance notification. Other markets including Korea followed suit. The EU had been a major importer of South African citrus products even if they have CBS because CBS is not a threat to their agricultural production. There is therefore a political and economic context for the setting of standards.

Conclusion

This chapter set out two objectives. The first objective was to examine systems of enforcing standards within the citrus chain. In this regard I proposed that the enforcement of standards is built into the entire citrus chain. The inputs that are used are subject to approval from the marketing agents and the government. The Departments of Health and Agriculture audit farms. Marketing agents and the officials of the farmers' cooperative monitor the farmers' production practices to ensure that the farmers are following the prescriptions. The marketing agents and the government departments subject packhouses to audits. The products that are exported are inspected by an independent inspection service at the packhouse and at the port of exit. Most of the activities explained above are possible through the application of three operational principles:

unrestricted access, centralized sourcing of inputs, and a well developed tracking system.

The second objective was to provide a summary and interpretation of standards within the citrus chain. In this regard I proposed that standards in the citrus industry can be divided into two broad categories. First, industry standards are set and enforced by the inspection service. They represent the guidelines that are developed by the industry itself. Second, the Plant Health and Protection Unit of the National Department of Agriculture and the Department of Health apply the government standards. These standards focus specifically on the international agreements to which the South African government is a signatory. Government standards are regulations.

Given these observations made above, we decided that standards have now become central tools of regulation. This informed our proposal that standards are used as systems of coordination that define responsibilities and expectations, and also used as measurement of risk. It also explains why we proposed that the consideration of standards is at the forefront for all the actors and why they need to be constantly conscious of such standards. The citrus chain is very tightly regulated and standards play a central role in the regulatory processes. The next chapter examines aspects of small scale farming that impact on farmers' abilities to meet standards.

CHAPTER 7

Aspects of Small-Scale Citrus Farming and Implications for Standards

Introduction

In chapter 6 we outlined how tightly regulated the global citrus chain is. We proposed that the enforcement of standards is built into the entire chain. In this chapter we identify some aspects of small scale citrus farming that we believe, have a negative impact on the farmers' abilities to meet the standards. Five major arguments will be advanced: First, the chapter examines land tenure and its implications for meeting standards. The principal argument is that the uncertainty associated with the current status of ownership among the small-scale citrus producers affects their investment decisions on the farms. This in turn undermines their ability to meet some of the external quality standards that are set by the industry.

Second, citrus production is a technically complex undertaking. Citrus is subject to several diseases, and it is in attempting to control the diseases that some farmers may violate the standards. In South Africa, the industry is dependent on heavy chemical usage, and farmers need to understand what is and what is not acceptable.

Third, standards are a cost to the farmer. For small-scale farmers, there is constant need to minimize such costs. Sometimes the cost considerations will override the concerns for meeting the standards.

Fourth, science is central in all the activities of the farmers. Farmers realize their dependence on science but are concerned by the fact that they have no access

to ownership of the scientific knowledge that they fund through the levies that they pay. Products developed through the research funded through the farmers' levies is protected by patent laws and they have to pay to access it. Fifth, most actors do not recognize labor standards without any negative sanction from the chain. The first four points lead to a situation where the farmers construct their own meaning of standards, which is in line with what they can afford to do.

Land Tenure

The key questions to be answered in this section are: what are the types of land tenure practiced in this region. Second, what are the implications of the tenure system for standards?

According to Moore (1995), tenure status is an important dimension indicating the social relations governing the use and output of accessible land. Some of the terms used by the participants to explain the system of tenure were: unsure, incomplete, unfinished, rent to own, expensive, overstretching, and huge debt. There is a sense of uncertainty in their ownership of the farms. The government has not as yet taken a firm decision on their fate.

There was a general sense of discomfort and anger among the farmers as they were asked about their tenure status. All the small-scale operations were previously owned by the state and operated by a parastatal. Currently, they are in the process of being privatized but the terms of such privatization have not as yet been finalized. Consequently the current farmers are all tenants. The rental arrangement that the farmers entered into with the previous government is called "Lease to Own," a contract in which a portion of the rent over the years

contributes to the payment of the actual price of each farm. The present government has not been willing to accept that arrangement, and it appears that the discussions have deadlocked.

At the beginning of the study, most of the farmers identified themselves as full time farmers. As the study neared the end, most had taken up other income-generating ventures including full-time jobs. The reality of full-time farming has forced them to look for alternative forms of income to subsidize their farming activities.

Deciding to become full-time farmers was a strategic option most farmers took so that the government could view their position as farmers favorably and thereby offer concessions in the rental rates or the purchase price. The government had adopted a policy to extend rights to individuals to whom ownership previously was denied.

In addition, the "ownership" status of the current tenants is challenged and undermined by the communities where the farms are located. This followed an earlier government proposal that the former state farms should be made into community farms and run by former employees instead of being sold to private individuals. However, after a farm that had been transferred to the local community completely stopped production in about two seasons, the government changed its policy.

What also makes the ownership patterns of the farms complicated is that most of the farms have a very high debt resulting from the period when the parastatal was liquidated without formally passing ownership to other people and without

necessarily stopping production. The current tenants do not want to take the responsibility for that debt, and even if the farms were sold, those debts would not be recoverable.

The problem of an unclear tenure system needs to be understood within the broader land reform challenges that face South Africa and other developing countries of the world, especially those that have recently gained their independence or attained majority rule.

Locating the Citrus Land Tenure within the Land Reform Process

According to Janvry (1981) literature on land reform is anchored in an agreement reached in 1979 by major governments which states that equitable distribution and efficient use of land are indispensable for rural development, for mobilization of human resources and for increased production for the alleviation of poverty. Janvry's observation is that regardless of this agreement, land distribution remains very skewed in favor of specific groups, especially in South Africa. Even in cases where there have been attempts to initiate land reform, not much has been achieved because policies that are proposed normally represent what he calls an "institutional innovation by the ruling order in an attempt to overcome economic or political contradictions without changing the dominant social relations" (Janvry 1981:264).

Deininger and Feder (1999) have observed that the persistence of the skewed distribution is likely to lead to social unrest and violence. They believe that land reform needs to be addressed seriously by all involved. Meaningful land reform can play a political function in trying to defuse unstable political systems.

Deininger and Feder have examined the challenges that need to be overcome by developing countries to effect meaningful land reform. They believe that there should be a clear definition of the meaning of property rights if land reform is to be meaningful and to lead to stability. For the authors, secure property rights will encourage investments and reward effort. Secure tenure increases incentives to supply labor, increases the supply of formal credit, and it makes it easier to transfer the land to more efficient users.

One of the key actors in the land reform debate has been the World Bank. Its position is that land reform needs to be based on some application of market forces to achieve the desired developmental effects. Such methods can be more effective in cases where there had been unequal access to land before as in the case of South Africa. Supporters of this method believe that it has the capacity to activate the market to create a suitable environment for the transfer of property from large farms for the creation of small sustainable farms.

The key to the success of this method is that those who are supposed to benefit from the reform process receive a combination of grants and loans from the public sector that they use to buy land from willing sellers.

The idea is for the market to be assisted by creating possibilities for effective demand among those sections of the community that otherwise would be unable to afford land purchases. For these policies to be effective, however, there should be a removal of policies that create incentives for individuals to hold on to land for reasons other than its productive use. That is referred to as the "correction of the supply forces."

Market assisted land reform therefore refers to a system of land reform in which the state intentionally manipulates both forces of supply and demand to create a market that is based on principles of equity (World Bank 2000).

Prosterman and Hanshed (1995) assert that meaningful land reform has the capacity to improve overall economic activity by even creating non-agricultural jobs. This is the case because a dynamic agriculture is capable of creating backward and forward linkages for broader development. However, with tenant farmers, such as those in this study, there generally is no incentive to invest in infrastructure and general improvement of the farms because of the lack of security of tenure.

Land Reform in South Africa

Several factors guide the land reform process in South Africa. For Deninger and May (2000), the key factors informing policy formulation are the fact that in the past there has been an unequal access to land that was well-orchestrated by the state through its policy of apartheid. Second is the fact that there has been heavy investment in capital items, which are geared toward servicing large commercial farms even though there is an abundance of labor in the rural areas.

Deininger and May believe that the South African government is using a land reform system that is based on both principles of equity and efficiency to encourage sustainable growth. Equity here refers to providing opportunities for those who would otherwise not be able to access land in an open market. Efficiency on the other hand refers to designing methods that will ensure that land is in the hands of those who are both capable and willing to use it productively.

The South African case shows the example of the implementation of a market-assisted, demand-based system of land allocation in which the state gives grants to land seekers that they have to use towards the purchase of land. The actual negotiations on purchasing price and other related matters are left to the buyers and sellers. There is no attempt by the state to expropriate land from the current owners for sale to or direct transfer to the landless groups. That point is significant for increasing the level of economic confidence in the South African economy.

In addressing the land allocation problems in South Africa, Deininger and May propose that there are some practical issues that require consideration. Key among such issues are the following:

Levels of Poverty

There are currently unacceptably high rates of poverty in most rural areas in the country with the Eastern Cape being among the leaders. The current levels of economic growth have not led to the absorption of most of the employable members of community. Given this fact, land allocation is viewed as being linked to poverty alleviation.

High Food Prices

The other major point to consider is that, given the current structure of agriculture, the prices of food are generally high. It can be estimated that the average middle class family spends between 30 and 40% of its disposable income on food. This is the result of the fact that agricultural production has

adopted capital-intensive methods instead of employment generation for the unemployed.

Land reform, therefore, needs to be linked to the wider process of agricultural transformation, which would include the adoption of efficient production methods leading to the lowering of food prices and thus creating opportunities for other investment.

Uneven Wealth Distribution

With the current trends in property ownership, there has been an uneven distribution of wealth with the result that wealth coincides largely with race. People of European descent own a significant portion of the wealth of the country. Similarly, people of African descent dominate the lowest level of the wealth scale. Land reform needs to address the question of choice between the extension of the African peasant agriculture and a creation of an African commercial farming class with links to the agribusiness of the country (Deininger and May 2000).

There are three broad areas of land reform on which the South African government currently is working. First is the restitution of land to communities that were forcibly removed from their areas. Such people were displaced from the communities of which they were part because of racial seclusion. Second, is the question of providing opportunities for the landless to purchase land through a system that has been described above. Third, there also are moves to sell off land that is owned by the state. This involves land that was owned by the several parastatal organizations. This scheme seems to make more land available for

those who want to buy, but also it would generate revenue to finance the government's social programs.

Citrus Farmers and Land Reform

The group of farmers in this study believe themselves to be productive African farmers who need to be targets of state land transfers and other forms of restitutive redistribution. They regard themselves as belonging to the segment of the South African population that over time has been systematically denied meaningful access to productive land because of race.

These farmers believe that their operations have the capacity to stabilize the rural sector in the region, which has high levels of unemployment. The employment opportunities that are likely to result from their commercial farms are believed to lead to some sustainable poverty reduction in the region. They also believe that their request is in line with the principles of the Reconstruction and Development Program (RDP) of promoting a fundamental transformation of the social, economic, and moral foundation of South African society. Under that program, the rebuilding of the country would involve the granting of opportunities to those who were denied such opportunities before. They are pushing for secure property rights under the RDP as opposed to tenant rights that they currently enjoy. As Prosterman and Hanstad (1995) have proposed, this might lead to a healthy diversified rural economy and active markets. One of the requirements for full participation in such an economy and markets is secure land tenure.

Implications of the System of Tenure for Standards within the Citrus Sector

The unclear tenure status of the farms affects the farmers' abilities to meet standards in three major ways. First, they find it difficult to commit to further investment on the farms to enhance their productivity. Key among such investment decisions is the question of investing in protective technology. Two basic forms of technology that are lacking on most farms are fencing that would prevent unsupervised access of animals to the farms and wind-breakers to protect the fruit from wind damage. Both technologies would require an injection of some capital. Without clarity of ownership status this is difficult to do. This in turn leads to higher rejections rates because of damaged fruit.

Second, the farmers are not able to use the local banks to raise loans for any of the activities that they want to do on their farms because they are unable to use the land as collateral. Third, most of the trees in the farms are very old, and there is a need to start replanting to keep production stable. As will be shown by the table below, most farms have huge areas that are not in productive use, and, even on those that are currently used, the trees are already in a downward spiral because of their age.

The table below illustrates the proportion of land that the farmers are currently using productively on their farms:

Table 3: Productive Land Usage by Small-scale farmers on the 27 Citrus Farms Studied, 2000.

Farm sizes	Total number farms	Total land in hectares	Area used in hectares	Proportion of land used	Proportion of land unused
20 hectare	9	180	91.5	0.51	0.49
22 hectare	2	44	24	0.54	0.46
23 hectare	1	23	15	0.66	0.34
25 hectare	10	250	138	0.56	0.44
27 hectare	5	135	101	0.75	0.25

From the table above one can see that there are vast areas of land that are not in productive use. This affects the profitability of the farms. In the same area, it was interesting to note the difference between the small-scale operations and the well-established commercial farms, especially in terms of investment decisions to improve the quality of their products.

Production Practices

The questions to answer in this section are: what production practices are followed by the farmers and how are the practices influenced by the standards? According to Moore (1995), understanding production processes includes understanding the land use patterns and the objectives for production. For Friedland (1984) production practices explain the techniques that are used in production. They address "the distinctive characteristics of each commodity, their problems, diseases, and control processes." To this Staatz (1997) adds that it is crucial to understand what the activities are, who the actors are, and what rules govern both the activities and actors.

Some of the terms that were used by farmers to explain their production practices included the following: commercial, small scale, rules, government inspectors, agents, expensive, chemicals, and soil quality.

The practices followed by the farmers are the same in theory and they are in line with what they regard as good practice. They believe that such practices are reinforced by the advice that they receive from the technical divisions of both the farmers' cooperative and the marketing agents. In reality, however, each farmer has his own interpretation of the guidelines. To a large extent such interpretation seemed to be influenced by the farmer's material resources. Most seem to want to do the absolute minimum to reduce their production costs but at the same time claim to be following the guidelines. All the farmers were concerned about their products access to the international markets.

Characteristics of Citrus

Citrus requires subtropical conditions to grow. The summers should be warm to hot, and winters should be mild (SANDA). In order for a citrus producing area to be established, there is a need for a reliable supply of water. All citrus-producing areas in South Africa are located in areas where there are well-developed irrigation schemes. Two irrigation schemes service the areas that are part of the study. Kat River services the Fort Beaufort side, and Thyume River services the Alice side. During the transitional period, water is available at a flat rate that is linked to the size of the farm until a proper accounting system is developed.

If all farmers are exposed to similar climatic conditions and have similar access to irrigation water, variations in the quality of their products can be viewed as a function of each farmer's production techniques.

The central activities on each farm center on ensuring that the trees and the soil are operating at optimum level. To achieve such objectives, the farmers have developed soil and tree management techniques on the one side and pest control mechanisms on the other.

Soil and Tree Management

Effective production requires regular soil tests. These are chemical tests designed to measure the nutrients available in the soil. From the tests, the farmers will be informed of what is lacking in their land, and they can plan to improve it accordingly. According to the farmers, soil fertility is improved through the use of nitrogenous fertilizers. Ground applications that are common include ammonium nitrate, which is used for the matured trees, lime with ammonium nitrate, which is used for the young trees, potassium chloride and nitrate which are used to improve the size of the fruit.

Several sprays are used including potassium nitrate, manganese nitrate, zinc, soluble oil spray, and manganese. Both sprays and ground applications can come in different brand names but contain the same chemicals.

Problems of Diseases and Pests

The management of pests and diseases are crucial for successful citrus farming. Most controversies in international trade have to do with the ways in

which diseases and pests are handled by exporting countries. The international guideline is that pests and plant diseases should not be exported to other countries. If there is evidence that the fruit contains pests or diseases that becomes a basis for rejecting the product in international markets. The argument is that the importing countries need to be conscious of what they introduce to their countries. If they import fruit containing a prohibited pest or a new disease, in the long run such pest or diseases will affect their own agricultural activities.

However, if the fruit to be imported contains pests or plant diseases that already are present in the importing country, the rule cannot be used to justify the rejection of imports. Instead, in such cases rejections are viewed as protectionism. The rules provide for quarantine only in cases where there are no traces of the pests or diseases in question.

The table below lists the diseases that are common in the South African citrus industry which are reason for concern for South Africa's trading partners. The impact of these diseases is different and is dependent on whether a country is a citrus producing country or not. Countries that do not produce citrus can have higher tolerances than countries that produce citrus.

Table 4: Summary of Common Diseases in South African Citrus

Disease	Cause	Effect	Remedy	Risk
Citrus Black Spot	Pests	Back spots on the fruit	Fungicides	Very high
Mealy Bug	Pests	Extracts plant sap	IPM – Ladybirds and Beetles	High
South African Citrus Thrips	Insects	Destroys leaves and the stem	Sprays and scouting. Tree destruction	Very high
Root Rot	Unhealthy soil surface	Reduces plant productivity	Very difficult to control once it starts	Very High
Citrus Greening	Pests	Will wipeout orchards		
Scale	Pests, dust and wind	Cosmetic damage on the skin	Windbreakers Petroleum based sprays	Low

Further, the handling of diseases and pests and the interpretation of their nature and impact provide an interesting account of how science is used in international trade to justify certain positions and interests. This point is taken up in the next chapter in the discussion of science as a basis for standards.

For a citrus farmer to be successful, he/she needs to be able to understand how to handle the diseases and pests that are listed in the table. Also there is a need to know when to intervene to target or prevent attacks from such diseases or pests.

Most of the diseases that attack the citrus trees often will appear on the skin of the fruit. As they damage the skin, they are referred to as blemishes. Blemishes are regarded as signs of poor cosmetic fruit quality. The larger the blemish, the lower the quality rating of the fruit. Some of the diseases require

complete quarantine of some products as they may spread quickly and affect others. Sometimes quarantine might be limited to products from the orchard where the fruit containing the contagious disease was harvested. Sometimes it might be extended to include all the orchards on a specific farm. It might also be extended to include all the fruit packed in a particular packshed. In international markets, the most extreme case is the quarantine of the products from a particular country.

The theory behind the quarantine system is that it is safer to isolate the source of the problem to be able to deal with it meaningfully. If the source is not fully isolated, there is a threat that the problem might be introduced to other orchards leading to serious problems.

The normal procedure is that for common diseases, careful management is expected. In such cases, there is no need to quarantine the fruit. Such fruit might be allowed in international markets with a low threshold of tolerances.

Diseases in Perspective

It is clear from the outline above that citrus farming is very complex because the actors need to deal with several diseases-causing pests. Second, because of the nature of the pests that affect citrus, the industry is heavily dependent on the chemical industry for effective sprays to manage the pests. It is in trying to manage the pests or in trying to reduce production costs that problems occur. Some chemicals may not be acceptable, and limited usage may not achieve the required results.

Moving Toward Integrated Pest Management (IPM)

As a step toward IPM, farmers are encouraged to set traps that will determine the frequency of the pest in question instead of routinely spraying the plants. If a given threshold is exceeded, they would be expected to spray, but if it is not reached there might be no need for using sprays. For example, in the case of the fruit fly, in the last few weeks before harvest, one trap is set to cover about one hectare of the farm. The traps are checked after seven days, and a threshold is set at two fruit flies per trap. In most cases that threshold is exceeded but in isolated cases it is not.

This system has its own advantages and disadvantages. The major advantage is that it represents a significant shift away from chemical dependence by the industry. Small-scale farmers view this enthusiastically as a way of reducing costs. In spite of the enthusiasm, even in cases where the threshold was reached, there was reluctance to act, especially if the excess was viewed as minor.

The Costs of Production Practices

The production practices outlined above represent common points of agreement among the farmers. They are not necessarily applied uniformly on all the farms. Costs seem to be a prohibiting factor for most farmers. Most farmers will ignore some applications because of financial constraints.

To address this problem, one of the marketing agents is willing to offer advances to some farmers for the purchase of the inputs in exchange for guarantees that the company would be the appointed marketing agent. Such advances are not paid directly to the farmers but are channeled through the farmers' cooperative and reach the farmer as required inputs.

It was clear from the observations and from the discussions that proper tree and soil management will depend largely accurate assessment and timely interventions on the part of the farmer. They also depend on the types and quantities of chemicals that are used. At some points, needed interventions by the farmers will coincide with periods when the farmers do not have the necessary capital to make the necessary interventions. Sometimes the interventions will be too costly for the farmer. In some cases the interventions will be too late to have the desired effects on the quality of the products.

Further, there were inconsistencies between what the farmers said they did and what they were observed doing. While the farmers would better understand the measurements, it looked like the major concern that they had in the application of the inputs was costs. The general practice appeared to be to apply the minimum possible inputs so that their use can be extended to larger areas. Sometimes the system worked for the farmers, but sometimes serious problems occur. As indicated above, especially with fruit flies, there was reluctance to apply chemicals just before harvest for fear of having to delay the harvest to observe the holding period. Consequently, some farmers harvested without spraying for fruit flies even though the thresholds in the traps had been exceeded.

The growing activities and pest control need to follow a systematic plan to ensure that certain threats are dealt with at the right time for the fruit to be of acceptable quality. The table below has been developed to explain the timing of important activities in which citrus farmers must engage in for their fruit to be

ready in time for the harvesting season. While there may be slight variations to the plan, most farmers try to schedule their activities in similar ways.

Table 5 Summary of Annual Cycle of Small-scale Citrus Farm Activities in the Area studied, Eastern Cape, South Africa.

July	Harvest
August	Plant Pruning, application of pesticide in the line of the previous year' harvest – red-scale, Australian Bug, Mealy Bug. Need to check the latest exclusions
September	Soil and tree tests, Root cleaning with chemicals, apply nutrients according to the laboratory results, apply herbicide. Irrigate 14 to 21 day intervals
October	Intensive irrigation, Herbicides, THRIPS baiting
November	Intensive irrigation, Herbicides, THRIPS baiting, natural thinning process (culling). New fruit appears. 7 day irrigation system
December	Intensive irrigation, Herbicides, THRIPS baiting, natural thinning process (culling). New fruit appears. 7 day irrigation system
January	Monitor Fruit size, apply herbicides
February	Monitor Fruit size, Bait for fruit fly
March	Monitor Fruit size, Bait for fruit fly
April	Monitor Fruit size, Bait for fruit fly
May	Harvest
June	Harvest

The Role of Science in the Productive Activities

Examining the role of science in the productive activities raises several important issues. First is how scientific knowledge informs the activities of the farmers. For Friedland (1984), agriculture provides an opportunity for the development and application of a scientific knowledge base. Second, and linked to the first point, is the understanding of a network of relations that organize the process of the production of scientific knowledge. In the United States this involves understanding the complex relationships that exist between educational institutions, the government, and industry. For Busch (1990), science and

technology have the additional function of structuring the commodity chain and determining who may or may not participate in it.

There have been observations that science has been central in the transformation of traditional agriculture to modern commercial agriculture. Applying science to all aspects of production has created opportunities for the mass production of uniform goods around the world. This depended on following standardized production methods, which were deemed to be "scientifically tested." This has set the scene for global trade in which the transnational corporations who possess a monopoly over the scientific knowledge have become dominant. Such corporations use their monopoly power to control the supply chains in their favor. They present the knowledge as packages generally referred to as "knowledge systems," which by their very nature undermine local knowledge. The key challenge in this type of a system is to develop standardized production practices that would guarantee that "the science" works. Such practices might be developed into standards that focus on the process to achieve the required product.

Busch et al. (1989) have taken the role of science in food production further. They have extended it to include studies of the character of technical change. Their aim is to correct two misconceptions about technical innovation. First is the misconception that science is generally neutral, and, therefore, technological change in the food production system is also neutral. For Busch et al. this view has guided the operation of scientific institutions in Western

countries. It calls for the public funding of technical innovation because the supporters believe that the ultimate beneficiary would be the consumer.

Second is the idea that there is a link between economics and technological change. This has come to be known as the "technological determinist school." It seeks to examine economic conditions that make technological change necessary.

Using the case of recent developments in biotechnology and changes that took place in the beef industry early in the previous century, Busch et al. develop an argument to the effect that technological change needs to be understood within the historical and social forces that are responsible for producing it. This means that science, and specifically, technological change are dependent on societal arrangements and do not benefit everyone in the same manner. The evolution and adoption of science is linked to the satisfaction of the economic interests of the dominant groups. The extension of the food production and distribution process represents attempts to redistribute the benefits from the production process in a way that will favor the economically-dominant class or corporate capital.

The small-scale farmers that are the subject of this study used the following terms to explain the role of science in their operations: necessary, reliable, effective, expensive, cannot experiment, not local, control, and cannot fund.

Most farmers were aware of the fact that science was necessary for effective commercial farming. They noted that it is through science that their activities are reliable. They know that if they apply certain inputs as

recommended, they would get the stated results. This for them was very important in keeping them competitive.

They also noted that science tended to tie them to the group, in this case the farmers' cooperative. The cooperative is able to negotiate better prices when it buys in bulk. Also the cooperative employs scientists who can be of assistance when there are production-related problems.

The dependence on science as the major source of inputs makes farming very expensive. Consequently, farmers are unable to experiment with new ways of doing things. They believe that they might either fail or produce products that would not be acceptable to the international markets. In the light of this observation they indicated that science has become a tool of control. Science prescribes their activities and has devised systems of monitoring their activities.

Farmers were quite aware of the fact that they are unable to make any contribution to the development of scientific knowledge. They realize that they are not big enough as a unit to fund research that could look into alternative farming techniques that would reduce dependence on expensive science. Some were aware of the fact that they are making financial contributions through the levy that they pay for research into citrus problems. However, when there is a recommendation from the research unit, it always proposes the use of new and expensive chemicals. In spite of their contribution for the research, some company ends up "owning" the knowledge that is produced. They could not understand how the system of patents could pass knowledge produced from

research that they had funded to private companies that produce expensive chemicals.

This problem is not unique to South Africa and is not limited to small-scale producers. Apple (1989) has provided an enlightening account of the issues that are involved in patenting the outcome of public funded research. Using the pioneering case of the University of Wisconsin Alumni Research Foundation (WARF) and Steenbock's patents, he raises opposing ideas on the idea of private patents.

He observes that at that early time (around the 1920s) scholars who were opposed to the idea insisted that inventions resulting from public funded research should be public property and should be available without restriction. The benefits should be for everyone and the inventions should not lead to pecuniary benefits for some private companies. Those who were supportive, including Steenbock, raised the issue of the control of the inventions to ensure that ethical use could be guarded.

Apple notes that the intellectual debate on these two positions has not been resolved. However, the financial constraints facing higher education around the world had made the issuing of patents more of a norm than an exception.

Labor as a Factor of Production

While international conventions refer to stringent labor standards for the countries that produce for global markets, in this study there was no direct relationship identified between labor standards and acceptance of farmers'

products. For example, while the standards are quite clear about the use of child labor, working conditions, and minimum wage levels, very few, if any, of the farmers observed those.

All farmers are quite aware of all the regulations. They know that the workers are entitled to representation, minimum wage levels set by the government, and decent working conditions. They indicated, however, that the scale of their operations is small. If they were to observe some of the regulations, they could go out of business. Further, they argue that they compare favorably with the established commercial farmers, who have not been able to meet the requirements either. Recently, there have been many reports on the use of child labor in South African farms. It is not yet clear whether any system of negative sanction has been developed to address the concerns.

Conclusion

The purpose of this chapter was to explain the challenges associated with small-scale citrus production. Guided by Friedland's organizing principles for commodity systems studies, we examined the nature of land ownership, production practices, the role of science in productive activities, and labor as a factor of production.

Five major arguments were advanced in this chapter. First, the uncertainty associated with the current status of ownership among the small-scale citrus producers affects their investment decisions on the farms. This in turn undermines their ability to meet some of the external quality standards that are set by the industry.

Second, commercial citrus production is a very technically complex undertaking. Citrus is subject to several diseases, and it is in trying to control the diseases that some farmers violate the standards. The industry is dependent on heavy chemical usage. Farmers need to understand what is acceptable and what is not acceptable.

Third, standards are a cost to the farmer. For small-scale farmers, there is a constant need to try to minimize such costs. Sometimes the cost considerations will override the concerns for meeting the standards.

Fourth, science is central in all the activities of the farmers. Farmers realize their dependence on science, but are concerned by the fact that they have no ownership or control of the results of the scientific knowledge that they fund through the levies they pay.

Fifth, most actors do not observe the labor standards and there are no negative sanctions for that. Farmers seem to be aware of what the regulations are. However it they do not seem to take such regulations seriously as they claim that even well established commercial farmers do not pay attention to the labor standards.

The observations outlined above, explain the proposal that farmers construct their own meaning of what the standards are and, such meaning is informed largely by what they can afford. Whereas the focus of this chapter was to identify some aspects of small scale citrus farming that have a negative impact on the farmers' abilities to meet the standards, chapter 8 will examine the way the

citrus chain is structured to see how it impacts on the activities of the small-scale producers.

CHAPTER 8

Issues in the Citrus Trade

Introduction

In chapter 7 I provided an overview of the challenges that face small-scale citrus producers. I argued that their small-scale status has a negative impact on their ability to meet the set standards. In this chapter I identify issues relating to the way the citrus chain is structured, which, I believe, impact negatively on small-scale operations.

First, I propose that there is a peculiar way in which risk is distributed in the citrus chain and other fresh fruit chains. I argue that in the South African case, this peculiar way can be explained in terms of the evolution of the marketing function. Second, I observe that the way in which the chain is currently structured reduces the shelf-life of the farmers' products. Third, I argue that while diseases continue to be a major problem for the industry, it is difficult to understand interpretation of their impact, as all explanations seem to want to justify certain positions. Fourth, I argue that the large number of marketing agents operating within the chain is to the disadvantage of the farmers. Finally, I argue that recent improvements in refrigeration technology are leading to the adoption of protectionist principles and to a redefinition of what "fresh" means.

Critical Standards Points and the Distribution of Risk

The philosophy behind commodity chains is that each actor requires the products that are produced by other actors upstream as inputs for his/her products. In turn, other actors need his/her products as inputs. What is more important about

chains in this regard is the fact that each actor buys the inputs from the other actors, adds value to such products, and then sells the products to the next actor.

The central issue in the series of transactions explained above is that ownership is passed from one actor to the next. As ownership is passed, several actors along the chain share the risks associated with commodity production and distribution.

In this system, one can observe that standards become time and place specific. The buyer evaluates the produce at the time and place of purchase. All actors become custodians of the set standards and are active in enforcing them, and purchasers satisfy themselves that the products meet the standards. There is a sense in which the purchasers take ownership of the standards so that products need to meet "their" standards. In that case purchases are for the products in their current state without further promises about their future. Busch has used the concept "critical standards points" to explain the role played by standards in traditional commodity chains. Critical standards points are the points of negotiation about the products that are about to change ownership. The seller wants to convince the buyer that the products meet the standards while the buyer wants to satisfy himself/herself that the products are indeed of the quality that are claimed. This negotiation is important because it has implications for the distribution of risk. Once the products exchange hands, the risk about their state is passed on to the next actor, even though the transactions are done in good faith.

The citrus chain and other fresh fruit chains are organized in such a way that ownership does not pass from one actor to the next as the products move

along the chain (Rabobank 1990, Murray 1995). Similarly, not all the actors along the chain share the risk. It is all borne by the farmer until the products are sold to a wholesaler or retailer. Consequently, in the event of spoilage, regardless of the cause, the farmer is the big loser.

Further, there are only two critical standards points that play an even more crucial role for continued international trade. These points are the determination of exportability by the inspection service in the country and the determination of acceptability by the importing country. As indicated before, in international trade, standards are negotiated by trading countries and are applied at ports of entry for imported goods.

The Distribution of Risk in South African Fresh Produce Markets

In South Africa, the nature of the distribution of risk among actors in the fresh produce commodity chains can be linked to the evolution of the marketing function within the fruit and vegetable sector and the operation of fresh produce markets in the country.

The marketing function evolved originally from the activities of relatives and friends, where the one who had a truck would be willing to transport the goods of the neighbors, friends, and relatives to the fresh produce market for sale. In this arrangement, it was not possible to purchase the products of the other farmers beforehand because there was no guarantee that they would be sold in the fresh produce market. Further, since the farmers and the distributors or marketers were very close in familial or ethnic identity, the personal relationship between them implied that the relationship would be built on principles of trust. While

there were payments for the services rendered in the form of transportation and selling, such payments would only be due after the sales were effected.

This suggests therefore that the farmer held the ownership of the fresh produce until the products were sold. In cases where such produce was not sold, or in cases where there was spoilage, the farmer would be the major loser. The distributor and marketer might lose too, but such losses would be commissions, which would be far less than the costs of the production inputs that the farmer would have lost.

In South African fresh produce markets, farmers bring their products to be sold by their appointed agents. If the products are sold, the farmer receives payment, the agents get commission, and the local authority that runs the market charges a levy. In cases where the products are not sold, no one receives any payment. In that case the farmer is the loser in terms of the input costs and labor time.

This principle has not changed significantly in spite of the professionalization of the distribution and marketing functions. Further, it has not changed whether the products are intended for the local or international markets. Risks are not equally distributed among all actors in the chain. This suggests that in both local and international markets, the scales are tilted against the farmers.

Shelf Life

What is the shelf life of an orange after it has been harvested? An examination of the life of an orange as it passes from one actor to another raises important questions about the considerations of shelf life of the products, between

the time they are harvested and the time they are consumed. It also leads one to enquire about the nature of cold chain management in the citrus chain and its implications for meeting or not meeting the standards.

It takes more than one day for oranges that have been harvested for the external treatment to start. After cleaning and packaging, the oranges spend about 4 hours on an un-refrigerated truck to the port of exit. The cooling process starts about 48 hours before the planned shipment. By that time, up to seven days may have lapsed since the harvesting of the fruit. Further, on average, the oranges will spend about 14 days at sea, under controlled temperature before they reach the importing country. (Oranges coming to the U.S. spend 17 days at sea.) The external applications are supposed to control the external decay of the product. The cold chain is supposed to prevent internal deterioration of the product.
In other sectors of the fresh produce markets, the requirements are very different. In the case of fresh vegetables, the recommendation is that the products need to be in the cold chain within one hour of harvest. Experts in this area argue that for each hour that a harvested product spends outside the cold chain, it loses one day of shelf life. From the interaction with farmers in this project, it emerged that the possibilities for spoilage often will lead to significant price reductions as the agents are under pressure to sell.

Diseases

Earlier we addressed the role of standards in controlling the spread of disease among trading countries. We highlighted the significance of the role played by the plant protection unit of the National Department of Agriculture. The

incorporation of issues relating to disease and safety in agricultural standards continues to be of significance in international trade. All countries generally want to protect their countries from deadly foreign pathogens, and most will guard jealously the control of what can or cannot be imported.

There are two categories of plant diseases. First are diseases that can be categorized as low risk. These would be common in most countries that produce a particular product. In international trade, the products containing traces of such diseases cannot be completely banned by the importing countries. What would be crucial would be the level of tolerance that the importing countries set. Second are diseases that are regarded as high risk. These may be peculiar to specific countries and may not have spread to all the countries that produce the products normally host to such diseases. In cases where products are infected with such high-risk disease, the importing countries will quarantine the products and reject them. Such products would likely go to waste, because their shelf life would be significantly reduced.

The handling of this second type of diseases has led to several debates about the role of science in the formulation and application of standards. I will use the case of citrus black spot (CBS) that we explained in the previous chapters. I argued earlier that CBS is a deadly disease for the citrus products and that once orchards are infested with it, it is very costly to manage it. Farmers are often advised to take the preventive steps instead of hoping to manage. According to South African scientists, CBS will survive only under specific environmental conditions. Infection occurs during the wet periods when there have been about

15 hours of sunlight with an average temperature of 25^0C. This is possible only in areas that have summer rainfall. Further, CBS will not stand the very cold temperatures associated with countries that are not in the tropics. In spite of these observations countries outside the tropics, particularly the U.S. will not accept products that are infected with CBS. Recently the European Union has given notice that it will reject CBS as well. Commentators on the industry believe these countries are using standards to protect local producers from foreign competition (Mather 2000). This issue is addresses up in the next section on the role of science in standard-setting. Issues relating to the management of disease continue to be a source of major debates on the fairness and accuracy of the standards that are designed to regulate the citrus industry.

The Number of Marketing Agents

One of the major changes that happened in South Africa with the revision of the Agricultural Marketing Act was that the monopoly enjoyed by the single channel marketing company in the country was ended, and the field was opened for other players. This resulted in two major developments. First, it attracted established multinational corporations to participate in the marketing of fresh fruit and vegetables from the country. It also allowed for new blood to enter the business, specifically from groups that were not happy with the way the dominant marketing agent was conducting its business. Mather (1999) has proposed that within a space of a few years, the number of marketing agents operating in the citrus sector in South Africa had increased from one to more than 40. Farmers

now can choose with which agents they want to work, depending on the terms that they are able to negotiate.

Farmers have expressed a concern that the availability of several agents may be to their own disadvantage because in some cases, their products end up competing with products of their fellow farmers or with products of the same farmer handled by different marketing agents. They propose that the single channel-system was advantageous in this regard in that such possibilities did not exist.

This is further complicated by the fact that most of the citrus products from South Africa are sold in spot markets and are not part of forward contracting with the retail chains. The roles of the marketing agents and the brokers have become very important in this situation. The marketing agents will source from several farmers in several regions in South Africa to achieve the volume that is needed in international markets. The brokers will also source from several agents operating in several countries. According to the marketing agents, it is the ability to anticipate economic elasticity movements that will distinguish a good broker and marketing agent from an inexperienced one. The profit margins for both the agents and the brokers are dependent on understanding how the system works. It also is important to understand that the system is designed in such a way that there is no security for any of the participants. Business is conducted on principles of goodwill and in the hope of creating long-lasting associations. These two principles imply that the actors within a chain will be interested in ensuring that their reputation with other members is not spoiled.

Farmers indicated that every other year there would be what they referred to as the "fly by night" agents who will try to get business even though no one knows about their activities. In the past such agents had succeeded in taking a few farmers' products but then not to be seen again.

Improved Technology

A key question that must be answered in trading in fresh fruit is what is the meaning of "fresh." Earlier we indicated that global trade in fresh fruits and vegetables was initiated largely because of the emergence of a wealthy and health-conscious class in the developed societies who sought to have access to these items throughout the year, irrespective of whether they were in season or not. More important is that they were willing to pay the higher price associated with the transportation of such products from the countries of origin to their countries. This changed food availability around the world as seasonality of most fruit and vegetables was completely undermined. Friedland (1984) has observed that in the United States, this process started with the importation of table grapes from Chile in winter.

International trade in fresh fruits and vegetables would essentially benefit the countries that had a counterseasonal advantage with most of the developing countries. It started with products that were also produced by the countries in question but has now moved to include what were previously regarded as exotics. As an outcome of these new markets, most fruit and vegetable exporting countries invested in infrastructure to take full advantage of the new opportunities.

Production targets were increased, and strict standards were developed to ensure that there was enough market penetration. Dependency on the export market was the unintended outcome of such initiatives.

Recent developments in refrigeration technology have slowly been eroding the advantage of the counterseasonal producers. Current technology allows for surplus fruit during the season to be stored and systematically released to the market when the local season is over. The consequence of this has been the reduced demand for the products from the counterseasonal producers. In spite of the various attempts to meet the standards set by the developed countries, most of the exporting countries have been experiencing a systematic decline in demand from the developed countries. Several commentators on the declining market access of the developing countries believe that standards are used as reasons to reduce demand when, in actual fact, the covert aim is to protect the local products that have been saved from the previous season (Mather 2000).

Sunkist, the citrus marketing company that is dominant in the United States, has played a significant role in this protective process. Sunkist now has developed a technology that allows for early harvest and storage at controlled temperatures for prolonged periods. This technology in turn allows for the storage of seasonal surplus for sale off-season and in competition to the products imported from countries with a counterseasonal advantage. While the United States has not been a big importer of South African fruit, several inroads are being made into this market, however, these markets no longer carry the growth potential, as was the case before, because of the introduction of the refrigeration

technology. The unfortunate consequence is that the consumer might never get the opportunity to define what constitutes freshness as the other products are prevented from accessing the markets.

Conclusion

Following on chapter 7 which looked at the challenges associated with small-scale citrus farming, this chapter looked at the way in which the citrus chain is structured. I argued that the way the citrus chain is currently structured impacts negatively on the small-scale producers. Five issues were raised in support of this argument. First, risk is not distributed equally among the actors in the citrus chain. Second, the shelf life of the products is reduced because of the way in which the chain is structured. This is to the disadvantage of small-scale farmers. Third, it is difficult to understand neutral interpretations of the impact of diseases because current explanations seek to justify certain positions. Fourth, the high number of marketing agents operating within the chain is to the disadvantage of the farmers. Finally, recent improvements in refrigeration technology are leading to the adoption of protectionist principles and to the redefinition of what "fresh" means.

The observations outlined above answer the final research question proposing that there might be problems with the way the chain is structured. The problems impact more on the small-scale farmers than any other actors within the chain.

CHAPTER 9

What is the Basis for Standards?

Introduction

Chapters 5 to 8 have been the presentations of the findings of this study. In chapter 5 we proposed that standards are used as systems of coordination. In chapter 6 we proposed that the enforcement of standards is built into the entire chain. In chapter 7 we proposed that there are challenges that small-scale citrus farmers are confronted with, which make it difficult for them to meet the standards. In chapter 8 we proposed that the way the chain is currently structured impacts negatively on the small-scale operations.

In this chapter we will translate the empirical knowledge gained from a study of the impact of standards on the global citrus chain to improve our understanding of the nature of standards within the food sector. We will achieve that objective by critically examining the bases for standards.

The starting point for discussions of standards is that they are technical tools that are informed by science. Using literature from the social studies of science that is critical of conventional views of science, I will challenge the view that standards are purely scientific and value neutral. I will propose that it is better to conceptualize standards as incorporating science, politics and more importantly, ways of life, or values. There seem to be systematic ways of excluding the other important forces in the development of standards, with overemphasis on the role of science.

Conventional Views on the Nature of Standards: Standards are Science, Science is Objective

There are two key arguments in this view. First is that standards are informed by science. They are technical in character and are developed by experts in the field. Second is the fact that standards represent an abstract system based on Cartesian science (Giddens 1990). The underlying principles are the conventional views of science. Such views are captured in the work of such scholars as Merton (1973), who proposed that science was a unique form of knowledge. It represented facts in an objective manner, and, as a body of knowledge, it was independent of those who have produced it. In line with this proposal, Merton decided that science was an objective body of knowledge constituted by scientific facts which should be non-negotiable. Science therefore is inherently "good" and "neutral" on issues of values. From such strong conservative views about the nature of science, Giddens has added that science tends to be divorced from the interests of those who have produced it. It develops a life of its own as an abstract system of rules and norms.

Following on these broad views about the nature of science, Brunsson and Jacobsson et al. (2000) have proposed that it is science that gives legitimacy to standards. They observe that one of the significant influences of modernity on society is the role that science plays in the lives of the members of society. Science exercises a dominating influence on a number of spheres in our lives. Even more important however, is the respect and trust that society has for scientific explanations. In as far as standards are concerned, science takes the

form of expert knowledge. In the case of standards, the expert knowledge tends to be stored in the form of rules. This implies that the knowledge possessed by the expert is no longer stored in the minds of individuals but becomes incorporated into a system of norms and rules, which, according to Brunsson and Jacobsson et al. (2000) do not need further interpretation. Further, these authors make the link that it is the reliance on expert knowledge that gives standards their legitimacy.

The existence of scientific experts therefore will lead to the existence of scientific standards. In some cases there may be organizations that are established that serve as the repositories of expert knowledge. In others there may be professional organizations that serve the purpose of peer evaluation of the work of the experts practicing in a particular area. All these serve to strengthen the legitimacy of scientific claims, which are then incorporated into standards.

It is interesting to note that this view concerns itself with the utility of standards that have been already developed. It does not deal with issues relating to how the standards were developed and who had the power to develop and implement them. Put differently, standards are "blackboxed" and the processes preceding the blackboxing are not an area of investigation. This observation is in line with conventional views of science.

In spite of the conservative ideas expressed earlier, Brunsson and Jacobsson et al. (2000) further observe that in spite of all the precautionary measures, the experts or the scientists realize that they wield excessive influence in society and may sometimes have their own agendas and use science to justify them. This observation is a basis for my argument that standards can be political

tools. They are an expression of the power that is wielded by some actors in the commodity chain. Further, the arguments that have been advanced against conventional views of science can contribute to creating an alternative view of the nature and role of standards.

Alternative Views of the Nature of Science and the Nature of Standards: Science is Socially Constructed, Standards are Political

The major critiques of the conventional views of science are to be found in the social constructivist and cultural studies approaches to an analysis of science. The key scholars within the constructivist approach include Latour (1987), Bowker (2000) and Knorr-Cetina (1995). What is common among the three scholars is that they have proposed that in order to understand the true nature of science, researchers should not limit themselves to analyzing "completed science." While completed science is important, there also is a need to examine its formative process. Consequently, they have proposed that we need to follow scientists to their laboratories to understand the true nature of their work. This approach is often referred to as the "science in action approach" or "laboratory studies." It is guided by a belief that instead of focusing on the official publications of the scientists, better insight will be gained by observing "scientists making science." Rouse (1996) proposes that the social constructivist studies have brought. "...renewed attention to the epistemic importance of laboratory practices and equipment. .." Theorists writing within this school of thought believe that the scientific laboratory has itself become a theoretical notion in the understanding of science. It has become an important agent of scientific development (Knorr-

Cetina 1995). For these scholars, reality is not given but constructed. They see the whole as a collection or the assembled, the uniform as the heterogeneous, the smooth and even surface as covering an internal structure. Approached in this way, there would be no initial facts, scientific objectivity, or reality. All will be subject to negotiation and agreements.

Latour's laboratory studies have led him to propose, among other things, that the most effective tool in the process of developing a science is the effective use of rhetoric. The facts never speak for themselves, as most scientists have believed. The facts need to be made to address the issue at hand effectively. Effective rhetoric is used as a means of enrolling other scientists in support of the scientist in question. For him it is not so much the idea, but rather, the support that is received from colleagues that makes scientific facts. He concludes that scientific facts represent an aggregation of agreements by scientists.

Following on Latour, Bowker (2000) has proposed that scientists operate on the principles of blackboxing their ideas. However, to understand the processes surrounding the blackboxing of some ideas requires that the black boxes be re-opened. Re-opening the black box implies subjecting the closed discussion to scrutiny by scientific observers. He notes that while the ideas may indeed be good, science has a system of legitimizing certain ideas at the expense of other equally important ideas.

Knorr-Cetina (1995) has proposed that the reopening the black boxes to analyze how decisions are taken has allowed several scholars to show that scientific objects are not only technically-manufactured in laboratories but also

are inextricably symbolically and politically construed. As an example she notes that scientific objects can be construed through literary techniques of persuasion that one finds embodied in scientific papers, through political strategies of scientists in forming alliances and mobilizing resources, and various attempts involving selection and careful omissions to build the science from within.

For Knorr-Cetina, constructionism has played an important role of deconstructing the process of knowledge production. She proposes that, in reading literature on constructionism, one obtains insight into how ordinary working things are blackboxed as objective facts. She notes that the constructivist scholars have uncovered the mundane processes behind the processes of establishing such facts.

Cultural Studies

Because the cultural studies approach is broad and all encompassing, it has attracted scholars with several backgrounds and interests who nonetheless are convinced of the all-embracing nature of science. I have chosen the work of Sandra Harding and Dona Haraway,[3] as key scholars within the cultural studies approach.

For Rouse (1996), cultural studies of science proposes that science needs to be viewed as:

> cultural formations that can only be understood through a detailed examination of the resources on which their articulation draws, the institutions to which they belong and the ways in which they transform those situations and have impact on others.

[3] Both scholars are feminist theorists challenging gender inequality within the sciences.

It is important to note that this approach is not restricted to scientific knowledge only but seeks to locate scientific inquiry within cultural practices and formations.

For Bernal (cited in Rouse, 1996), science was a social product of human labor, which ". ..required considerable resources and that it promised great benefits but could also create new resources for oppression."[4] He observes that science implies "a unified and coordinated and above all, conscious control of the whole of social life." Further, he decides that there was a need to ensure that it is only "humane science" that flourishes.

Harding (1991) has proposed that most of the problems that we experience with science have to do with the fact that what dominates science is a "Western Scientific World View or Mindset." For her, such a mindset is constituted by culturally-distinctive belief patterns in which scientific rationality plays a central role. What is a problem, however, is the fact that this group cannot recognize that they have culturally different patterns of behavior, which in turn influence their orientation.

She further proposes that science contains both progressive and regressive tendencies[5]. This is in direct opposition to the claims that science is inherently good and value neutral. What should be a challenge to the scientists is how to advance progressive tendencies while inhibiting the regressive tendencies. There is a need for a science that is liberating in nature. This will involve reinventing

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[4] Bernal's work was a response to the attempts by the government to shape the research agenda through its funding mechanisms.

[4]While Harding's concern is gender inequality in the sciences, the principle of progressive and regressive tendencies has wider application.

modes of thought to enable those marginalized (by racism, imperialism, class, exploitation, gender discrimination, etc) to gain more control over the conditions of their lives (Harding 1991).

Haraway's (1995) starting point is to observe that all the Western cultural narratives about objectivity are ideological and designed to govern the relations between body and mind, distance and responsibility. She then proposes that her notion of "situated knowledge" is about a practice of objectivity that privileges contestation, deconstruction, passionate construction, and webbed connections. It would allow for the transformation of systems of knowledge and ways of seeing. Her view of science would be founded on an understanding of the politics and epistemologies of location, positioning, and situating where partiality and not universality is the condition of being heard to make rational claims. For her, the question of location resists the politics of closure and finality. It is important to note that Haraway's point is built on a central assumption of sociology of knowledge, namely, that ideas have a social origin. The social location of the participants in science influences their analysis.

The discussion of the alternative views of science points to a possibility that science is not as neutral, independent, or objective as the conventional views of science have led us to believe. If standards are built on science, they will suffer from similar limitations.

Science vs Science: Whose Science Counts?

The starting point here is whether we should accept the view that standards are purely scientific or technical or whether we should acknowledge the

role of social forces in determining the nature of standards. Jukes (2000) has provided a very interesting account of how science within an economically volatile situation may be used to defend different positions adopted by different countries on issues of exports and imports.

Jukes's point is that it has been possible for some countries to use food safety concerns to justify trade barriers with others. Using the case of growth-promoting hormones in beef cattle and production aids used to increase milk production in cows (BST), he shows how scientists can reach completely different decisions on the same matter. He notes that American scientists have strongly argued that artificial growth and production enhancing hormones are safe. They do not have any harmful residues for the consumers. European scientists on the other hand have expressed concerns about the safety of consuming the products in which such hormones have been incorporated, arguing that there is no conclusive evidence to guarantee their safety. In line with this observation they have called for a ban in importation of American products where these hormones have been used. American exporting companies have proposed that this action was calculated to protect European producers from global competition, an action that is prohibited by the World Trade Organization (WTO). It is quite interesting to note that the resolution of the standoff between the European Union and the United States was not necessarily scientific but rather political.

Given Jukes's account, it is clear that even in cases of food safety, the notion of an objective scientific reality that is waiting to be discovered does not exist. As Haraway has indicated, science is from specific social locations. From

his observations, Jukes has suggested that science is not sufficient in determining what is acceptable or not acceptable. While most societies will embrace science-based technical standards, other variables are equally important to determine the acceptability of the practice. This would suggest that there is always an interaction between science and the value system of a society.

Standards and Profits

In an earlier chapter we presented the argument of Reardon et al. that standards can be seen as a company strategy to improve competitiveness in differentiated markets. Grindley (1995) supports that argument. He proposes that standards can and have been used as strategies to improve the competitive advantage of some companies, thereby improving their profitability. He observes that when firms must make decisions on standards, they need to make a choice on whether to set and support their own standards or to support external standards. They also need to decide whether they will share a standard with the competitors as opposed to keeping it as a private standard. In all cases, the decisions are, to a large extent, influenced by the prospects for profitability. Firms need to estimate a chance of winning with the choice that they will opt for.

In the citrus chain, the company that plays a coordinating role has been central in evaluating the choices for all the actors in the chain. The profitability of all the actors, including the small-scale producers, is therefore dependent on the right decisions that are taken by the coordinating company.

For Grindley (1995) standards add value by making it cheaper to buy complements, easier to switch from product to product, and easier to use product

combinations. Their impact can be felt both from the demand and supply sides. On the demand side, he proposes that standards enlarge markets by creating possibilities for an increased scale of production that makes the products cheaper to produce. Further, he proposes that they also reduce the switching costs. Because all suppliers subscribe to the same standard, switching product preference is not expensive. Finally, he proposes that, on the demand side, standards increase connectivity by joining core products to a network.

On the supply side, he proposes that there generally will be shared input and development costs leading to a situation where the core products are cheaper to produce. Second, standards will lead to purchase economies resulting from greater customer information and the reputation of the product.

Grindley (1995) further notes that the larger the base of standard users, the higher the credibility of the product and the developer of the standard. In that situation, the leader gets a disproportionate advantage over those who adopted the standard late.

Conclusion

In this chapter we sought to translate the empirical knowledge gained from a study of the impact of standards on the global citrus chain to improve our understanding of the nature of standards within the food sector. The approach adopted was to critically examine the bases for standards. In the chapter we proposed that the supporters of the technical view of standards are influenced by the conventional views of science. We proposed also that the processes surrounding the formulation and application of standards are similar to the

processes surrounding the adoption of "scientific facts." From the discussion above we can conclude that it not accurate to conceptualize standards as purely scientific tools. It is only when scientists re-open the blackboxed ideas that the role of social forces in the adoption of standards is recognized. The main argument is that standards are not limited to science. Other interests including the principles of protectionism have been built into standards. This explains why there is always ongoing debate on the intended objectives and the unforeseen impact of standards. What does seem to be the case is that power plays a significant role in ensuring that some groups' interests are protected within the international standards. We therefore can conclude that science, values, power, and profits are the central bases of standards.

CHAPTER 10

Conclusions and Recommendations

Introduction

The purpose of this study was to examine the impact of international food and agricultural standards on small-scale citrus producers in three towns of the Eastern Cape Province. While the study used several forms of data gathering, the driving force of the study was commodity chain analysis. The citrus products were followed along the production and distribution chain, in an attempt to answer the following research questions: How do international food and agricultural standards structure the global citrus production and distribution chain? How are standards formulated, communicated and applied? How do the emergent farmers structure their production practices to be in line with the product requirements set by the international markets? What shortcomings can be identified both at the level of farm operations and at the level of the chain?

The Context of the Study

Two issues have served as a backdrop for this study. First, the legacy of "Apartheid" continues to affect the agricultural sector in South Africa. That legacy explains why some farmers are fully commercial while others remain at the small-scale level of operation. Second, South Africa needs to take full advantage of the counterseasonal advantage that it has with the major citrus producers. To do that it needs to stabilize it export volumes at levels that are higher than the current levels. Small-scale producers have the lowest export level and should be a target group for attempts to improve exports.

Summary of the Key Findings

The findings of this study can be summarized into three key points: First, the findings in this study suggest that unlike the popular convention that suggests an end of regulation, the citrus chain is highly regulated with standards playing a central role. I have argued that in commodity chains standards are now at the center stage. They are used as systems of coordination. Actors use standards to define their responsibilities. Standards also are used to define what to expect from other actors in the chain. They also are used to measure the risk that actors are willing to take with the products.

Using the citrus global chain as an empirical case, this study extends the analytical tools of commodity systems approach and GCC to include an account for the regulatory processes within the chains. We now understand that products do not flow automatically along the production and distribution chain. We also know that it is not only the location of countries within the world system that defines their responsibilities in the chain. Standards are central tools of facilitating the operations of the network.

Second, given the purposes outlined above, the study suggests that the effectiveness of the coordination system lies in enforcement strategies that are in place. In the study we found that the enforcement of standards is built into the entire chain. Inputs need approval, production practices are monitored, farms and packhouses are audited and export products are inspected. Given these observations it can be concluded that the citrus industry is highly regulated. In the absence of the state's direct regulatory functions, the industry uses standards to

regulate the activities of the actors. The first hypothesis of this study can be confirmed.

Second, the farmers' production practices are affected by the structural problems associated with their small-scale status, within the South African socio-political situation. Small-scale farmers need to deal with uncertain land tenure. They have to understand the complex systems of managing diseases and they view some standards as increasing their operating costs. They believe that they are paying twice for the scientific knowledge that they require. The impact of these structural factors is that farmers now construct their own meaning of the standards, focusing on what they can afford and what they regard as absolutely necessary. Most of the time these judgments are not effective. These observations confirm the second hypothesis that small-scale farmers have a difficulty in meeting the standards but have to operate within the chain.

Third, the study makes an observation that the citrus chain is organized in a manner that is to the disadvantage of the small-scale farmers. There is a peculiar way in which risk is distributed in the citrus chain and other fresh fruit and vegetable chains. Further, the study has observed that the way in which the chain is currently structured reduces the shelf life of the farmers' products. The study also notes that while diseases continue to be a major problem for the industry neutral interpretations of the causes and impact of diseases are very rare. Further, the high number of marketing agents operating within the chain is to the disadvantage of the farmers. Finally, the study has observed that access is going

to be very difficult given the recent improvements in refrigeration technology, which are redefining of the meaning of freshness.

Standards and International Trade

In international trade, standards are not a matter for consideration by the trading parties. The port of entry represents a government-to-government encounter. Consequently irrespective of what the standards set by a particular country are, at the port of entry, the transactions are guided by the interpretation of several bilateral and multilateral agreements, and all the international protocols governing trade.

At this level relations are not always smooth because the importing country will be conscious of protecting its atmosphere from unfamiliar pathogens that will be a threat to its own agricultural activities. However, there also is political courtesy for countries that have good political relations.

Further, while governments will not be directly involved in the day today administration of standards, they are nonetheless expected to create an enabling environment for international trade to occur smoothly. In the South African case creating an enabling environment involves ensuring that the local exporters have favorable access to the major consuming countries, because that will generate the much needed foreign exchange for the country. The government will therefore use its political influence to achieve such objectives.

Also the role of the fruit industry brokers has become very important in the understanding of international trade. As indicated earlier the brokers want to ensure that their customers have an all year supply of citrus and other types of

fruit. In the process they have been accused of manipulating supply and demand to maximize their profits. Some of the ways used include finding fault with fruit or delaying the same until there is a threat of decay thereby significantly reducing the price. While these are possibilities, no data are available to substantiate the claims. What is clear is that in international trade, it is more than just what is contained in the standards that affects the sale and the price of the citrus products.

Policy Recommendations

The policy recommendations discussed in this section are geared towards guiding the activities of farmers, intermediaries, the South African Government, foreign governments, international agencies, and all other actors associated in some way with the global fruit chains and specifically the citrus chain.

(a) Market Driven Farming.

Producing for the international market involves a significant shift in the way farming is practiced. Such a shift is both practical and ideological. On the practical level, the process involves a shift away from traditional production practices that are chosen by the farmer in his/her attempts to remain competitive in the business, to those that are preferred by the prospective buyer who claims to represent consumer preferences. Put differently, a farmer is discouraged from producing what he/she wants in methods that he or she is familiar with, in the hope that someone will be interested in purchasing the products. Instead, the farmer needs to acquire skills to research what the markets want and to ensure that he/she understands the specifications and requirements before he/she begins the production process. Commercial farmers need to understand that the buyers are

not interested in what they are most easily capable of producing. The buyers are more interested in ensuring that what they want is produced according to their specifications. This has proved to be a major challenge for small-scale farmers.

While this is a practical move, it is also an ideological move at the same time. Farmers lose both their assumed independence and their control of the labor process. Braverman (1974) has proposed that one of the unique developments of the capitalist labor process is the separation of conception from execution. This is done to ensure that the control functions are removed from the actual producers on the shop floor to an office manned by managers or controllers of other people's work.

In the case of citrus farming I propose that the losing of the control function has the ideological implication of confirming a new class position of the farmers. I would suggest that it implies a move from a petty bourgeois position to a position of a propertied laborer. Davis (1980) following Marx has proposed that as part of the development of the capitalist system it may be possible for some laborers to retain ownership of property. However, if they are to be integrated into systems of capitalism they will be involved in an exploitative relationship with the capitalists who are dominant in the agricultural sector. This suggest that ownership of property des not necessarily guarantee protection against exploitation.

(b) Looking beyond the production function

The argument advanced here is a logical continuation of the argument advanced above. Here I will propose that all agencies that are concerned with

initiating, funding, and evaluating the viability of rural development programs that are based on agriculture need to be conscious of the fact that it is not production alone that will ensure both the sustainability of a project and, more importantly, meaningful development. Access to markets is the key determinant of success for agricultural projects. While most governments have allocated land to rural communities for agricultural production and donor agencies have provided training and access to the necessary inputs for production, less research has been focused on market analysis before production commences. At the end of the day the most creative agricultural development projects result in producing for consumption instead of being commercial undertakings. The challenge is to understand that agricultural production has become very competitive. There are several competing producers who are willing to produce most agricultural goods. It therefore becomes imperative that producers know beforehand what the market requirements are. With international trade this is even more important as concerns for food safety have shaped the standards that are applied.

The notion of comparative advantage in agricultural production has now been extended to include more than just the factors of production but also a consideration of market requirements such as aspects of food safety.

(c) Commodity Chains and Profits

Actors on a commodity chain need to understand that commodity production is not necessarily profitable for all the actors in the chain. Profits are not distributed equally among the members. Further, the longer the chain, the thinner the profits are spread out.

Limitations of the Study and Areas for Further Research

Impact of Time

This study was designed as a time-specific study. There has been no attempt to examine the impact of standards on small-scale farmers over a long period. Factoring in the influence of time would have made the study longer and more expensive. This is be an area for further research. The questions could be studied longitudinally study covering between five and ten years with close monitoring of the activities of the farmers and other members of the chain. Such a study would provide good insight into the impact of standards on small-scale producers.

Measurement of value creation

The study focused among other things on the distribution of risk among the actors along the citrus chain. It also would be interesting to measure value creation and the distribution of benefits among the actors. This would require systematic tools of measurement and reliable information on the earnings of all the actors who are part of the chain. In this way, areas of high value creation can be identified and could be compared to the earnings for those parts of the chain.

Standards a Critical Appraisal

The study of standards has provided insights into the workings of both local and international markets. What has emerged from the discussion of the literature and the examination of the position of small-scale farmers is that standards are also about a way of life and a value system. They are influenced by

general conventions of some societies. This challenges societies operating outside such conventions to understand them and in some cases to even adopt them.

In encouraging standardization, the enforcement of standards represents a significant step back to modernity. We can expect uniform tastes shaped by standardized production methods. It will be very difficult to create niches outside the established lines preferred by the dominant marketing agents.

It is, for example, interesting that there has been no attempt to market the unique taste of the oranges from this region even though all the actors are conscious of this difference. Lack of interest results from the fact that such initiatives would jeopardize the position of the dominant marketing agent that regards all oranges from South Africa as being the same.

Further, standards in commodity chains are more than just guidelines that determine what is acceptable or not acceptable. They are an expression of the power relations among the various actors within the chain. Some actors have the power to devise and implement standards informed by their value system and general ways of life. Such standards are imposed on the small-scale operators without regard for the cost implications and ways of life of such operators.

In the light of the above arguments one can acknowledge the power of standards at an ideological level. It is important to note that what is achieved through standards is what could not be achieved through development policies, e.g., modernization. Under the standards regime, farmers are modernizing their operations; and they are adopting different value systems. One can conclude that

standards can be equated to modernization but this time with integration into global trade serving as the carrot.

APPENDICES

APPENDIX A

Guide for Interviews of Small-scale Farmers

Date of the interview

Contact

Name of the farm

Location

Size

Size in relation to other farms in the area

Type of Ownership: Family farm, Corporation or Coop

How many farmers are in this region?

Primary products of the farm

Primary customers

Markets

Are any of your products intended for the export market/ further processing/ formal sector or informal sector?

How do your products reach their intended destination?

Are you aware of any standards that guide the production of citrus products that are intended for export?

Who determines those standards?

What is your role in setting such standards?

Do you think that such standards are fair to you as a farmer?

What would you like to see changed in as far as such standards are concerned?

Do any of your customers in general tell you how they expect you to produce?

Who is responsible for marketing your products?

Production practices

Do you have your own supply of water or are you dependent on rainwater?

How do you manage your soil to ensure optimum productivity?

What types of fertilizers do you use on your grounds?

What types of insecticides do you use for your plants?

Are there any guidelines, which tell you what chemicals to use or not to use?

Who determines such guidelines?

What is your role in the determination f such guidelines?

When last were there changes in as far as the guidelines are concerned?

Do any of your customers tell you what to use and what not to use?

What chemicals would you like to use that are currently not used?

What do such chemicals do?

Why are you not using them?

What chemicals would you like to discontinue using?

What do they do?

Why are you not discontinuing their use?

Labor

Would you identify yourself as a full-time farmer or a part-time farmer?

If you are a full-time farmer, have you at any point considered getting another job and farming part-time?

If so, why was that the case?

If you are a part-time farmer do you think that you could succeed in farming

without the income from your job?

Apart from you, are any of your family members involved in the activities of the farm?

What is their role on the farm?

Is there any full time hired labor apart from family members?

How many are they and what do they do?

For how long in a year do you require seasonal labor?

How many laborers do you usually employ during the harvest season?

Are they paid a fixed hourly, weekly, biweekly or a monthly rate or are they paid per units of their pick?

How is your pick measured – bushels, baskets, boxes or weight.

Are there any guidelines that determine the type of contract that you can have with your employees?

If there are, who determines them?

What is the role of the government in the determination of guidelines?

What is the role of the farmers in the determination of such guidelines?

What is the role of your customers in the determination of such standards?

Farmer organization

How are farmers organized in this area?

What is the significance of the farmers' organization? What does it do for the farmers?

Are there any farmers who are not part of the farmers' organization?

What proportion of citrus farmers do they constitute?

Can you give me an overview of how the citrus industry is structured in this region?

Can you give me an overview of how it is structured in the country?

Of the production of the entire country, are you able to tell me what proportion this region contributes?

Of that regional contribution, what is your contribution?

Is there such a thing as national standards for citrus?

Who sets such standards?

What is the role of the farmers in setting such standards?

Science

What is the role of science and technology in your operation?

What is the source of scientific information that you use?

International factors

How do you think the recent agreement between the EU and SA will affect your market access in Europe.

Are farmers aware of the EU standards for the production of citrus?

If they are, how did they get access to that information?

What has been your contribution to the recent WTO talks on market liberalization?

Can you recommend any person that I can talk to who is involved in issues of standards for the citrus industry?

Sustainability

How long do you think your operation will last?

What will you do with it when you decide to retire from farming?

Goals

What do you regard as the major goal of your operation?

Thank you for your time.

APPENDIX B

Guide for Interviews of Citrus Processors, Eastern Cape.

Date of the interview

Contact

Name of the facility

Location

Size (capacity)

Type of Ownership: (Corporation or Coop)

What are the primary activities of the organization?

Who are the primary customers?

Markets

Are any of your products intended for the export market/ further processing/ formal sector or informal sector?

How do your products reach their intended destination?

Are you aware of any standards that guide the production of citrus products that are intended for export?

Who determines those standards?

What is your role in setting such standards?

What would you like to see changed in as far as such standards are concerned?

Do any of your customers in general tell you how they expect you to produce?

Who is responsible for marketing your products in this facility?

Grades and Standards

Some farmers informed me that inspection and grading takes place in the packing sheds that are on this property. Can you explain how the process of inspection and

grading takes place?

In as far as testing for traces of prohibited substances are concerned, can you tell me who is responsible for conducting such tests?

What are the guidelines for the tests that are conducted?

Who determines the guidelines

What happens to Oranges that that have traces of prohibited substances?

In as far as the determination of quality standards is concerned, can you tell me who is responsible for grading the products.

What are the guidelines for the grading system that is utilized?

E.g. What are the requirements for the best grade, next grade etc?

Who determines the guidelines?

What is your role in setting those guidelines?

What are the requirements for the export grade oranges?

Science

Please tell me about the process that oranges go through from the point you receive them (either from the farmers, or other actors)

Can you explain to me the types of chemicals that are used for the cleaning and waxing process.

1. Before oranges go for gassing, they are washed. What is used at that stage and what is the intention?
2. What is the content of the gas that is used to ripen the oranges?
3. What is the content of the dipping water that oranges go through before being waxed?

4. What is the process intended for?
5. What is the was that is used made of?
6. What is it intended for?

Initial sorting (manual)

What specifically are the manual sorters looking for during what I can call the first round of sorting?

What is the cause of the marks on the skin?

Can you quantify the costs per orange for the cosmetic treatments

What is the intention of electronic sorting?

How are the machines programmed?

What defines class 1, 2 etc

What is the average export quality oranges produced per farmer?

Operations

If this is a coop, how many farmers in this region are members?

Are there farmers who are not members?

How is the stake of the farmers determined in the coop?

How is the management board appointed?

How are decisions on packing for specific marketing agent taken. Are they purely management decisions?

Inputs

If you supply your members with inputs please answer the following questions:

How do your members manage their soil to ensure optimum productivity?

What types of fertilizers do they use?

What type of insecticides do they use?

Who are your major suppliers?

Are there any guidelines, which tell you what chemicals to use or not to use?

Who determines such guidelines?

What is your role in the determination f such guidelines?

When last were there changes in as far as the guidelines are concerned?

Do any of your customers tell you what to use and what not to use?

What chemicals would you like to use that are currently not used?

What do such chemicals do?

Why are you not using them?

What chemicals would you like to discontinue using?

What do they do?

Why are you not discontinuing their use?

Labor

What is the staff complement within the organization?

What do they do?

For how long in a year do you require seasonal labor?

How many laborers do you usually employ during the harvest season?

Are they paid a fixed hourly, weekly, biweekly or a monthly rate or according to the volume of their work?

Are there any guidelines that determine the type of contract that you can have with your employees?

If there are, who determines them?

What is the role of the government in the determination of guidelines?

What is the role of the farmers in the determination of such guidelines?

What is the role of your customers in the determination of such standards?

General

Some farmers indicated to me that the accounting procedures here encourage them to produce for the export market and that if their produce is sold in the local market they get negative entries on their records.

How do you del with products that do not meet your export standard?

Do you have any system of encouraging farmers to produce according to the required standards?

Can you give me an overview of how the citrus industry is structured in this region?

Can you give me an overview of how it is structured in the country?

Of the production of the entire country, are you able to tell me what proportion this region contributes?

Thank you for your time.

APPENDIX C
Letter of Invitation and Consent

Dear ..... (prospective participant)

I am involved in a study of the informal sector for the citrus market in your area. The objectives of the study are the following:

(a) I want to understand what are the distinguishing features between formal and informal operations.
(b) I want to understand why some producers are able to operate in the formal sector while others are not.
(c) I want to see to what level are those operating in the informal sector aware of the standards that are in place in the industry.
(d) I also want to know what are the implications of the operation of standards in commodity markets for rural development.

I have identified you as a person involved in citrus and would like to ask you a few question about your operation. Please note that in order for my research to be meaningful you should participate freely, you should feel free to refuse to respond to questions and free to terminate the session at any time.

Your name and address will only be known to the researcher. It will be kept confidential for the purposes of publishing. Your privacy will be protected to the maximum extent allowable by law.
If you need to contact me after the interview please feel free to do so.

To confirm that I have read the consent procedure to you, I will ask you to sign this note at the bottom.

Thank you for your assistance.

Sincerely

Andile Siyengo
422 Berkey Hall
Michigan State University
East Lansing, MI 48824
(517) 432 2214
May 30, 2000.

Interviewee's Name:
Signature :

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