



Grain Market Research Project

**MARKET STRUCTURE,
CONDUCT, AND PERFORMANCE:**

**CONSTRAINTS ON PERFORMANCE
OF ETHIOPIAN GRAIN MARKETS**

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MARKET STRUCTURE, CONDUCT AND PERFORMANCE: CONSTRAINTS ON PERFORMANCE OF ETHIOPIAN GRAIN MARKETS

EXECUTIVE SUMMARY

Throughout the world, the major share of staple food costs to the consumer is typically accounted for by marketing costs. In Ethiopia, marketing costs account for about 40% to 60% of the total price spread between producer and retail prices (GMRP, 1997). The reduction of these costs represents a major opportunity to improve farm production incentives and simultaneously make food more affordable to low-income consumers.

The purpose of this report is to assess the efficiency of the Ethiopian grain marketing system and identify some of the constraints on market participants which influence its performance. The main questions dealt with are: How is the grain marketing system organized and coordinated? Is the grain trade business composed of many small units competing one another or is it dominated by few large participants? What are the approaches followed by traders in buying, selling and pricing grain? Are there any barriers to entry, and if so, what are the major factors? What problems and constraints are observed in transportation, storage, financial credit, and market information? How have the structure and conduct of the market and the constraints and problems affected the performance of the market?

This report is based on data obtained from both primary and secondary sources. The primary sources include the Rural Household Survey which covered a random sample of more than 4,000 rural farm households all over the country and the Traders' Survey that covered a random sample of about 20% of the 1,100 wholesale traders operating in the 26 markets covered by the Ethiopian Grain Trade Enterprise and Grain Market Research Project's Market Information System (MIS). Both surveys were conducted by the Grain Market Research Project (GMRP) in 1996. Secondary sources of data include the GMRP's Market Information System monthly bulletins and other published materials by the Project and other agencies.

The major findings of the study are summarized as follows:

- (1) Wholesale traders are the principal actors in inter-regional grain movement. They, handle about 45% of the estimated 26.4 million quintals of grain sold annually by farmers and state farms.
- (2) At a national level, grain wholesale trade seems to be dominated by a small percentage of merchants; the largest 10% command about 43% of the volume traded at wholesale level.
- (3) The degree of inequality in market share at the local market level varies from market to market and from crop to crop; the computed Four-firm Concentration Ratio (CR4), however, does not indicate a high degree of market domination by large traders. For most markets and crops the CR4 is less than 33%.

- (4) Farmers normally bring their marketable grain to markets that are 5 to 20 km away from their villages and about 79% of their annual grain sales occur immediately after the harvest when they need cash to purchase food, cover wedding expenses, repay outstanding loans, and pay tax.
- (5) Generally, farmers and merchants do not have access to high-quality market information upon which they base their marketing decisions. The information that farmers get in particular does not assist them in deciding what crops to plant and how much. There is practically no market extension service in the present system that guides farmers in their production, storage and marketing decisions. Information on export market is also lacking.
- (6) Grain buying price at the local markets is mostly determined by deducting miscellaneous costs and a net traders' profit margin from the prevailing wholesale price in Addis Ababa; traders provide little advance payment, credit, or other incentives for farmers to sell to them at harvest. Grain prices are rarely negotiated in advance. Decisions regarding grain sales to merchants by farmers also are seldom influenced by such factors as blood, ethnic, or religious relationships.
- (7) Inter-market grain flow is coordinated mainly by the brokers in Addis Ababa who specialize by route and coordinate grain buying, selling, transporting and pricing activities.
- (8) The main constraints identified by traders are 'kella' (grain checkpoint) taxes, lack of financial credit, absence of control on un-licensed traders, unavailability of transport services and high transport tariff, lack of adequate storage facilities at appropriate locations, and lack of market information.
- (9) The variability of the number of 'kellas' and the amount charged between any two markets has caused uncertainty and confusion among merchants, causing a negative impact on grain movement and consequently on producer and retail prices.
- (10) Because of shortage of financial credit and lack of transport services, smaller merchants are subjected to low capital turn-over. These problems have a negative effect on the competitiveness of the market; while smaller traders' capital is tied up in inventory while waiting an average of 1-2 weeks to secure transport, the relatively large merchants may exert considerable influence on grain prices in the absence of any challenge from such alternative buyers.
- (11) Most of the merchants feel that the Government can play an important role in improving marketing facilities including developing new market places, allowing merchants to improve existing buildings which they acquired through rent, constructing and maintaining roads and expanding telephone services.
- (12) Lack of access to working capital and facilities at convenient location in the market place seem to be the most important barriers to entry.

- (13) The existence of barriers to entry, and the constraints facing traders have a negative impact on the performance of the grain marketing system. Comparison of the expected and actual price spreads between Addis Ababa and 19 selected markets shows that in 11 cases out of 19, the price spread can be considered adequate only after attributing non-monetary transaction costs of about 30% over and above the monetary costs. This may be attributed to several factors including risks associated with lack of good market information and sporadic and uncertain costs such as 'kella' charges, variable transportation rates, and other forms of transaction costs.
- (14) Seasonal price variations are also significant. For example in Addis Ababa, the Gross Real Returns to Storage is 3.66% per month for mixed teff, 3.24% for wheat, and 5.18% for white maize. When these figures are compared to the opportunity cost of capital tied up in inventories, which is about 0.83% to 1.17% per month, there seems to be substantial seasonal variation which reflect storage costs only after including a fairly high implicit risk premium for temporal arbitrage.

Based on the above mentioned findings, the study recommends the following policy measures to improve the efficiency of the grain marketing system:

- (a) Abolishing all grain movement checkpoints and the present sales tax system on grain; conduct a detailed study to evaluate the merits and demerits of different taxation systems with the view to designing an appropriate taxation system that could assist the local governments obtain better tax revenue; promote inter-dependence between producing and consuming areas; enhance smooth grain flow and spatial integration; induce different market participants including, farmers, traders, and consumers; and improve regional food security.
- (b) Clarifying the regulations governing licensing and participation in the grain trade, and then enforcing these regulations to ensure an equal playing field for all participants;
- (c) Devising appropriate credit policy to cater for the credit needs of grain traders and providing incentives for private investment in the grain marketing system, such as storage and transport facilities.
- (d) Strengthening the current market information services by expanding the market and commodity coverage of the MIS and by providing additional information on crop production prospect, temporal and spatial grain flows, food import and export intentions, stock level, world market prices of export crops, etc. To assist and properly guide farmers in their planting, storage, and marketing decisions, dissemination of relevant market information through the agricultural extension system should also be considered.
- (e) Improving marketing infrastructure and facilities in the major regional markets
- (f) Conducting research on the different components of the system - farmers, assemblers, brokers, retailers, transporters, warehousing, etc., in order to get a better understanding of the entire marketing system.

- (g) Although this paper focuses on the organization, conduct, and performance of the small family operated grain businesses, there appears to be an emerging market structure with the rising involvement of incorporated private enterprises such as ‘Ambassel’, Ethiopia Amalgamated, and others. Because of their superior organizational, financial, and physical capability, and oft-alleged connections with government, as well as their diversified business activities and scale economies, these companies may bring about major changes in the structure, conduct, and performance of Ethiopia’s grain marketing system. Therefore, it is recommended that an assessment be made on the positive and negative impacts of the emerging market organization.

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1. INTRODUCTION

1.1. The Problem

Throughout the world, the major share of staple food costs to the consumer is typically accounted for by marketing costs. In Ethiopia, marketing costs account for about 40% to 60% of the total price spread between producer and retail prices (GMRP 1997). The reduction of these costs represents a major opportunity to improve farm production incentives and simultaneously make food more affordable to low-income consumers.

Despite the impressive growth in grain production over the past three years, large portions of the rural and urban population remain food insecure due to low incomes to purchase food. Over 60% of the rural households in Ethiopia possess less than one hectare of land, and a very large portion of these households cannot grow sufficient food to feed themselves. The market dependent population, that is, the population that depends on the market for all or part of its food supply, is estimated to be about 42% of the total population (Alemayehu 1993). Almost all urban consumers are dependent on the functioning of agricultural markets to acquire their food, which accounts for about 65% of total household expenditure; expenditure on cereals alone constitutes about 21% of total household expenditure (Bereket et al. 1996). It is clear that an inefficient marketing system entailing substantial costs to consumers will have detrimental effect on the food security and well being of the poor.

Moreover, the potential for future farm-level income and productivity growth in Ethiopia will be intimately tied to productivity growth at the various stages in the marketing system. Abundant worldwide evidence has shown that the incentives and ability for farmers to make investments in productivity-enhancing inputs and production methods depends on the functioning of markets for inputs, credit, and crop distribution. Unfortunately, discussions of grain marketing policy in Africa have often taken place in an information vacuum, with very little empirical knowledge of market structure, the behavior of the various actors in the marketing system, and the constraints they face that impede further innovation and productivity growth in the food system.

1.2. Objectives of the Study¹

This study is an extension of previous work in Ethiopia relating to the study of the organization and performance of the Ethiopian grain marketing system on a larger and a much more representative sample. The purpose of the study is to assess the efficiency of the Ethiopian grain marketing system and identify some of the constraints on market participants which influence its performance. The main questions to be dealt with are:

¹ The initiative for the present study originated from the PL-480 Title III Agreement between the Government of the Federal Democratic Republic of Ethiopia and the Government of The United States of America for the donation of agricultural commodities signed in July, 1996. One of the conditions agreed upon for the implementation of the above mentioned agreement was the Government initiation of a study of the barriers to entry and constraints to the performance of private sector participation in agricultural input and output markets.

- How is the grain marketing system organized and coordinated? Is the grain trade business composed of many small units competing one another or is it dominated by few large participants?
- What are the approaches followed by traders in buying, selling and pricing grain?
- Are there any barriers to entry, and if so, what are the major factors?
- What problems and constraints are observed in transportation, storage, financial credit, and market information?
- How have the structure and conduct of the market and the constraints and problems affected the performance of the market?

The report has six sections including the introduction and is structured as follows: Section two provides basic market analytical concepts and discusses the data sources and methodology used in data collection and analysis. Section three briefly describes organizational aspects of the grain marketing system including characteristics of surveyed traders, marketing channels, volume of marketed output flowing through different channels, size distribution of traders, market conduct and barriers to entry.

Sections four identifies and discusses problems and constraints faced by traders relating to transportation, storage, financial credit, market information, etc. Section five analyzes inter-regional and seasonal price variations with the view to assessing economic efficiency of the marketing system. Finally, section six presents summary and conclusion.

1.3. Review of Past Grain Market Performance Studies

Since the market liberalization of 1990, few studies have interviewed traders as a basis for examining the organization and behavior of Ethiopia's grain marketing system (some exceptions are Alemayehu 1993; Wolday 1992; and KUAWAB 1994). However, the conclusions of these studies are typically based on non-random and relatively small samples of grain traders in specific areas of the country. The study conducted by Alemayehu in Chilalo, Ada, and Addis Ababa aimed at analyzing the impact of deregulation on grain market participants and on the economic performance of the marketing system. The study analyzed market structure and performance partly based on primary data sources including a sample survey of 141 farm households, 17 traders engaged in petty trade, assembling, wholesaling, and retailing in the study areas; 10 brokers operating in Addis Ababa, and several other traders from different parts of the country. Similarly, Wolday analyzed the marketing system in southern Ethiopia using the industrial organization model and focusing on two crops, namely, maize and teff. The study was based on a sample survey of 33 wholesalers, retailers, and farmer-traders. A rapid market appraisal was also conducted by KUAWAB Business Consultants in 1994, covering 9 crops and 31 important markets in 13 regions, and it collected data from non-randomly selected farmers, traders, and institutions in both grain surplus and deficit areas of the country.

The general conclusions of grain market performance based on these studies are sometimes conflicting and are summarized as follows:

- (a) private sector marketing margins generally declined after the deregulation of grain markets (Alemayehu; KUWUAB);
- (b) private sector grain trade has become competitive and more efficient than the parastatal trade (Wolday);
- (c) although the degree of competitiveness varied from market to market, the markets generally appeared to be competitive (KUWUAB);
- (d) the returns to trade were normal compared with the expected and were much lower compared with the risks of transporting grain over space and storing grain over time (Alemayehu);
- (e) spatial price spreads were higher compared to the estimated transfer costs and cost of transporting grain from rural to urban markets was particularly high for small trucks (Wolday);
- (f) there were indications of collusive behavior in some rural markets to the detriment of grain producers (Wolday);
- (g) grain trade was highly concentrated in the hands of few licenced wholesalers but an increasing participation of un-licensed traders helped improved competition (Wolday);
- (h) seasonal price difference were high compared to the estimated storage costs (Wolday);
- (i) returns to transport and storage were about normal suggesting that the transport and storage functions were carried out with reasonable efficiency (KUWUAB);
- (j) there were many barriers to entry, including lack of working capital and financial credit (Wolday, Alemayehu);
- (k) capital ceilings that had been placed on the private sector were removed and traders were free to move grain from place to place (KUWUAB);
- (l) following deregulation of grain markets, most grain markets both at local and national levels became more integrated in the short run (Alemayehu; Wolday);

The above mentioned studies provide useful information about the organization and efficiency of the Ethiopian grain markets; however, they fail to give a complete picture, because of their limited area coverage, small and non-random sample size and analytical focus. As can be observed from the brief review presented above, some of the studies were conducted in few markets that specialize in certain crops.

2. CONCEPTUAL FRAMEWORK, DATA AND METHODOLOGY

2.1. Conceptual Framework

One important approach to the study of market performance, namely, the study of market organization or market structure analysis, suggests that relationships exist between structural characteristics of a market and the competitive behavior of market participants and that their behavior in turn influences the performance of the market (Scarborough and Kydd 1992; Scott 1995). Among the major structural characteristics of a market are the degree of concentration, that is, the number of market participants and their size distribution; and the relative ease or difficulty for market participants to secure an entry into the market. Market conduct refers to the behavior of firms or the strategy they use with respect to, for example, pricing, buying, selling, etc., which may take the form of informal cooperation or collusion.

Typical structure-conduct-performance (SCP) analysis tend to assess market performance largely in terms of:

- (1) whether marketing margins charged by various actors in the marketing system are consistent with costs; and
- (2) whether the degree of market concentration is low enough (and the number of firms operating in a market is large enough) to ensure competition,² which is in turn assumed to drive down costs to their lowest level.

The SCP approach postulates that as market structure deviates away from the paradigm of perfect competition as characterized above, the extent of competitiveness of the market will decrease; and consequently a decline in market efficiency will take place (Scarborough and Kydd 1992; Scott 1995).

However, there are several shortcomings with these criteria for assessing market performance which should be kept in mind when reviewing the findings contained later in this report. First, the criterion that observed marketing margins should be consistent with costs does in no way indicate that the marketing system is performing adequately. Schultz's "efficient but poor" observation of low-resource farmers also characterizes the functioning of marketing systems in many developing areas (Shaffer et al. 1985). Marketing margins may approximate costs, but these costs may be too high and unstable to encourage rapid investment in the marketing system to promote on-farm productivity growth. The technologies used on the farm and in the marketing system may be appropriate taking as given the risks and high costs within the system, but they would surely not be appropriate if more developed institutions and

² It is generally assumed that a market is competitive if: (a) there are many buyers and sellers in the market, (b) there are no dominant market participants powerful enough to pressurize competitors or engage in unethical marketing practices, (c) there is no open or concealed complicity among market participants regarding pricing and other marketing decisions, (d) there are no artificial restriction that obstruct mobility of resources, (e) there is free entrance of buyers and sellers to the market with no special treatment to particular groups or individuals, and (f) there is a homogeneous product so that customers are indifferent between supplies offered by alternative channels.

coordination arrangements were implemented to shift and absorb risks of investment in new technology and reduce transaction costs of exchange. Economic development can be largely viewed as a continuous process of institutional innovation in response to (and to facilitate the use of) new productive technologies, and technical innovation made possible (or constrained by) the risks, and costs of exchange within existing institutions governing market exchange.

Therefore, assessments of market performance based on whether costs approximate marketing margins must be viewed as very static assessments, and fail to incorporate the longer-run dynamic issues of how incentives can be structured within the rules of economic exchange to reduce costs at the various stages of the production/marketing system (Jayne 1997).

The second criteria (establishing competition through number of firms in the market) is also problematic in the presence of scale economies. In Ethiopia grain markets, scale economies may arise both from technology and from the existence of isolated thin markets. The high costs of transportation between a production region and a major regional market may result in very low producer prices in the remote production region. Low prices in turn depress the marketable grain surplus available for purchase. And the existence of small surpluses in turn limit the number of grain traders that can profitably operate in an area, particularly in the presence of scale economies in marketing activities (e.g., transportation). Therefore, the existence of few traders (high market concentration among grain buyers) would not necessarily point to lack of competition or artificial barriers to entry, nor would a large number of traders each handling very small volumes indicate that per unit marketing costs are being minimized.

Thirdly, the ability to capturing the gains from specialization and commercialization is limited by the size of the market. The size of the market is in turn influenced by transaction costs. These costs include the ex-ante costs of collecting the information necessary to decide whether to engage in exchange, negotiating the deal, and the ex-post costs of contract monitoring and enforcement. Where these expected costs exceed the expected gains from exchange, no transaction takes place. High transaction costs therefore prevent what would otherwise be beneficial trades and depress the dynamic development of exchange-based economic systems required for structural transformation. Therefore, market performance should also be assessed based on the range of activities that do not exist in addition to assessing the efficiency of existing exchange arrangements.

While a specific goal of policy is to reduce marketing costs, the evolution of more productive economies over the past two-hundred years has featured the development of more complex and costly marketing and contracting arrangements but which has facilitated investment in more technically efficient production processes (North 1994). The evolution of more productive economic systems may involve higher marketing costs, not less. In this regard, marketing systems performance should be evaluated not only to the extent that costs of the existing system are minimized (a static approach). One needs to consider those costs in relation to the set of services provided, and the effect of these services on technical innovation and productivity growth throughout the food system. For example, a complex contracting mechanism for exchange of product may involve high costs in terms of negotiation, legal services, monitoring, and related public resources to resolve contract disputes if necessary, but

such mechanisms may provide the stability of returns to justify major investments in new technology that lead to productivity gains at other stages of the food system.

2.2. Data and Methodology

This study is based on data obtained from both primary and secondary sources. The primary sources include the Rural Household Survey and the Traders' Survey, both implemented by the Grain Market Research Project (GMRP) in 1996. Secondary sources of data include the GMRP's Market Information System monthly bulletins and other published materials by the Project and other agencies.

The Rural Household Survey covered a random sample of more than 4,000 rural farm households all over the country and provides an important database on rural households' behavior, including grain production, grain purchase, sales and exchange, food aid and food for work, land use and cropping patterns, agricultural input utilization, etc.

The Traders' Survey, which is the major source of primary data for this study, covered about 20% of the 1,100 wholesale traders operating in 26 regional grain markets throughout the country. These markets were initially selected for the reporting of market information so as to fairly represent the whole country in terms of geographical location and cropping pattern. About one-fifth of the total number of wholesale grain traders operating in each of the 26 markets was selected using a stratified random sampling procedure. Before the sample was selected, a list of all traders in a particular market was prepared in an ascending/descending order, on the basis of their 'assessed' volume of purchase, in order to fairly spread the sample over the entire study population and obtain a representative sample of small, medium, and large traders. This information was provided by the purchasing agents of the Ethiopian Grain Trading Enterprise (EGTE), who liaise frequently with the grain traders in their respective areas in the course of assessing market conditions on behalf of EGTE.

A substantial amount of data relating to traders' ownership of physical assets, access to credit, transportation and market information, buying, storing and selling behavior, etc., was collected using a formal survey questionnaire. Field data collection was carried out by trained enumerators selected from EGTE personnel. Grain price data were obtained from both EGTE and the GMRP/MIS. The new market information system (GMRP/MIS) has been operational since August, 1996 and collects producer, wholesale and retail prices weekly from the 26 markets for the major cereal crops.

The volume of grain flows through the various channels, and the relative share of the different market participants were estimated and diagrammatically presented based on the reported grain purchase and sales data obtained from the Farm Household Survey and the Traders' Survey. Spatial and temporal grain flows by wholesale merchants were also estimated based on the results of the Traders' Survey.

A measure of the efficiency with which storage function is performed was computed using grand seasonal indices (GSIs) prepared by GMRP. EGTE monthly wholesale grain prices for the period 1991 - 1996 were decomposed using time series analysis so as to isolate its

seasonal pattern. The temporal price analysis in this study mainly focuses in Addis Ababa and covers only selected crops - mixed teff, white wheat, and white maize.

A simple spatial equilibrium model was also used to analyze inter-market price differences using eight month average wholesale prices of selected markets and crops obtained from the new GMRP/MIS.

3. GRAIN MARKET STRUCTURE AND CONDUCT

The market for grain is the largest of all markets in Ethiopia in terms of the volume of output handled, the number of producers, consumers and other market participants involved, and the vastness of the geographical area of operation. Million of farmers and consumers as well as a number of marketing agents are engaged in the production and consumption of grain and in the provision of diverse marketing services, namely, buying, selling, transporting, storing, processing, retailing, etc. The main features of the Ethiopian grain marketing systems are highlighted as following:

3.1. Marketed Volumes Through Alternative Channels

It is difficult to determine precisely the volume of grain marketed annually, because it fluctuates from year to year depending on weather and rainfall conditions. According to the preliminary findings of the Rural Household Survey conducted in 1996, a relatively good crop year, it is estimated that the proportion of output marketed by farmers is about 27%. The marketable surplus of state farms is also estimated to be 80% of their produce. Thus, based on CSA's 'meher' and 'belg' production estimate of 1995/96, the total quantity of grain marketed was about 26.4 million quintals or 28% of total yearly production.

The proportion of output marketed, however, varies from crop to crop; it was 26% for cereals, 37% for pulses, and 71% for oilseeds. Cereals, pulses and oilseeds represent about 83%, 12% and 5%, respectively, of the total grain marketed by farmers and state farms.

The marketed quantity flows from producers to consumers through a number of channels. Figure 1 below depicts the various market participants, their inter-relationships, the options available for the different market participants for buying or selling grain, and an estimate of the volume of grain passing through the alternative channels.

As can be seen from Figure 1, producers of grain consist of small farmers and state farms, which account for 95% and 5% of the total marketed quantity, respectively. Producers' market outlets include

- (a) direct sales to rural and urban consumers
- (b) direct sales to rural assemblers/farmer-traders,
- (c) sales to retailers,
- (d) direct sales to inter-regional traders, and direct sales to Government owned large mills.

The rural assemblers, mainly consisting of farmer-traders, buy grain from farmers at rural markets with the purpose of reselling it to consumers and/or regional wholesalers. They are mostly independent operators, but sometimes they are temporarily hired by the regional

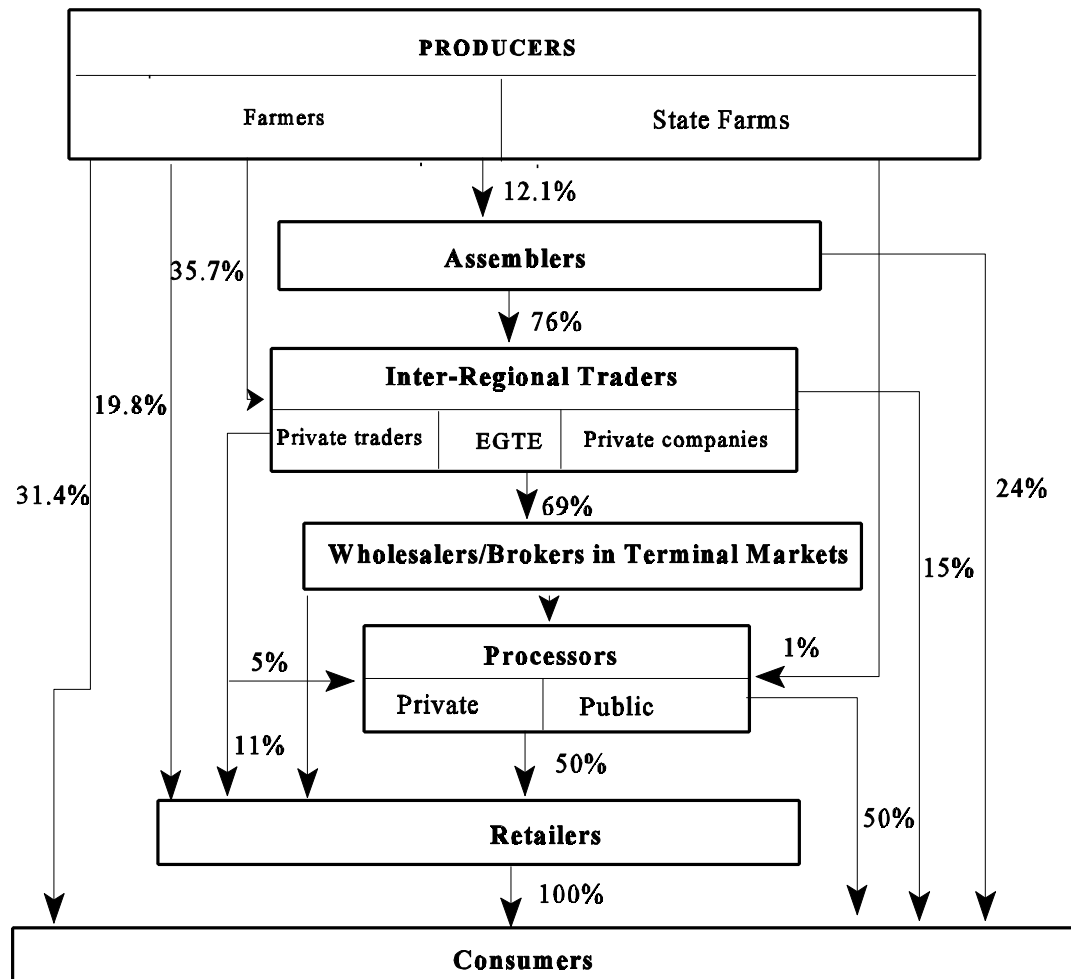
wholesalers as agents for a fixed fee or on commission basis. As shown in the figure, these assemblers sell most of the grain they buy from farmers to inter-regional grain traders.

The inter-regional traders consisting of wholesale trades, EGTE, and private companies are the principal actors in inter-regional grain movement. As can be seen from the figure, these actors purchase about 45% of the total domestic marketable quantity and transport and sell 69% of it in the terminal markets and deficit areas.³

³ These estimates are based on data from the Household and Trader Surveys, covering the 1995/96 crop year, a relatively large harvest year.

Figure 1. Grain Market Structure and Commodity Flows, 1995/96 Crop Year

Domestic Grain Production and Supply							
* Domestic Production = 94.3 million qts (Farmers = 98.4%, State Farms = 1.6%)							
* Marketed Quantity = 26.4 million qts (Farmers = 95%, State Farms = 5%)							
Teff: 21% of Total Marketed Quantity	Wheat: 14% of Total Marketed Quantity	Barley: 10% of Total Marketed Quantity	Maize: 25% of Total Marketed Quantity	Sorghum: 11% of Total Marketed Quantity	Pulses: 12% of Total Marketed Quantity	Oilseeds: 5% of Total marketed Quantity	others 2% of Total marketed Quantity



Data is not available on the total number of regional wholesale grain traders operating in the whole country. However, according to the data obtained from the MIS, there were about 1,100 wholesalers identified in the 26 regional markets covered by the MIS. There was an average of 42 merchants per market, but this number varied from 5 to 200, depending on the importance of the market. Of the 1,100 wholesalers identified in the 26 markets covered by the MIS, 219 were selected through a stratified random sampling procedure for a structured interview. The characteristics of these 219 sample merchants are summarized as follows:

Table 1. Characteristics of Wholesale Traders Covered by the Survey

Characteristics	Before Market Liberalization	After Market Liberalization			
Percent owning store	48.0	57.9			
Percent owning vehicle	15.3	12.2			
Percent owning truck	14.3	15.2			
Percent owning weighing scale	95.3	94.9			
Percent having telephone line	44.1	46.0			
Percent who were engaged in grain	59.4	100.0			
Average number of years in grain		14.0			
Sex composition (%):					
Males		96.8			
Females		3.2			
Ethnic Composition (%)					
Amhara		42.4			
Oromo		26.7			
Gurage		14.3			
Tigraway		10.6			
Others		6.0			
Level of education (%):					
No formal schooling		17.8			
Religious school		8.7			
Primary school		35.6			
Secondary school		33.3			
College education		4.6			
Ownership of Business (%)					
Sole proprietorship		98.2			
Partnership		1.4			
Private limited		0.5			
Proportion of Traders Undertaking Different Activities in Addition to Grain Trade (%) (N = 640)	First Quartile (lowest)	Second Quartile	Third Quartile	Fourth Quartile	All
None	59.3	65.5	61.1	50.0	58.6
1	25.9	24.1	19.4	22.2	22.7
2	7.4	6.9	13.1	16.7	11.7
3	7.4	3.4	5.6	11.1	7.0
Important business activities including grain trade in terms of revenue generated in 1996					
First important activity		Grain trade (75%)			
Second important activity		Freight transport (27.6)			
Third important activity		Shop (30.3%)			
Fourth important activity		Grain milling (16.7%)			

Source: GMRP Traders' Survey

3.2. Market Concentration

Market concentration refers to the number and relative size distribution of buyers/sellers in a market. Many studies indicate the existence of some degree of positive relationship between market concentration and gross marketing margins. It is generally believed that higher market concentration implies a non-competitive behavior and thus inefficiency. But, the studies also warn against the interpretation of such relationships in isolation from other determinant factors like barriers to entry and scale economies (Scott 1995).

There are a number of measures of market concentration, but the most commonly used is the market concentration index, which measures the percent of traded volume accounted for by a given number of participants. Empirical studies in the fields of industrial organization suggest certain levels of concentration at which non-competitive behavior of market participants begin in different industries. For example, Kohls and Uhl (1985) suggest that a four-firm concentration ratio (CR4), that is, the market share of the largest four firms, of less than or equal to 33% is generally indicative of a competitive market structure, while a concentration ratio of 33% to 50% and above 50% may indicate a weak and strongly oligopsonist market structures, respectively. However, the CR4 is best regarded as a “rule of thumb,” and as mentioned previously, there are reasons why high concentration levels may be reasonable in light of small potential volumes traded. Moreover, as shown in Figure 1, producers in Ethiopia sell about half their marketed grain to retailers and direct to end users, bypassing the grain wholesalers that are the focus of this analysis. Concentration ratios at the wholesaler level may exaggerate the degree of market power that may be exerted by large traders due to the existence of alternative channels for grain distribution in many areas.

Notwithstanding these caveats, the concentration of the wholesale grain trade is clearly important information in Ethiopia. This was computed using annual volume of purchase both at national and local market levels. The results are displayed by the Lorenz curve shown in Figure 2 and by the ‘Four- Firm Concentration Ratio’ or CR4 presented in Table 2.

As can be seen from the Lorenz Curve below, about 90% of the merchants account for 57% of the volume of grain purchased nationally by wholesalers. The largest 10% of wholesalers account for about 43% of the grain marketed nationally at the wholesale level. The bottom 40% have an insignificant share of less than 10%. The computed Gini coefficient is about 0.56, indicating a high degree of inequality in terms of volume annually handled. The degree of inequality is also similar for the specific crops. However, the observed inequalities in the volume of total and specific grain purchases by traders may be partly explained by the degree of production concentration in few areas, particularly in the traditionally surplus producing regions of Gojam, Shewa, and Arssi for all crops, Arssi and Bale for wheat and barley, Wellega and East Shoa for Maize, Gojam and Shoa for teff.

Unlike the size distribution of traders at the national level, the extent of inequality in market share at the local market level differs from market to market and from crop to crop. After disaggregating the number of local traders operating in individual markets (Table 2), no market in the sample had a level of concentration for all grains collectively which would be considered anti-competitive, except possibly Gonder and Bahir Dar. The largest four traders in these markets accounted for 44% and 34% of the grain traded at the wholesale level in

these markets. In Bahir Dar, the largest four teff and sorghum wholesalers accounted for 46% and 63% of the teff and sorghum traded locally. Market concentration was also found to be over 40% for maize in Dire Dawa and Bahir Dar, barley in Assassa and Shashemene, and wheat in Nazreth and Shashemene. However, with these possible exceptions, the structure of the grain markets generally does not indicate that few traders in the local markets control a sufficiently large share of the marketed volume at the wholesale level which they could use to influence grain prices to their advantage. Market concentration in Addis Ababa, the dominant market in the country, was found to be very low for all cereals.

The question of the relevant market hinges on the geographic scope of traders' business and barriers to trading in several different grains or market places. Entry barriers may be caused by the costs of transportation or lack of timely information. There is some evidence of this based upon differences in prices among markets (see Table 6). The issue of market concentration and competition is clearly related to the high costs of transportation and small market volumes among some markets. There are well-established economies of scale in grain trading. If the potential marketed volumes from farmers in a particular area are very small, unit costs may rise as the number of traders increase. This would tend to limit the number of traders operating in isolated areas with low trade volumes. However, these considerations do not rule out problems of market conduct and/or serious barriers to entry influencing market performance. These issues are discussed below.

Figure 2. Size Distribution of Wholesale Grain Traders in the 26 Markets

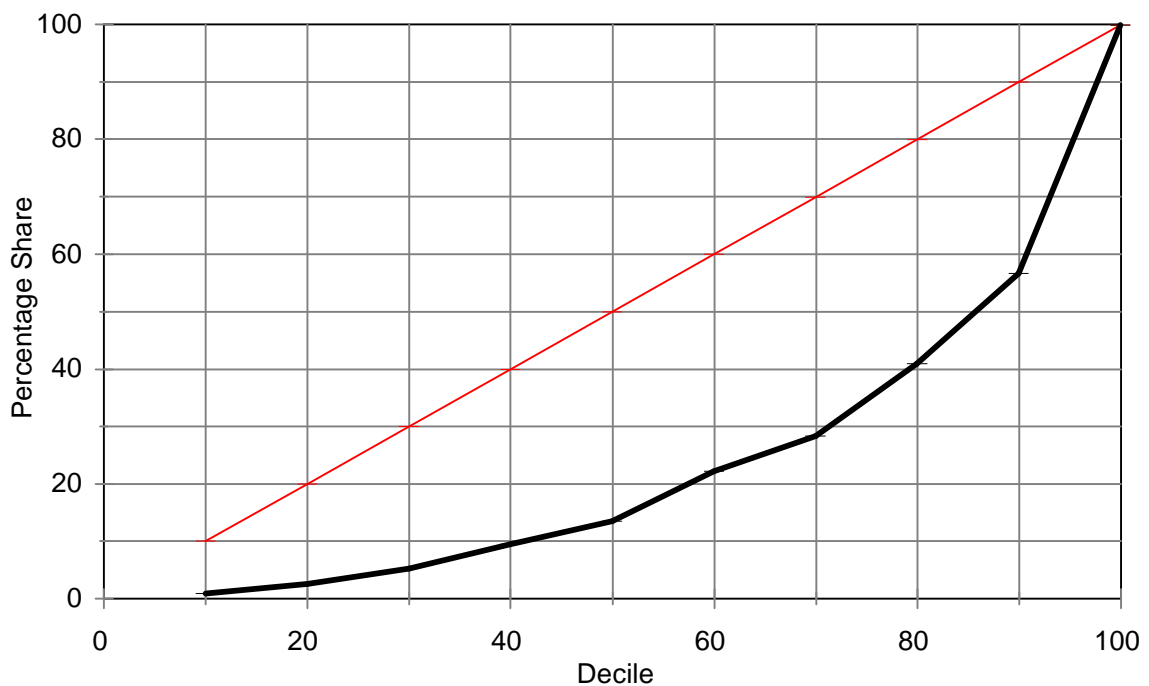


Table 2. Estimates of Four-Firm Market Concentration Ratio at Different Markets

Market	Crop	CR4 (%)	Market	Crop	CR4 (%)
Dire Dawa	Maize	56.02	Nazreth	Wheat	47.26
	Sorghum	32.97		Teff	12.89
	Teff	19.49		Maize	28.47
	All Grains	34.70		All Grains	20.16
Mekele	Teff	8.00	Shashmene	Maize	20.6
	Sorghum	7.84		Wheat	49.38
	All Grains	20.35		Barley	55.81
				All Grains	32.56
Addis Ababa	Teff	16.47	Meki	Maize	37.77
	Wheat	16.06		Teff	27.68
	Maize	11.91		All Grains	32.58
	All Grains	3.56			
Gonder	Sorghum	45.26	Enchini	Teff	34.73
	Teff	19.10		Wheat	20.65
	All Grains	44.06		All Grains	27.31
Bahir Dar	Teff	46.15	Hosaena	Teff	20.07
	Maize	42.55		Wheat	11.24
	Sorghum	63.24		All Grains	13.03
	All Grains	33.99			
Assassa	Wheat	20.62			
	Barley	50.79			
	All Grains	20.32			

Source: GMRP, Traders' Survey

Note: Estimates of CR4 were obtained as $(4 * \text{total purchase of the largest trader in the sample}) / (\text{total purchases by all traders surveyed in the market} * \text{total number of traders operating in the market} / \text{number of surveyed traders})$.

3.3. Market Conduct

Farmers normally bring their marketable grain to markets that are 5 to 20 km away from their villages by carrying it or using pack animals. Grain sales by farmers in markets beyond 20 km distance are infrequent. Most of the grain is sold between January and March. Grain sales by farmers during the above mentioned period represents 79% of their annual sales; and the remaining 21% is sold during June - December (GMRP Rural Household Survey 1996).

Farmers are forced to sell their grain immediately after harvest, when prices are generally low, because of fear of storage loss and also in order to meet their cash needs for the purchase of food, for covering wedding expenses, and for repaying loans and taxes. Because of their large number compared to the wholesalers, lack of direct access to other markets or alternative channels and absence of any market extension service, farmers' bargaining power is generally weak.

Similarly, the main grain buying season of wholesale traders is between January and March in which they buy about 51% of their yearly supplies. The volume purchased during the periods October-December, April-June, and July-September gradually declines to 26%, 15% and 8%, respectively. The difference in the sales pattern of farmers and the purchase patterns of wholesalers is due to the fact that about half of farmer sales are directly to consumers or retailers, not to the wholesale trader.

Even though the wholesale merchants collect grain from different places, they normally purchase about 60% of their grain supplies at their own warehouses. The traders do not provide advance payment, credit, or any incentive other than a price to farmers as a means of encouraging them to bring the grain to their stores. Nationally, 97% of the farmers reported that they did not get any price offer before harvest. Grain prices were not fixed in advance and less than 5% of farmers took loans from merchants during the 1995/96 season. Farmers' decisions regarding grain sales to merchants were not influenced by such factors as blood, ethnic, or religious relationships according to the survey results.

Traders indicated that the price at which they buy grain at the local markets is determined by deducting miscellaneous costs and a net profit margin from the prevailing wholesale price in Addis Ababa which they get from the brokers. This indicates that the local market prices are largely determined in relation to Addis Ababa prices. However, the margin between regional market prices and Addis prices may fluctuate if the merchant, who has already purchased grain in the regional market, cannot secure transport quickly and prices either decline or rise meanwhile in Addis. In this way, problems in securing transport in a timely way introduces substantial risk into the operations of grain wholesalers. It has been reported that prices in Addis Ababa change rapidly and enormously between the time they inquire about wholesale prices in Addis Ababa and the time they transport and sell their grain in the terminal markets. As a result of these risks, wholesalers may incorporate an added "risk premium" into their marketing margins, which may account for why margins appear higher than costs in some cases (see Section 5.1).

On the sales side, the wholesale merchants' strategy is mainly focused on the terminal markets and deficit areas of the country rather than on the smaller local markets. Some 69% of the grain purchased by wholesalers is transported and sold in the terminal markets and deficit areas. Of the total quantity shipped out by traders, nearly 35% and 31% went to Addis Ababa and the deficit areas, respectively (Table 3). In Addis Ababa, in particular, inter-market grain flow is coordinated by the brokers operating in the main terminal markets. There are more than 200 brokers/wholesalers in Addis Ababa, but the most important are not more than 50. The brokers are specialized by route and coordinate grain buying, selling, transporting and pricing activities. The brokers generally do not compete aggressively for regional wholesalers' business and most of the regional traders are loyal to their respective "client" broker. This situation indicates generally long-term relationships between brokers and regional traders based on trust.

Most wholesalers (about 66%) carry out their local grain sales by directly selling to clients, but grain sales in the terminal markets and other deficit areas are mostly carried out using the services of commission agents and sometimes by directly selling to buyers. In the Addis

Ababa terminal market in particular, regional wholesalers have difficulty selling grain without the assistance of the big brokers.

Almost 83% of the interviewed merchants said they can not sell grain in Addis Ababa without the help of the brokers. Half of the regional merchants reported that they regularly use the services of particular brokers while the others do not. The main reasons for using the services of brokers are that they (1) sell grain on behalf of the regional merchants; (2) provide market information; (3) collect and haul back grain sacks; (4) collect and send back money from the sale of grain; (5) identify grain buyers from deficit areas; (6) provide temporary storage services; and (7) arrange transport for transferring the grain. In terms of importance, however, the merchants identified selling grain (62%), providing market information (36%), collecting and sending grain sacks (32%), collecting and sending the money from grain sells (49%) as the major functions of the brokers. Merchants usually pay a fixed commission amounting to Birr 0.90 per quintal for local sales agents and Birr 1.42 per quintal for brokers operating in the terminal markets and other deficit areas.

The wholesale merchants are also engaged in cross-border trade with Eritrea mainly in grain export. Their involvement in importing grain and rendering transport service is minimal. In 1996 the estimated volume of grain exported to Eritrea was some 510,000 quintals, of which 409,200 quintals or 80% was sorghum. Other crops exported include maize 65,000 quintals or 13%, teff 25,300 quintals or 5%, wheat 7,500 quintals or 1.5%, and barley 3,000 quintals or 0.6% of total export. The major grain exporting market to Eritrea is Gonder which accounted for about 99% of the sorghum and 92% of the maize exported to Eritrea. This export trade requires trades in large volumes and these economies of scale in long-distance trade at least partially explain the appearance of high market concentration for Gonder in Table 2.

The most important teff exporting markets to Eritrea are Mekele (18%), Alamata (28%), Ehil Berenda (17%), Dangla (11%), and Shewa Robit (24%). Wheat export to Eritrea is from Ehil Berenda (Addis Ababa).

Table 3. Estimated Inter-market Grain Flow Matrix (in quintals)

Origin	Destination Markets								Total	%
	Addis Ababa	Dire Dawa	Mekele	Nazreth	Wollo	SPNNR	Gonder	Others Deficit Areas		
Dire Dawa	19,200							9,600	28,800	1
Mekele								8,100	8,100	
Alamata			31,788					16,525	48,313	2
Gonder	2,125		2,200		300,000			467,890	772,215	27
Bahir Dar	69,937		6,525		8,413		21,562	7,850	114,287	4
Dessie	23,500				650				24,150	1
Woldiya	2,800		700						3,500	
Dangla	11,000		4,725				5,375	14,650	35,750	1
Debre Tabor	13,500								13,500	
Shoa Robit	1,200				8,300			4,200	13,700	
Dejen	90,700								90,700	3
Assassa	71,675			30,225				24,850	126,750	5
Eteya	102,545			22,500					125,045	4
Nazreth	16,690	174,800						207,437	398,927	14
Shashemene	74,168			19,987		121,648		72,896	288,699	10
Meki	21,935	10,750		84,375		31,551			148,611	5
Enchini	96,295								96,295	3
Ambo	15,575							7,439	23,014	1
Shambu	44,153	7,813						14,660	66,626	2
Nekemte	3,825								3,825	
Gimbi										
Bale Robe	188,850			5,900				9,000	203,750	7
Mettu	13,672								13,672	
Jimma	21,803							2,002	23,805	1
Hosaena	66,522					75,904		1,953	144,379	5
Total	971,670	193,363	45,938	162,987	317,363	229,103	26,937	869,052	2,816,413	100
As% of Total	35	7	2	6	11	8	1	31	100	

Source: GMRP, Traders' Survey 1996

3.4. Barriers to Entry

Many of the institutional barriers to grain trade, such as the enforcement of the quota system, price control, preferential treatment given to state enterprises and cooperatives in the allocation of bank credit, limitations imposed on capital ceilings for wholesale and retail trade, restrictions on the number of merchants in a particular market, etc., have been abolished since the liberalization of markets in 1990.

Even though such barriers are no longer obstacles to private participation in grain trade, there are still other barriers that require serious attention. The most important of these is the large amount of start-up capital required for financing grain trade operations. Taking the average annual volume of purchase by the lowest quartile, i.e., 1,014 quintals as the minimum scale of operation, an average procurement price of Birr 150 per quintal, and based on the assumption that this volume is in 2 discrete purchase/sale cycles per year, the minimum financial outlay needed for purchasing, storing and transporting grain would be about Birr 75,000 (roughly US\$11,538). Allocating such an amount of capital from personal savings or obtaining bank loan by presenting a collateral of equivalent value is difficult for most potential entrants.

As mentioned earlier, the already established wholesale merchants, particularly the relatively big ones, carry out other business activities such as providing freight service, grain milling, etc., in addition to grain trade. This gives them an additional advantage compared to small merchants and potential entrants, because their unit cost would be relatively lower than that of others.

Other barriers to entry include the cost of establishing oneself in a convenient location in the market place and the problem of access to appropriate and adequate storage facilities.

4. PROBLEMS AND CONSTRAINTS FACED BY TRADERS

The major problems and constraints reported by grain merchants are ‘kella’ charges, absence of control on un-licensed traders, high taxation rate, time wasted at ‘kellas’, high cost of borrowing, poor quality of storage facilities, required contributions for local development, poor road conditions, poor telephone services, high cost of grain transport and shortage of storage facilities. Only some of the most important are briefly discussed below:

4.1. ‘Kella’ Charges

Grain movement checkpoints have been identified as the number one problem by 35% of the interviewed merchants. The number of grain movement checkpoints between any two markets varied from 2 to 15 and the most frequently observed number was 2. The official and unofficial amount of money that merchants paid also varied from area to area and from individual to individual, but the average ‘kella’ charge was Birr 8.30 per quintal. The following table shows the number of ‘kellas’ and the amount charged between pairs of selected markets.

Table 4. Number of ‘Kellas’ and ‘Kella’ Charges Between Markets

Source Market	Destination Market	Number of ‘Kellas’			‘Kella’ Charges (Birr/qt)		
		Min	Max	Mean	Min	Max	Mean
Ambo	Addis Ababa	2	2	2	5.50	10.00	7.50
Nekemte	Addis Ababa	2	4	3	7.00	15.00	11.40
Assassa	Addis Ababa	2	4	3	5.00	20.00	7.94
Dejen	Addis Ababa	2	3	2	1.80	15.00	4.12
Dessie	Addis Ababa	3	3	3	4.00	6.00	5.00
Bale Robe	Addis Ababa	4	8	6	5.00	9.00	7.00
Enchini	Addis Ababa	1	1	1	7.00	35.00	12.44
Hosaena	Addis Ababa	5	10	8	8.00	8.00	8.00
Nazreth	Dire Dawa	5	15	8	5.00	12.00	8.85
Shambu	Dire Dawa	15	15	15	15.00	21.00	18.00
Assassa	Nazreth	3	3	3	5.00	6.00	5.53
Alamata	Mekele	1	1	1	5.00	13.00	10.42
Dangla	Bahir Dar	1	2	1	1.00	2.00	1.75
unweighted mean kella charges between routes:							8.30

The highest number of 'kellas', that is, 15, was observed between Shambu and Dire Dawa and the total amount charged along this trade route was Birr 18. Similarly, the average number of grain checkpoints between Nazreth and Dire Dawa was 8, but the total charge was only Birr 8.85 per quintal. On the west route, the most frequently observed number of 'kellas' between Nekemte and Addis Ababa was 2, but the total official and unofficial payment asked was Birr 11.40 per quintal. On north-west route the 'kella' charge enforced between Bahir Dar and Addis Ababa was Birr 6 per quintal at two checkpoints.

The number of 'kellas' between Bale Robe and Addis Ababa varied from 4 to 8, and the 'kella' charge from Birr 7 to Birr 9 per quintal. There was only one checkpoint between Alamata and Mekele, but the amount charged was Birr 10.42 per quintal. On the other hand, there was neither 'kella' nor any charge between Shashemene and the deficit areas in the south.

Although the 'kellas' are intended to serve as a mechanism for collecting sales tax on grain, they have a negative impact on grain movement and consequently on producer and retail prices. For example, taking the average maize price spread of Birr 16.50 per quintal that prevailed in August, 1996 between Nekemte and Addis Ababa (Asfaw et al. 1997), it is evident that a 'kella' charge amounting Birr 11.40 per quintal could not encourage merchants to move grain from Nekemte to Addis Ababa. An important side-effect of raising revenue through taxing grain distribution is therefore to reduce the degree of spatial market integration and to impede the gains from trade.

Moreover, the variability of the number of 'kellas' and the amount charged between any two markets has caused uncertainty and confusion among merchants; this may have contributed to the substantial price differences observed among regional markets. Traders have recently alleged that the 'kella' taxes have been replaced by taxes collected at their warehouses after estimating the number of quintals purchased.

Another problem related to 'kellas' is the transport time wasted at the 'kellas'. According to a recent study conducted by the GMRP, the average time spent at a 'kella' is estimated to be about 8.58 minutes. This indicates that on such routes as Nazreth - Dire Dawa, as much as 88 minutes are spent at the 10 'kellas' found between these two markets. The merchants are normally obliged to compensate the truck owners for the time they spend at the 'kellas' and then recoup the expenses from grain buyers and/or sellers.

4.2. Absence of Control on Un-licensed Merchants

Another problem identified by merchants is the absence of government control on un-licensed merchants. Although the law requires merchants to acquire a licence from the regional authorities in order to engage in grain trading (at a cost of 200 Birr per year for wholesaler licence), licensed traders allege that this is not well enforced, which provides an un-level playing field in grain trading. As a result of this, some have returned their licences to continue operating illegally. Although data for all markets is not available, the number of merchants operating without license is large. For instance, 15 of the 45 merchants operating at Meki have no licence, and only 5 out of about 20 merchants in and around Shoa Robit have licence.

As these unlicensed merchants do not pay sales tax, profit tax, etc., the licensed merchants are at a disadvantage. According to the law, a small licensed merchant handling about 1,000 quintals is required to pay 35% of his net profit or approximately Birr 2,500. The existing system imposes different costs on different categories of grain trading firms. This creates incentives for the licensed traders to avoid taxes and most likely reduces the average scale of traders' operations and potential benefits of scale economies.

4.3. Access to Bank Credit

Shortage of financial credit was reported to be another limiting factor in operation and business expansion. The problems in acquiring loans seem to occur from lack of collateral and partly from lack of interest to expand business. Despite the fact that about 65% of the merchants believed that availability of credit has increased since the market liberalization of 1990, 39% of those interviewed reported they did not obtain any credit. The main reasons given for not taking bank credit are varied, but the most common are the lack of collateral to be eligible for bank loan, the high risk associated with grain business, and lack of interest to expand the business because of the competition from un-licensed merchants.

About 61% of the wholesale merchants covered by the survey reported that they have obtained credit amounting to Birr 27.2 million, of which about 95% was for financing grain purchase operations, 2% was for starting up new lines of business, and 2% for investment on transport equipment. About 49% of the loans obtained by merchants was from commercial banks, 48% was from informal sources, mainly large grain businesses, and the rest was from relatives, friends and 'equb'.

Access to bank credit varied by category of merchant; of the total bank credit given the share of the lowest quartile was 18% and that of the upper quartile was 34%. The respective shares of the second and third quartiles were 23% and 25%. The share of the large merchants of the total credit obtained from both formal and informal sources, however, was 66%; this is because the credit extended by the large private grain businesses was totally received by the upper quartile. This gave the large merchants additional advantage, because such loans are interest free; while the other type of loans bear 13% to 15% interest per annum. Large grain buyers from Eritrea and EU local purchase bid winners provided interest free credit to regional merchants so that they could buy and supply them large quantities of grain. The repayment period for loans obtained from commercial banks is 12 months.

Even though 61% reported that they obtained credit, the average amount of bank credit taken was Birr 98,043 for the first quartile, Birr 136,136 for the second quartile, Birr 100,969 for the third quartile and Birr 164,351 for the fourth quartile. The overall mean was Birr 123,750. This amount is too small to enable the merchants to make capital outlays on storage and transport facilities and even to finance a reasonable level of grain inventories. Without such investments, it would be difficult to anticipate operational and technical improvements in the grain marketing system in the future.

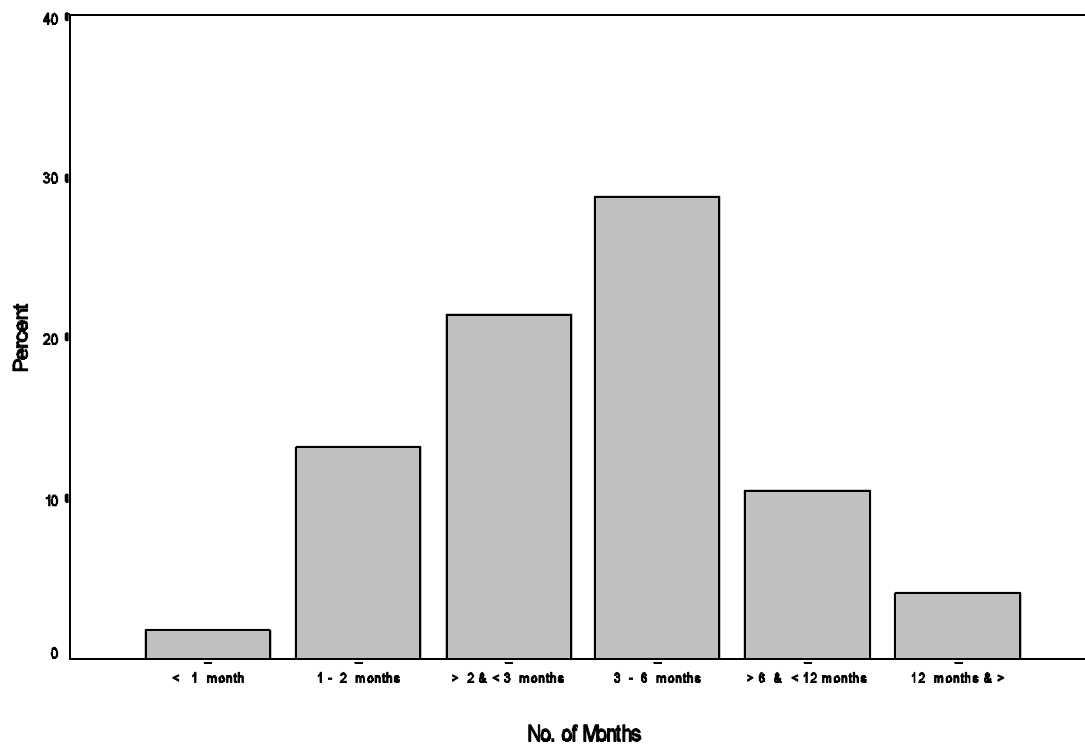
4.4. Access to Storage Facilities

Because of the subsistence nature of grain production in Ethiopia, most of the grain produced by rural households is retained on farm for consumption, seed, and reserve. According to the Rural Household Survey, about 72% of the total grain production is retained for on-farm uses and stored at the farm in traditional storage structures that are mostly inadequate to protect the grain from damage caused by weevils, termite, rodents, birds, moisture and other pests.

Although the extent of crop damage at the farm level due to poor storage is not well documented, the above mentioned survey indicates that most farmers face storage problems. The most serious storage problems faced by farmers are attacks by weevils, termites, rats and rodents; more than 65% of the farmers reported that they face such problems. Some farmers even reported that they sell their grain immediately after harvest because of fear of storage loss at the farm level.

Similarly, although storage capacity in the assembling markets is reported to have increased since the market was liberalized in 1990, about 66% of the merchants reported that storage facilities are still inadequate in terms of availability, storage and premise space, and location. About 19% of the merchants reported that they have tried to obtain storage rental services between December and March, but failed to do so. The facilities are also reported to be vulnerable to damages caused by moisture, rodents, and pest.

Figure 3. Average Number of Months Stock is Held in Store by Wholesale Traders



Source: GMRP, Traders' Survey 1996

More than 80% of the merchants hold grain stocks for up to 6 months between the time of grain purchase and sale, 13% keep inventories for up to 12 months and only 5% for more than a year. Most merchants use bagged storage, but sometimes also use bulk storage. Weight loss during storage was estimated to be 3.32% for maize, 2.10% for white wheat and 2.37% for mixed teff, but these figures vary with length of storage; for example, storage loss for mixed teff varies from 1.5% for grain stored for up to two months and 4.2% for grain stored for over a year. The major causes for storage loss in order of degree of seriousness are moisture, rodents, and spillage.

Shortage of adequate and appropriate storage facilities in or around the market places results in high marketing cost in the form of transporting the grain from the center of the market to the storage locations and high storage loss and spillage due to the susceptibility of the existing poor facilities to damages caused by moisture, rodent, pests as well as due to poor structure and unhygienic condition.

A rough estimate provided by merchants shows that the average storage cost of grain is about Birr 5.40 /quintal/month. This is composed of storage loss (9.20%), storage rent (16.15%), fumigation cost (9.00%), interest cost (24.00%), labor (12.77%), materials (9.67%), and others (19.21%).

Most of the merchants said that the Government can play an important role in improving marketing facilities in their areas of operation including developing new market places, allowing merchants to improve existing buildings which they acquired through rent, constructing and maintaining roads and expanding telephone services.

4.5. Access to Transportation Services

The wholesaler traders normally use trucks to move their grain from the assembling markets to the terminal markets and other deficit areas. About 15% of the wholesalers have their own truck and the rest depend on private and state owned freighters as well as on NGOs. Ownership of truck varies by category of merchant; for example, while only 5% of the lowest 25% of the traders own trucks, 45% of the upper group have their own truck.

For all seasons, more than 60% of the wholesale merchants reported that their primary source of trucking service are private haulers operating in the vicinity of the assembling markets. The second and third important sources of transport services for most merchants are private truckers operating outside the assembling markets and state owned organizations. The wholesale merchants who own trucks transport about 80% of their grain using their own trucks. Merchants who do not own trucks, however, have difficulty of getting transport services; more than 55% said it takes them a week to get trucks on rental and 12% said it takes them up to two weeks. Smaller traders observed that such transport constraints tied up

their working capital in inventory and allowed relatively large traders (who had greater liquidity) to exert greater influence over the market.

Both problems of availability and high transport tariff have been identified as serious by the interviewed merchants. Grain destined for the Addis Ababa Ehil Berenda has to arrive on Sunday, Tuesday, and Thursday evenings for sale the next day before the prevailing wholesale price changes. Normally grain is sold the next morning until 10 a.m. Grain that arrives late has to be sold four to five days later by which time prices could fall substantially and subject merchants to large losses. After 10 a.m, the trucks are normally ordered to leave the central area until the next peak market day. The truckers spend 2-3 days in Addis Ababa with their loads, and if the grain is not sold within these days, it has to be unloaded somewhere near the sheds or the merchants have to pay Birr 100/truck/day.

If the grain is not sold on truck within the following 2-3 days, the merchants unload their supplies and are required to pay Birr 2/quintal/month for storage. As the storage place is not protected against dust, rodents, etc, the merchants could incur additional losses due to color change, spillage, spoilage, etc. The sacks could also be damaged by rodents. For fear of losses and damage, the merchants sometimes instruct their brokers to sell the grain at the price quoted by their broker.

Since the timely and speedy flow of grain from producing to consuming areas is essential for an efficient marketing system, the present slow movement of grain could have contributed a lot to market inefficiency and substantial inter-regional price variations. In addition to the delay in obtaining transport service, weight loss is also common in transporting grain; 83% of the merchants interviewed reported that they experience weight loss ranging from 0.1% to 16%. The mean loss reported is about 2.18%.

4.6. Access to Market Information

Farmers normally get market information from different sources including neighbors and traders. Their primary source of information is the market place; about 56% said that their first source of information is the market place, 42% mentioned neighbors as the second source of information, and 63% said traders are their third major source of market information (GMRP, Rural Household Survey 1996).

Grain merchants also get market information regarding overall harvest prospect, supply situation in their areas of operation, demand for and supply of grain in Addis Ababa, price of grain in different regional markets, grain buying price of mills, private companies and EGTE and quantity of grain imported. However, not all merchants have equal access to the above mentioned types of market information. For example, although most merchants believe that information on harvest prospect, supply situation in their areas, and demand for and supply of grain in Addis Ababa is very much valuable for their operations, only about 10% of the merchants reported that they utilize such information. Their sources of information are their own assessment and other merchants. Merchants reported they had almost no information on imported grain. In particular, local purchase decisions of donors can introduce major changes

in domestic market conditions and exacerbate price instability unless this information is widely disseminated in advance.

Information on demand and supply situation and grain prices in the main terminal market of Addis Ababa is also unevenly distributed; only about 50% of the interviewed merchants, most of which are in the upper quartile, have access to such information. Their main sources of information are the brokers in Addis Ababa and other merchants. The proportion of merchants who have telephone service is about 46%, but varies from 62% for the highest quartile to 38% for the lowest quartile.

From the above, it is clear that farmers and merchants generally do not get a variety of market information upon which they base their marketing decisions. Mostly they depend on the market place, brokers in the terminal markets, and other farmers and traders for price information. The information that farmers get in particular does not assist them in deciding what crops to plant and how much. There is practically no market extension service in the present system that guides farmers in taking production, storage and marketing decisions. Information on export market is also almost totally lacking.

Market information, particularly price, is an indicator of short run demand and supply conditions in various markets. By indicating what grains are demanded and where, it facilitates the timely and speedy flow of grain from producing to consuming markets, and thereby contributes to market efficiency. Thus, the lack of it could have been one of the main contributing factors to inter-regional trade inefficiency. Although the Government has already launched a pilot public market information system project, it needs some time before an assessment is made on its impact on the performance of the grain market. Responses from non-trading information user institutions, however, is so far positive.

5. GRAIN MARKET PRICE RELATIONSHIPS

5.1. Spatial Price Relationships

Spatial price relationships generally refer to the factors that cause prices in one area to change in relation to those in another. These variable may be shifts in demand or supply or changes in the pattern of trade or transfer costs. It is, however, postulated that under competitive market structure, spatial price relationships are largely determined by transfer costs consisting of transportation, handling, fixed costs, and unmeasured transaction costs (e.g., the costs of time spent in identifying and negotiating transactions, risks associated with opportunistic behavior of trading partners, contract monitoring, enforcement, etc). The principle is that under competitive market conditions and in the absence of any trade barrier, the price differential that could prevail between trading areas is equal to transfer costs (Tomek and Robinson 1981).

The basis for this assumption is that, if regional price differences substantially exceed transfer costs, buyers would be motivated to buy and transport grain from low price areas to those with high price and this will eventually cause price in the supplying areas to increase and those in the importing areas to decrease to a level at which price differences no more exceed transfer costs (Tomek and Robinson 1981). However, the comparison of costs and actual margins is difficult because of the unmeasured and perhaps unmeasurable “transaction cost” portion of marketing costs, that is., the transaction and risk costs mentioned above. Nevertheless, some insights are possible simply by comparing observed price spreads with the measurable component of spatial transfer costs.

On the basis of the above hypothesis and following the analytical approach used by Hays and McCoy (1978) in their study of the spatial performance of markets in Northern Nigeria, a comparative analysis of expected and actual inter-market price differences was attempted for selected crops and markets using GMRP/MIS eight month average wholesale price data for the period August, 1996 to March, 1997. The markets selected for this analysis are shown in Table 5. Continuous trade constantly goes on between these markets and the major terminal market of Addis Ababa and the direction of grain flow is almost always towards Addis Ababa.

According to Hays and McCoy (1978), the expected price in the supplying markets is:

$$PP_{ij} = P_i - (Hc_{ji} + Tc_{ji} + As_{ji}),$$

where

PP_{ij} = the calculated parity price in the i^{th} market in relation to the j^{th} market

P_i = the actual price at the i^{th} market (Addis Ababa)

Hc_{ji} = handling costs for moving grain from the j^{th} market to the i^{th} market

Tc_{ji} = transport cost of grain from the j^{th} market to the i^{th} market, and

As_{ji} = normal trader profit margin

The price spread between two markets is postulated to be: $PS_{ij} = PP_{ij} - P_j$, where PS_{ij} = the price spread between the i^{th} and j^{th} market and P_j = the actual price in the j^{th} market. It is assumed that under competitive conditions, PP_{ij} and P_j are equal and therefore, $PS_{ij} = 0$. If PS_{ij}

is greater than 0, then it is believed that there is an opportunity for traders to obtain more than normal profit.

The results of the analysis using the above model are presented in Table 5 below. Comparison of the expected and actual price spreads between Addis Ababa and the selected markets shown in the above table, shows that in 11 cases out of 19 the computed PS_{ij} is positive; in fact for some markets and crops it is substantially high. Under the assumption that the unmeasured transaction cost component of transfer costs is relatively small (less than $\frac{1}{2}$ of the monetary transport+handling cost), then there is some indication of market inefficiency in inter-market trade. This inefficiency may be attributed to several factors including some degree of market domination by traders, lack of adequate market information, institutional barriers to the smooth flow of grain between markets such as the 'kellas', traditional buying and selling practices that condition traders to buy and sell grain only in specific markets regardless of prevailing prices, high market risk in moving grain, etc. Only if the unmeasured transaction costs of spatial arbitrage were of a magnitude equal to or greater than the measured monetary transport plus handling costs could the grain trade between several markets be considered efficient. For example, the average price spread for mixed teff between Hosaena and Addis Ababa was almost twice as large as the measured transfer costs between these two markets (as specified in columns 5, 6, and 7 in Table 5).

According to the study made by GMRP on the response of Ethiopian cereal markets to liberalization (Asfaw and T.S. Jayne 1997), grain wholesale price differentials between markets in deficit and surplus areas have generally declined since the reform of March, 1990. Findings of the study show that while wholesale prices in deficit markets declined by 6-36%, those of surplus markets increased by 12-48% in real terms. Despite this positive trend since the market liberalization of 1990, the magnitude of the price differentials between producing and consuming areas appears to be still considerable compared to the transfer cost of grain between markets.

Table 5. Spatial Price Relationships Between Addis Ababa and Selected Markets

Market	Crop	Actual price in Market (P_j)	Distance from Addis Ababa (km)	Transport Cost (Birr/qt) (T_{C_j})	Handling Cost (Birr/qt) (H_{C_j})	Trader's Margin (Birr/qt) (AS_{ij})	Actual Price in Addis Ababa (P_1)	Expected Price in Market (PP_{ij})	Difference (PS_{ij})
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9) = (8-5-6-7)	(10) = (9) - (3)
Assassa	White Wheat	100	285	14.3	2.5	8.2	141.0	116.1	+16.1
Eteya	White Wheat	121	150	7.5	2.5	9.2	141.0	121.8	+0.8
Bale Robe	White Wheat	99	442	22.1	2.5	8.7	141.0	107.7	+8.7
Hosaena	Mixed Teff	129	232	11.6	2.5	10.0	195.0	170.9	+41.9
	White Wheat	109	232	11.6	2.5	8.6	141.0	118.3	+9.3
Nekemte	White Maize	52	327	16.4	2.5	5.0	71.0	47.2	-4.8
Jimma	White Maize	56	346	17.3	2.5	5.2	71.0	46.0	-9.0
Meki	Mixed Teff	170	134	6.7	2.5	12.5	195.0	173.3	+3.3
	White Maize	62	134	6.7	2.5	5.0	71.0	56.8	-5.2
Dangla	Mixed Teff	110	485	24.3	2.5	9.6	165.0	158.7	+48.7
	White Maize	58	485	24.3	2.5	5.9	71.0	38.3	-19.7
Shambu	Mixed Teff	99	314	15.7	2.5	8.2	195.0	168.6	+69.6
	White Maize	46	314	15.7	2.5	4.5	71.0	48.3	+2.3
Bahir Dar	Mixed Teff	137	570	28.5	2.5	11.7	195.0	152.8	+15.8
Ambo	Mixed Teff	147	125	6.3	2.5	10.9	195.0	175.3	+28.3
	White Maize	59	125	6.3	2.5	4.7	71.0	57.5	-1.5
Nazreth	Mixed Teff	173	98	4.9	2.5	12.6	195.0	175.0	+2.0
	White Wheat	131	98	4.9	2.5	9.7	141.0	123.9	-7.1
	White Maize	69	98	4.9	2.5	5.3	71.0	58.3	-10.7

Source: GMRP/ MII

Note: (1) Transport tariff is assumed to be 0.05 Birr/qt/km

(2) Normal profit or traders' margin is assumed to be 7% of AA price parity price

5.2. Temporal Price Relationships

Due to the seasonality of grain production, prices are normally expected to be low during the harvest season and to rise afterwards up to the next harvest as a function of costs of storage. Under competitive situations, the seasonal price differences should be equal to the storage costs incurred between the time of harvest and the subsequent points in the year. Thus, it is assumed that grain is allocated throughout the year by the relationship of current and expected prices to storage costs including direct costs of warehouse rent, labor, interest on capital invested in inventories, risk, and normal profit. If seasonal price differences are over and above storage costs and normal profit, this may indicate the existence of some degree of inefficiency in storage (Tomek and Robinson 1981).

In the absence of actual costs of storage, seasonal price differences could be compared with the opportunity cost of capital invested in inventories to serve as a rough indicator of storage efficiency. One commonly used technique of estimating the seasonal component of price change is the Gross Real Returns to Storage (GRRS) which is free of inflationary trend and which does not take costs of storage into account (Trotter 1992). The Gross Real Returns to Storage is defined as:

$$\text{GRRS} = [(\text{GSI}_{\text{highest}} - \text{GSI}_{\text{lowest}}) / \text{GSI}_{\text{lowest}}] \times 100$$

Where,

$\text{GSI}_{\text{highest}}$ = the highest grand or pure seasonal price index, and

$\text{GSI}_{\text{lowest}}$ = the lowest grand or pure seasonal price index

Due to the lack of data on actual storage costs, an attempt has been made to test the efficiency of the storage function using gross or pure seasonal price indices that were computed by GMRP using 6-year monthly price data obtained from EGTE. The multiplicative time series model was used to isolate the trend, cyclical, and random components of the raw series. Results of the price analysis for Addis Ababa for selected grain types are shown below, and details are provided in the annex, Tables A, B, and C.

Table 6. Seasonal Price Variations in Addis Ababa

Crop Type	Highest GSI	Lowest GSI	GRRS (%)	No. Of Months Between Lowest and Highest GSI
Mixed teff	106.89 (Jun)	93.24 (Feb)	14.64	4
Wheat	90.16 (Jan)	110.59 (Aug)	22.66	7
White maize	83.11 (Nov)	117.56 (Jul)	41.45	8

As can be seen from Table 6 above and the related annexes, there are significant seasonal variations in the prices of the three crops selected. The gross returns to storage are the highest for maize - about 5.18% per month followed by teff - 3.66% and wheat - 3.24%. Comparing these figures to the current cost of borrowing capital - 10% per annum - it seems

that the returns to storage are high. However, since storage costs include storage rent, labor, fumigation, risks associated with quantitative and qualitative grain losses, price risk, etc., the actual return to storage may be smaller than that indicated above. Even the opportunity cost of capital or the real interest rate could be much higher than the 10% currently charged by commercial banks.

6. CONCLUSION AND RECOMMENDATION

6.1. Summary and Conclusion

The major findings of the study are summarized as follows:

Based on CSA's 'meher' and 'belg' production estimate of 1995/96, the total quantity of grain marketed by farmers and state farms in 1995/96 was estimated at about 26.4 million quintals or 28% of total production during that year. The inter-regional traders, that is, wholesale traders, EGTE, and private incorporated companies, are the principal actors in inter-regional grain movement. These actors purchase about 45% of the grain sold by farmers and state farms nationally. They then transport about 69% of this amount to the terminal markets and deficit areas.

The computed four-firm concentration Ratio (CR4), that is, the share of the largest four traders in the total volume of grain purchased at the wholesale level, is generally at levels considered to be competitive. Addis Ababa in particular is characterized by a large number of participants and a low level of market concentration. However, several regional markets, e.g., Gonder, Bahir Dar, have a fairly high degree of market concentration for specific crops.

Farmers normally bring their marketable grain to markets that are 5 to 20 km away from their villages by carrying it or using pack animals. About 79% of farmers' annual grain sales occur immediately after the harvest season - January to March - because of fear of storage loss and in order to fulfill their immediate cash needs.

Generally, farmers and merchants do not get a complete set of market information upon which to base their marketing decisions. Mostly they depend on the market place, brokers in the terminal markets, and other farmers and traders for price information. The information that farmers get in particular does not assist them in deciding what crops to plant and how much. There is practically no market extension service in the present system that guides farmers in their production, storage and marketing decisions. Information on export markets is also lacking.

Grain buying price at the local markets is mostly determined by deducting miscellaneous costs and a net traders' profit margin from the prevailing wholesale price in Addis Ababa which the traders obtain from the brokers in Addis Ababa. Traders buy about 60% of their grain supplies at their own warehouses. The traders do not provide advance payment, credit, or any other incentive to farmers as a means of encouraging them to bring the grain to their stores. Grain prices are rarely fixed in advance and less than 5% of farmers took loans from merchants over the 1995/96 year. Decisions regarding grain sales to merchants by farmers also were not influenced by such factors as blood, ethnic, or religious relationships.

Inter-market grain flow is coordinated by the brokers operating in the main terminal markets, particularly in Addis Ababa. There are more than 200 brokers/wholesalers in Addis Ababa, but the most important are not more than 50. The brokers are specialized by route and coordinate grain buying, selling, transporting and pricing activities.

The main constraints identified by market participants are 'kella' charges, lack of financial credit, absence of control on un-licensed traders, unavailability of transport services and high transport tariff, lack of adequate storage facilities at appropriate locations, lack of market information, etc.

The variability of the number of 'kellas' and the amount charged between any two markets has caused uncertainty and confusion among merchants. Although the 'kellas' are intended to serve as a mechanism for collecting sales tax on grain, they have a negative impact on grain movement and consequently on producer and retail prices. Recently, the Government has decided to abolish all grain checkpoints; however, whether the decision has been fully implemented or not is not yet known. Moreover, even if the decision has been enforced, the impact, on grain movement and incentives of agents, of the new tax collection system that may have been put in place has not been evaluated yet.

Licensed merchants are at a disadvantage and could not be competitive in buying and selling because of absence of control on un-licensed traders who do not have the obligation of paying taxes imposed on licensed traders.

Shortage of financial credit was observed to be another limiting factor on operation and business expansion. Moreover, a substantial portion of the small traders' working capital is tied up in grain inventory due to the delay in obtaining transport service. Thus, as a result of deficiencies in financial credit, the small merchants are frequently sidelined from participating in the market until they are able to finally sell their inventory. These financial and transport constraints combine to allow relatively large merchants to exert potential influence on grain prices in the absence of any challenge from such alternative buyers.

Because of the subsistence nature of grain production in Ethiopia, about 72% of the total grain production is retained for on-farm uses and stored at the farm in traditional storage structures that are mostly inadequate to protect the grain from damage caused by weevils, termite, rodents, birds, moisture and other pests. Storage facilities at different levels of the marketing system are also inadequate in terms of availability, storage and premise space, and location. Most of the facilities are vulnerable to damages caused by moisture, rodents and pest. Most of the merchants feel that the Government can play an important role in improving marketing facilities including developing new market places, allowing merchants to improve existing buildings which they acquired through rent, constructing and maintaining roads and expanding telephone services.

Lack of access to working capital and facilities at convenient location in the market place seem to be the most important barriers to entry.

Analysis of spatial and temporal aspects of market efficiency show that of the expected and actual price spreads between Addis Ababa and 19 selected markets shows that in 11 cases out of 19, the price spread is substantially high, even after considering plausible levels of unmeasured transaction costs. Observed price spreads could be considered efficient for several markets only when assuming transaction costs equal or greater than the measured cost component, consisting of transport, handling, and normal profit margin. The appearance of unusually high margins may be attributed to several factors including, lack of adequate market

information, sporadic and variable taxes at 'kellas', traditional buying and selling practices that condition traders to buy and sell grain only in specific markets regardless of prevailing prices, poor road infrastructure, temporary unavailability of transportation services and high rates, high market risks, etc.

Seasonal price variations are also significant. For example in Addis Ababa, the Gross Real Returns to Storage is 3.66% per month for mixed teff, 3.24% for wheat, and 5.18% for white maize. When these figures are compared to the opportunity cost of capital tied up in inventories, which is about 0.83% to 1.17% per month, there seems to be substantial seasonal variation which may not reflect storage costs, except after accounting for rather large temporal risk premiums.

6.2. Recommendation

Based on the above mentioned findings, the following policy measures could be recommended to improve the performance of the grain marketing system:

Abolish grain movement control and the present sales tax system on grain: If it may be considered in the interests of equity that grain merchants should pay sales tax, the kella is not an appropriate means of collecting this tax. It is doubtful whether it has been effective in terms of the amount of revenue generated by local administrations. There are indications that some of the merchants are able to pass the check points by paying much less than the official rate to individuals assigned at the 'kellas'. The varying rates applied at different places to different individuals has resulted in uncertainty about the cost of moving grain from one place to another.

Moreover, the 'kella' system of collecting revenue has been a major cause of inefficiency in grain transportation. Valuable transport time is unnecessarily wasted at the 'kellas'. Also, wholesalers indicate that these costs are passed along to others in the food system, mainly in the form of lower prices for producers. Sales tax on grain also hurts the poor, because the poor spend more than 60% of their income on food.

Thus, it is recommended that the grain movement check points and the present sales tax system on grain be eliminated. It is further recommended that a detailed study be conducted to evaluate the merits and demerits of different taxation systems with the view to designing an appropriate taxation system that could assist the local governments obtain better tax revenue; promote inter-dependence between producing and consuming areas; enhance smooth grain flow and spatial integration; induce different market participants including, farmers, traders, and consumers; and improve regional food security.

Enforce control on illegal trade: Although the Law requires that merchants should have license to operate at the wholesale level, a large number of merchants have continued to operate without a license. This has put the legally operating traders at a disadvantage when competing in the market. The licensing system may be alternative way for government to collect tax revenue from traders as well as a means to monitor new entry and evolving characteristics of the grain market. Local administrations should review and improve the grain

trade licensing and control procedures without setting any limit on the number of licenses to be issued at each market. The enforcement of the licensing and control procedure may require a lot of time and energy if it is done by the administration alone. Therefore, the administration, in collaboration with representatives of traders, should devise means of controlling those who attempt to engage in illegal trade.

Devise appropriate credit policy to assist grain traders: As mentioned earlier, financial constraint is the major barrier to entry into grain business, and it also limits the operation of existing businesses. Grain merchants need a considerable amount of fund to invest on storage and transport facilities and to finance seasonal grain inventories. The present credit policies of commercial banks, however, are not designed to meet the special credit needs of the small merchants who play a crucial role in the marketing system.

It is, hence, recommended that a special long-term fund be instituted with the assistance of donors in order to create an enabling environment for the gradual development of the Ethiopian grain marketing system. Such a fund is critical in view of the country's present drive for self sufficiency in food. The anticipated growth of marketable grain surplus needs to be accompanied by improvements in market infrastructure - development of market places, upgrading of storage and transport facilities, skills in grain storage and marketing, etc. Appropriate credit policies have also to be formulated and implemented to provide long term credit to grain merchants and other market participants that may provide transport and warehousing services.

Strengthen the current market information services: Market information is regarded as the "lifeblood" of markets. It is essential for the efficient functioning of the marketing system if it provides comprehensive, accurate and timely information to market participants. As mentioned earlier, however, although most of the merchants recognize the need for market information, it appears that they operate without such essential information as demand and supply situation and grain prices prevailing in different markets. Moreover, access to information is confined to the relatively few large merchants who seem to dominate the grain market.

At present, attempts are being made by the Government to disseminate market information to farmers, consumers, traders, and other users through a weekly radio broadcast and a monthly market information bulletin. The information, however, is limited to grain prices, and there is no public provision of comprehensive market information. The MEDaC/USAID/MSU collaborative Grain Market Research Project (GMRP) has launched a pilot Market Information System and collects weekly producer, wholesale, and retail grain prices of selected crops from 26 markets. It is, therefore, proposed that the market and commodity coverage of the MIS be expanded and additional information regarding crop production prospect, temporal and spatial grain flows, food import and export intentions, stock level, world market prices of export crops, etc., be provided to different users.

To assist and properly guide farmers in their planting, storage, and marketing decisions, dissemination of relevant market information through the agricultural extension system should also be considered.

Improve marketing infrastructure and facilities: Cross-country evidence indicates that the payoffs to transport infrastructure are high (Antle 1983). Donor support in this area would make the market liberalization adjustments more effective. The dilemma is that improving transport infrastructure is very costly. Phased investments may be required which first target high potential food and cash-crop regions where agricultural intensification is more likely to be financially sustainable. Improved market infrastructure also requires further policy change to remove remaining import tariffs on vehicles and spare parts.

One important role for research is to identify where such infrastructure investments would have the highest payoffs. For example, by analyzing food production, consumption, and price dispersion patterns in a country, researchers can provide insights into where investment in a road would do the most to improve food security or increase production potential through raising farm output prices and lowering farm input prices. Given the high cost of such infrastructure investments, such targeting is extremely important.

Conduct research on the different components of the system: the present study is confined to regional wholesale grain traders; it does not cover the other participants operating at different levels of the marketing system - farmers, assemblers, brokers, retailers, transporters, warehousing, etc. In order to get a better understanding of the entire marketing system - its problems and constraints-specialized studies should be carried out in the future. Given the producer price 'crash' for maize and wheat in 1996, a systematic analysis of how the grain marketing system is coordinated and whether high marketing costs are impeding growth of effective demand in consuming/deficit regions could be a first priority in this endeavor.

Conduct an appraisal on the impact of the emerging market structure on producers' and traders' incentive: This paper entirely focuses on the organization, structure, and conduct of the individual wholesale grain traders, that is, the family operated independent grain businesses. Recently, however, as a result of the economic liberalization, a number of incorporated businesses including already established and newly formed private companies have entered into grain trade. Among these are, 'Ambassel', 'Guna', 'ODA', Ethiopia Amalgamated, 'Dinsho', Ethio-Trade, etc. Some of these private companies have substantial experience in trade and they carry out a multiple of business activities including agricultural inputs distribution, distribution of industrial commodities, banking and insurance, transportation, milling, import, and export trade, etc.

The private incorporated companies are relatively better organized in terms of skilled manpower, financial and physical resources, and they have easy access to financial and other credit facilities. Their participation in grain trade has shown an increasing trend in the past two years. For example, the private incorporated companies have been awarded a bulk of the EU local grain purchase contracts in 1996 and 1997. The emergence and involvement of these private companies in the grain business could have considerable impact on the structure, conduct, and performance of the Ethiopian grain marketing system. Because of their apparently superior organizational, financial, and physical capability compared to the small family owned and operated independent grain businesses, as well as their diversified business activities and scale economies, the incorporated enterprises may bring about considerable changes in the structure, conduct, and performance of the grain market and may also affect producers' and traders' incentives in the long run.

It is, therefore, recommended that an in-depth appraisal of the emerging market structure be conducted to look into the impact of their involvement on producers, traders, and consumers.

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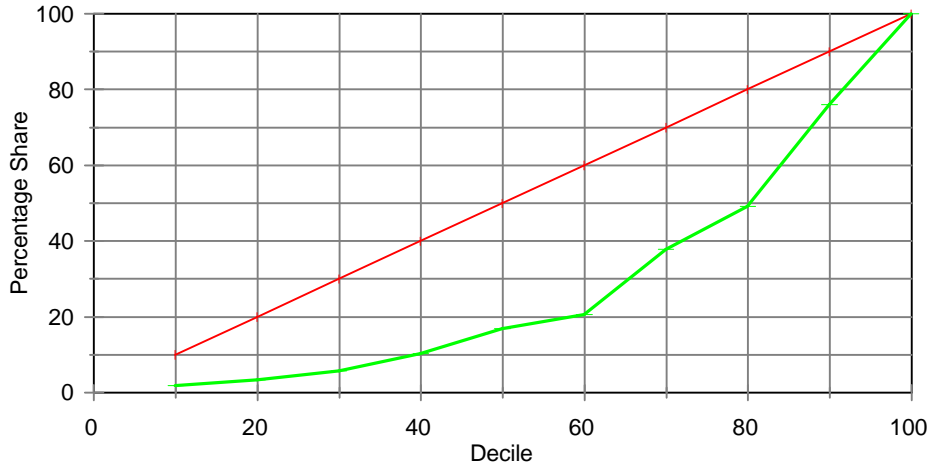
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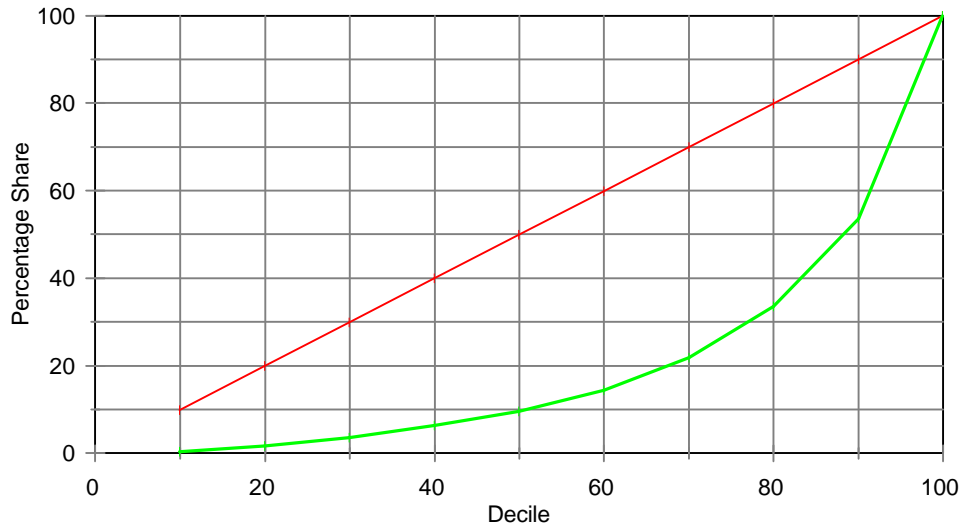
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APPENDIX 1.

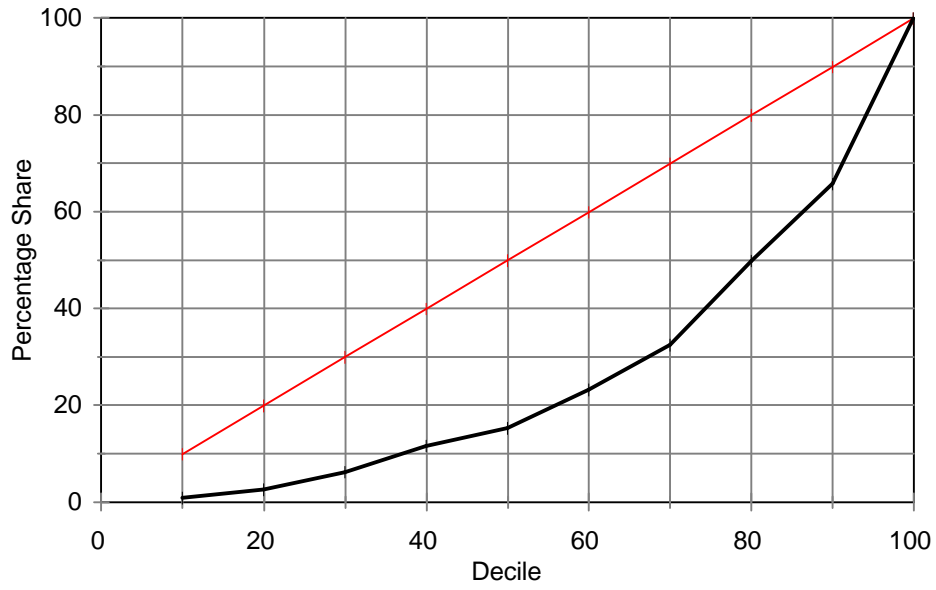
Size Distribution of Traders by Volume of Maize Purchase



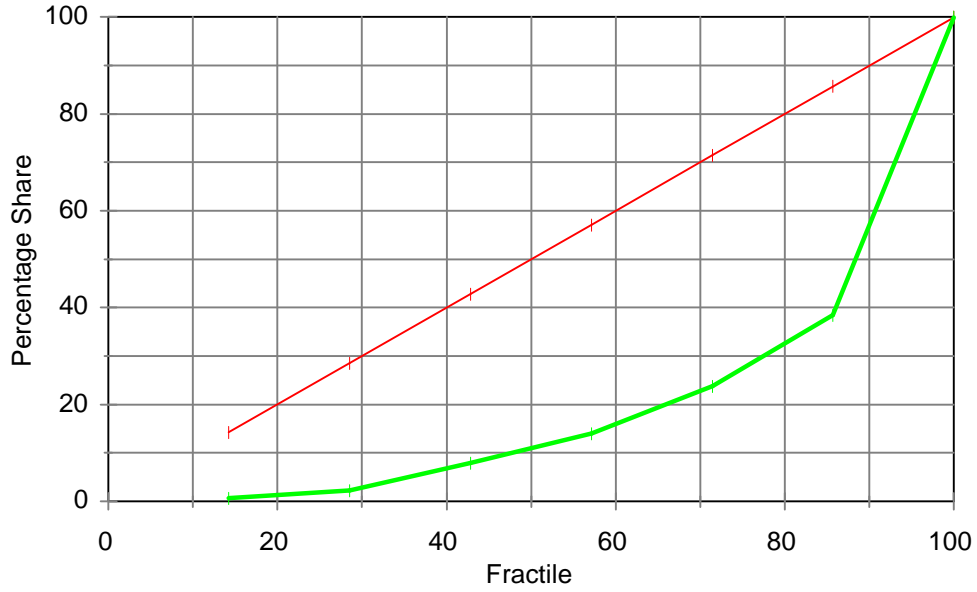
Size Distribution of Traders by Volume of Wheat Purchase



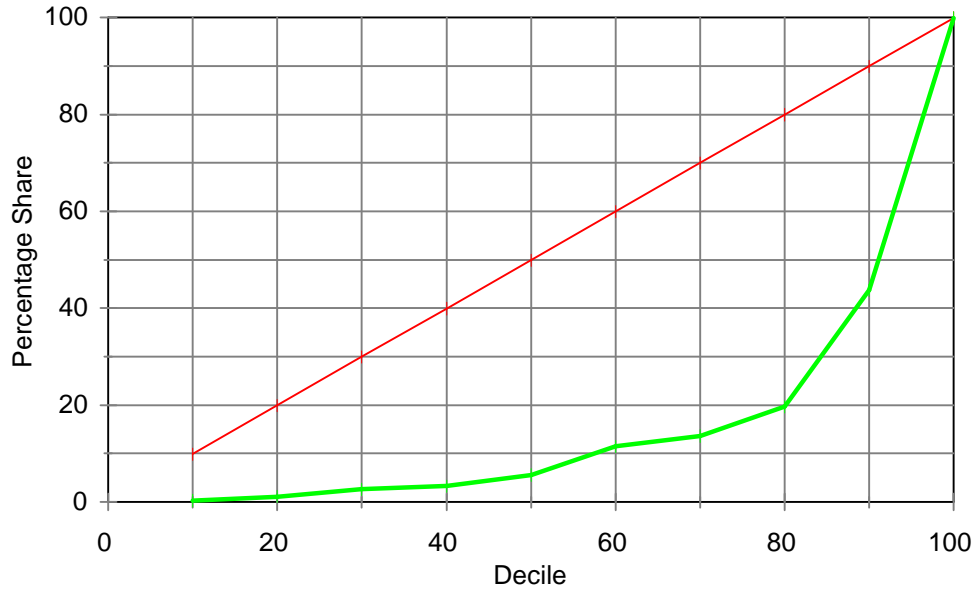
Size Distribution of Traders
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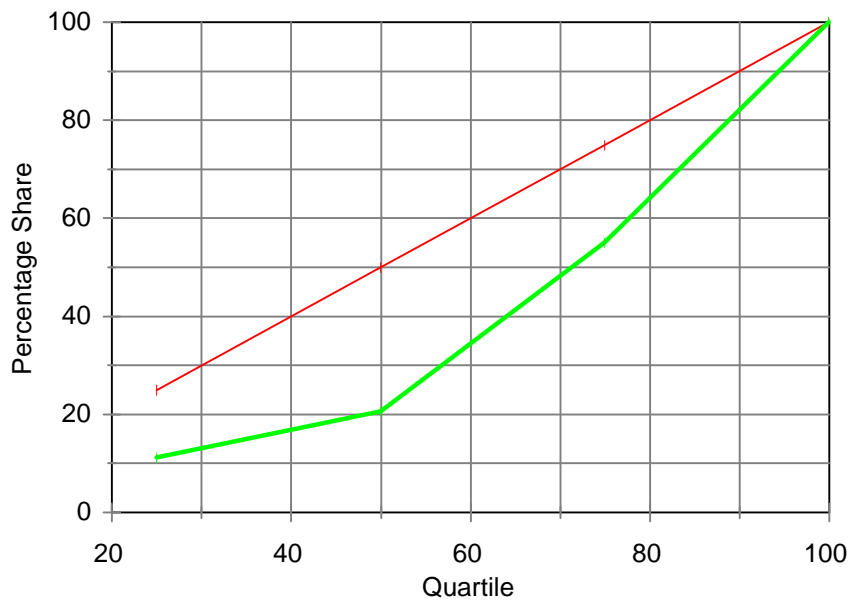
Size Distribution of Traders
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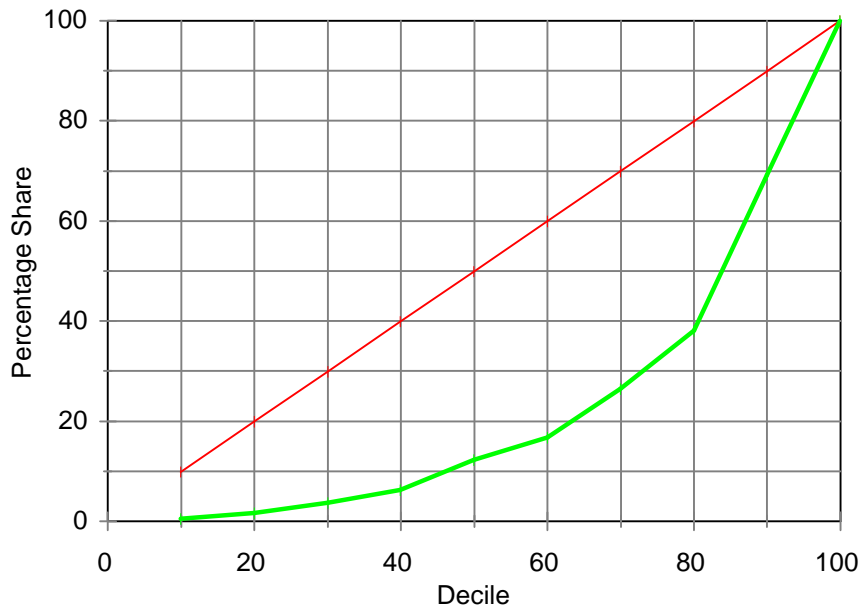
Size Distribution of Traders
by Volume of Sorghum Purchase



Size Distribution of Traders
by Volume of Millet Purchase



Size Distribution of Traders
by Volume of Pulses Purchased



Size Distribution of Traders
by Volume of Oilseeds Purchase

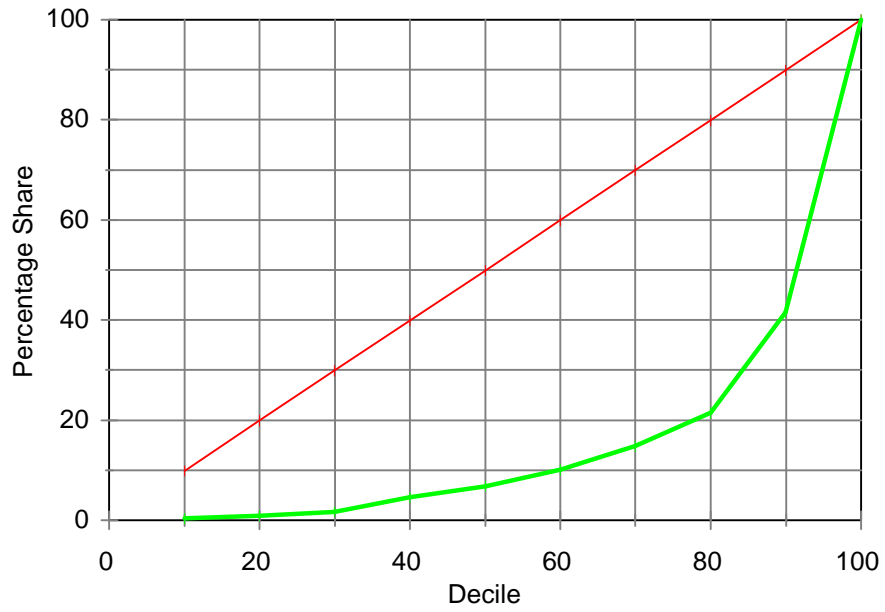


Table A. Seasonal Price Variation of Mixed Teff in Addis Ababa

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1991	1	88	94	100	113	111	109	111	100	97	92	99
1992	2	95	100	99	101	104	95	100	110	111	104	104
1993	3	98	94	96	97	106	99	100	98	104	99	88
1994	4	92	88	89	112	116	106	102	111	105	103	92
1995	5	94	98	101	103	104	102	105	106	105	107	108
1996	6	98	86	89	90	101						
Seasonal index	6	6	6	6	6	6	5	5	5	5	5	5
N	21	21	21	21	21	21	15	15	15	15	15	15
Sum X	91	91	91	91	91	91	91	91	91	91	91	91
Sum X ²	565	560	565	573	616	642	511	518	525	522	505	491
Sum Y	53,277	52,416	53,405	54,861	63,632	68,846	52,347	53,750	55,261	54,596	51,139	48,489
Sum Y ²	1,998	1,934	1,938	1,980	2,109	2,227	1,530	1,544	1,588	1,576	1,544	1,479
Sxx	18	18	18	18	18	18	46	46	46	46	46	46
Sxy	21	(26)	(40)	(26)	(47)	(20)	(3)	(10)	13	10	29	6
Syy	73	149	201	140	389	152	123	85	136	99	134	273
Regression SS	24	39	89	37	126	23	0	2	4	2	18	1
Residual SS	49	111	112	102	263	129	123	83	132	97	116	272
Residual MS	12	28	28	26	66	32	41	28	44	32	39	91
t (null hyp=100)	-4.17	-3.32	-2.51	-2.34	0.78	3.35	0.95	1.89	2.10	2.16	0.39	-0.58
S.E. (Mean)	1.42	2.04	2.36	1.97	3.29	2.05	2.22	1.85	2.33	1.99	2.32	3.30
Mean	94	93	94	96	103	107	102	104	105	104	101	98
GSI	94	93	94	95	103	107	102	103	105	104	101	98
GSI + 1 S.E.	95	95	96	97	106	109	104	105	107	106	103	101
GSI - 1 S.E.	93	91	92	93	99	105	100	102	103	102	99	95
Trend coef.	1.17	-1.49	-2.26	-1.46	-2.69	-1.14	-0.07	-0.22	0.28	0.22	0.63	0.13
S.E. (coef.)	0.84	1.26	1.26	1.21	1.94	1.36	0.94	0.78	0.98	0.84	0.92	1.40
t (coef.)	1.40	-1.18	-1.79	-1.21	-1.39	-0.84	-0.07	-0.28	0.29	0.26	0.69	0.09

Table B. Seasonal Price Variation of Wheat in Addis Ababa

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1991	85	84	97	95	106	111	120	122	110	103	98	90
1992	93	96	79	95	94	97	109	114	119	119	108	94
1993	89	90	88	92	96	100	102	103	101	105	112	94
1994	89	91	92	94	99	105	107	111	119	110	102	90
1995	88	93	96	101	104	107	104	105	102	98	95	93
1996	99	98	99	98	97	99						
N	6.00	6.00	6.00	6.00	6.00	6.00	5.00	5.00	5.00	5.00	5.00	5.00
Sum X	21.00	21.00	21.00	21.00	21.00	21.00	15.00	15.00	15.00	15.00	15.00	15.00
Sum X ²	91.00	91.00	91.00	91.00	91.00	91.00	91.00	91.00	91.00	91.00	91.00	91.00
Sum Y	543.00	552.00	551.00	575.00	596.00	619.00	542.00	555.00	551.00	535.00	515.00	461.00
Sum Y ²	49,261	50,906	50,875	55,155	59,314	64,005	58,950	61,835	61,027	57,499	53,241	42,521
Sum XY	1,928	1,963	1,961	2,030	2,080	2,154	1,592	1,628	1,637	1,586	1,533	1,385
Sxx	17.50	17.50	17.50	17.50	17.50	17.50	46.00	46.00	46.00	46.00	46.00	46.00
Sxy	27.50	31.00	32.50	17.50	-6.00	-12.50	-34.00	-37.00	-16.00	-19.00	-12.00	2.00
Syy	119.50	122.00	274.83	50.83	111.33	144.83	197.20	230.00	306.80	254.00	196.00	16.80
Regression SS	43.21	54.91	60.36	17.50	2.06	8.93	25.13	29.76	5.57	7.85	3.13	0.09
Residual SS	76.29	67.09	214.48	33.33	109.28	135.90	172.07	200.24	301.23	246.15	192.87	16.71
Residual MS	19.07	16.77	53.62	8.33	27.32	33.98	57.36	66.75	100.41	82.05	64.29	5.57
t (null hyp=100)	-5.40	-4.53	-3.08	-3.81	-0.59	1.39	2.85	3.49	2.80	2.07	0.94	-9.93
S.E. (Mean)	1.82	1.84	2.76	1.19	1.76	2.01	2.81	3.03	3.50	3.19	2.80	0.82
Mean	90.50	92.00	91.83	95.83	99.33	103.17	108.40	111.00	110.20	107.00	103.00	92.20
GSI	90.16	91.66	91.49	95.48	98.97	102.78	108.00	110.59	109.79	106.60	102.62	91.86
GSI + 1 S.E.	91.99	93.50	94.26	96.67	100.72	104.79	110.81	113.62	113.29	109.79	105.42	92.68
GSI - 1 S.E.	88.34	89.82	88.73	94.29	97.21	100.78	105.19	107.56	106.29	103.42	99.82	91.04
Trend coef.	1.57	1.77	1.86	1.00	-0.34	-0.71	-0.74	-0.80	-0.35	-0.41	-0.26	0.04
S.E. (coef.)	1.04	0.98	1.75	0.69	1.25	1.39	1.12	1.20	1.48	1.34	1.18	0.35
t (coef.)	1.51	1.81	1.06	1.45	-0.27	-0.51	-0.66	-0.67	-0.24	-0.31	-0.22	0.12

Table C: Seasonal Price variation of White Maize in Addis Ababa

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1991	81	90	119	94	107	114	129	113	104	90	83	84
1992	90	89	94	109	108	114	121	121	121	112	77	83
1993	90	91	95	92	97	103	100	95	96	102	83	74
1994	96	87	90	104	111	113	125	136	102	81	81	93
1995	101	103	104	106	107	112	112	110	107	84	91	92
1996	89	98	100	95	92	103						
N	6	6	6	6	6	6	5	5	5	5	5	5
Sum X	21	21	21	21	21	21	15	15	15	15	15	15
Sum X ²	91	91	91	91	91	91	91	91	91	91	91	91
Sum Y	547	558	602	600	622	659	587	575	530	469	415	426
Sum Y ²	50099	52084	60938	60258	64756	72523	69451	67031	56526	44665	34549	36534
Sum XY	1954	1992	2072	2104	2145	2281	1731	1734	1577	1364	1265	1304
Sxx	18	18	18	18	18	18	46	46	46	46	46	46
Sxy	40	39	-35	4	-32	-26	-30	9	-13	-43	20	26
Syy	231	190	537	258	275	143	537	906	346	673	104	239
Regression SS	89	87	70	1	59	37	20	2	4	40	9	15
Residual SS	142	103	467	257	217	106	518	904	342	633	95	224
Residual MS	35	26	117	64	54	26	173	301	114	211	32	75
t (null hyp=100)	-3.44	-2.99	0.12	0.05	1.38	5.01	3.79	2.52	1.65	-1.17	-8.28	-4.75
S.E. (Mean)	2.53	2.30	3.86	2.68	2.77	1.99	4.64	6.02	3.72	5.19	2.04	3.09
Mean	91.17	93.00	100.33	100.00	103.67	109.83	117.40	115.00	106.00	93.80	83.00	85.20
GSI	91.29	93.12	100.47	100.13	103.81	109.98	117.56	115.15	106.14	93.93	83.11	85.31
GSI + 1 S.E.	93.82	95.42	104.33	102.81	106.57	111.97	122.19	121.17	109.86	99.11	85.15	88.40
GSI - 1 S.E.	88.76	90.83	96.60	97.46	101.04	107.99	112.92	109.13	102.42	88.74	81.07	82.22
Trend coef.	2.26	2.23	-2.00	0.23	-1.83	-1.46	-0.65	0.20	-0.28	-0.93	0.43	0.57
S.E. (coef.)	1.42	1.21	2.58	1.92	1.76	1.23	1.94	2.56	1.58	2.14	0.83	1.27
t (coef.)	1.59	1.84	-0.77	0.12	-1.04	-1.19	-0.34	0.08	-0.18	-0.44	0.52	0.44

APPENDIX 2.

GRAIN MARKET RESEARCH PROJECT HOUSEHOLD SURVEY (1995/96 CROP YEAR): COMPARABILITY WITH CENTRAL STATISTICAL AUTHORITY AGRICULTURAL SURVEY

Jean Charles Le Vallée

The household-level analysis in this report is derived mainly from two sources. The Grain Market Research Project (GMRP) household survey, implemented in June 1996, and the Central Statistical Authority (CSA) Agricultural Survey, implemented in December 1995. The CSA survey is drawn from a nationally-representative sample of 14,800 households using the CSA sampling frame. The GMRP survey involved 4,218 households included in the CSA survey (hence the GMRP sample is a sub-sample of the CSA survey) and is also nationally-representative with respect to the major agricultural regions of the country, namely Tigray, Oromiya, Amhara, and Southern Regions. The following sub-regions are also considered nationally-representative: Tigray (Tigray); North and South Gonder, East and West Gojam, Agewawi, North and South Wello, Wag Hamra, North Shewa and Oromiya zone (Amhara); East and West Welega, Illubabor and Jima, North, East and West Shewa, Arsi, Bale, Borena, East and West Harerge and Somali (Oromiya); Yem, Keficho, Maji, Shekicho, Bench, North and South Omo, Derashe, Konso, Hadia, Kembata and Gurage, Sidama, Gedeo, Burhi and Amaro (Southern regions). The remaining smaller regions, Afar, Somali, Beni-Shangul and Gumuz, Gambella, Harari, Addis Ababa and Dire Dawa, do not contain sufficient observations for the survey to be considered strictly representative of their region.

The purpose of this annex is to present descriptive statistics on the comparability of key variables contained in the GMRP Household Survey (1995/96 crop year) and the CSA Agricultural Survey (1995/96 crop year). This annex focuses on three key variables in agricultural production: meher crop production, crop area cultivated, and household fertilizer use.

For grain crop production, there are three different national estimates available for the meher season: (a) farmer recall from the GMRP Household Survey; (b) farmer recall from the CSA Agricultural Survey; and (c) crop-cut estimates from the CSA Agricultural Survey (Table 1). Crop cutting involves direct physical measurement within the fields harvested while farmer recall estimates are obtained through surveying farmers after the crops have been harvested (1-2 months after in the case of the CSA Agricultural Survey and 4-5 months afterward in the case of the GMRP survey).

Table 2 shows the correlation coefficients of the three measures of production, with the household being the unit of observation. Strong correlations can be found between the GMRP and CSA farmer recall estimates, particularly for maize, wheat, barley and millet. Correlation coefficients are generally lower between the CSA crop-cut estimates and either the CSA or GMRP farmer recall estimates.

Table 1. National Meher Grain Production Estimates

Source of Estimate	Estimated Production (million metric tons)
GMRP Household Survey Farmer Recall	7.84
CSA Agricultural Survey Farmer Recall	8.51
CSA Agricultural Survey Crop-cut	9.27

As is the case with the CSA data, it is generally found that the measurement of production from crop cuts result in higher estimates than the estimates from farmer recall. A review of the empirical tests of crop-cut versus farmer recall data collection supports the conclusions that crop-cut estimates of production result in upward biases due to a combination of errors (Murphy et al. 1991, Poate and Casley 1985, Verma et al. 1988). These errors relate to biases resulting from poorly executed techniques (Rozelle 1991), large variances due to heterogeneity of crop conditions within farmer plots (Casley and Kumar 1988), and non-random location of sub-plots and tendencies to harvest crop-cut plots more thoroughly than farmers (Murphy et al. 1991). Verma et al. (1988) found that farmer estimates are closer to actual production (derived from weighing farmers' harvests) than crop-cut estimates. In general, tests of crop-cut estimates in Africa have been found to be overestimated by between 18% and 38% (Verma et al. 1988). Farmer recall was also found to result in a smaller variance in production estimates than crop-cut estimates. On the other hand, crop-cut estimates were found to provide more accurate measurements of crop yield.

Table 3 provides estimate of total cropped area by killil. Using the crop-cut method for estimating area, the results give 8 million hectares nationally for both sample sizes.

ANOVA tests were made on production and area data to see if the sub-sample (GMRP survey) was statistically different of the bigger sample size (CSA survey), in other words, if the sub-sample was representative of the bigger sample if randomly selected. At the national level and also at the regional level (i.e. killil), for all grains, we found no results that showed that these two sample sizes were significantly different at the 0.01 level: thus the sub-sample is representative of the bigger sample.

A comparison of mean household fertilizer use can be found in Table 4. Both sample sizes give very similar results.

Table 2. Correlation Coefficients of the Three Measures of Production

	Grain groups	GMRP production (FR)	CSA production (FR)	CSA production (CC)
Maize	GMRP production (FR)	1,000**		
	CSA production (FR)	636**	1000	
	CSA production (CC)	222**	128**	1000
	Number of observations	2370	4352	4304
Wheat	GMRP production (FR)	1		
	CSA production (FR)	702**	1000	
	CSA production (CC)	228**	269**	1,000
	Number of observations	1106	2101	2120
Teff	GMRP production (FR)	1,000		
	CSA production (FR)	470**	1,000	
	CSA production (CC)	384**	285**	1000
	Number of observations	2112	4105	4044
Barley	GMRP production (FR)	1,000		
	CSA production (FR)	676**	1,000	
	CSA production (CC)	347**	269**	1000
	Number of observations	1391	2637	2613
Sorghum	GMRP production (FR)	1,000		
	CSA production (FR)	410**	1,000	
	CSA production (CC)	423**	333**	1000
	Number of observations	1852	3608	3552
Millet	GMRP production (FR)	1,000		
	CSA production (FR)	622**	1,000	
	CSA production (CC)	416**	284**	1000
	Number of observations	424	822	806
Pulses	GMRP production (FR)	1000		
	CSA production (FR)	200**	1,000	
	CSA production (CC)	109**	224**	1000
	Number of observations	1785	3354	3322
Oil seeds	GMRP production (FR)	1000		
	CSA production (FR)	537**	1,000	
	CSA production (CC)	369**	103**	1,000
	Number of observations	666	1250	1193

** Correlation is significant at the 0.01 level (2-tailed)

Table 3. Total Crop Area Compared Between Both Surveys

Killil	Area (MHa) CSA Survey n=14512	Area (MHa) FSS Survey n= 3653
Tigray	481	484
Afar	24	21
Amhara	2938	3116
Oromiya	3617	3533
Somali	60	58
Benishangul	95	93
SNNPR	6978	7188
Gambela	101	39
Harari	44	45
Addis Ababa	98	96
Dire Dawa	74	59
Total	7.94	8.05

Table 4. Mean Percentage of Households Using Fertilizer by Killil.

Killil	% hh fert use (CSA survey)	% hh fert use (GMRP Survey)
Tigray	45	40
Afar	13	3
Amhara	39	36
Oromiya	49	45
Somali	6	6
Benishangul	23	28
SNNPR	36	29
Gambela	0	0
Harari	81	83
Addis Ababa	97	79
Dire Dawa	34	29

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