MSU International Development Working Paper

Opportunities to Improve Household Food Security Through Promoting Informal Maize Marketing Channels: Experience from Eastern Cape Province, South Africa

by

Lulama Ndibongo Traub and T.S. Jayne

Department of Agricultural Economics
MICHIGAN STATE UNIVERSITY
East Lansing, Michigan 48824

MSU International Development Working Paper No. 85
2006

MSU Agricultural Economics Web Site: http://www.aec.msu.edu/agecon/
MSU Food Security III Web Site: http://www.aec.msu.edu/agecon/fs2/index.htm

MSU INTERNATIONAL DEVELOPMENT PAPERS

Carl Liedholm and Michael T. Weber

Editors

The MSU International Development Paper series is designed to further the comparative analysis of international development activities in Africa, Latin America, Asia, and the Near East. The papers report research findings on historical, as well as contemporary, international development problems. The series includes papers on a wide range of topics, such as alternative rural development strategies; nonfarm employment and small scale industry; housing and construction; farming and marketing systems; food and nutrition policy analysis; economics of rice production in West Africa; technological change, employment, and income distribution; computer techniques for farm and marketing surveys; farming systems and food security research.

The papers are aimed at teachers, researchers, policy makers, donor agencies, and international development practitioners. Selected papers will be translated into French, Spanish, or other languages.

Copies of all MSU International Development Papers, Working Papers, and Policy Syntheses are freely downloadable in PDF format from the following web sites:

MSU International Development Papers
http://www.aec.msu.edu/agecon/fs2/papers/recent.htm#recentidp
http://ideas.repec.org/s/msu/idppap.html

MSU International Development Working Papers
http://www.aec.msu.edu/agecon/fs2/papers/recent.htm
http://ideas.repec.org/s/msu/idpwrk.html

MSU International Development Policy Syntheses
http://www.aec.msu.edu/agecon/fs2/psynindx.htm
http://ideas.repec.org/s/msu/polbrf.html

OPPORTUNITIES TO IMPROVE HOUSEHOLD FOOD SECURITY THROUGH PROMOTING INFORMAL MAIZE MARKETING CHANNELS:

EXPERIENCE FROM EASTERN CAPE PROVINCE, SOUTH AFRICA

by

Lulama Ndibongo Traub and T.S. Jayne

May 2006

This report is published by the Department of Agricultural Economics and the Department of Economics, Michigan State University (MSU). Funding for this research was provided by the Rockefeller Foundation and from the American people, via the Food Security III Cooperative Agreement (GDG-A-00-02-00021-00) between Michigan State University and the United States Agency for International Development, through the Bureau for Economic Growth, Agriculture and Trade's Office of Agriculture and Food Security, with supplemental funding from the Africa Bureau's Office of Sustainable Development. The authors would like to recognize the University of Pretoria and the National Agricultural Marketing Council (NAMC) of South Africa for their collaborative efforts in generating this study. This report is one of several country-level studies addressing the overall objective of Maize Marketing and Trade Policies in Southern Africa. The coordinating agency for these studies is the Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN). This report has benefited from the comments and advice of Johann Kirsten, Hester Vermuelen, Godfrey Rothogwa, Eunicah Mphato, Kit le Clus, Anthony Thompson, Mteteli Nikelo, and Encoh Qwabe. The views expressed in here are solely those of the authors and should not be taken to reflect the official positions of any organization or agency.

Traub and Jayne are, respectively, visiting research specialist and professor, International Development, in the Department of Agricultural Economics, Michigan State University.

ISSN 0731-3438

Published by the Department of Agricultural Economics and the Department of Economics, Michigan State University, East Lansing, Michigan 48824-1039 U.S.A.

Acknowledgements

The authors would like to recognize the University of Pretoria and the National Agricultural Marketing Council (NAMC) of South Africa for their collaborative efforts in generating this study. This report is one of several country-level studies addressing the overall objective of Maize Marketing and Trade Policies in Southern Africa. The coordinating agency for these studies is the Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN). This report has benefited from the comments and advice of Johann Kirsten, Hester Vermuelen, Godfrey Rothogwa, Eunicah Mphato, Kit le Clus, Anthony Thompson, Mteteli Nikelo, and Encoh Qwabe.

This report is published by the Department of Agricultural Economics and the Department of Economics, Michigan State University (MSU). Funding for this research was provided by the Rockefeller Foundation and from the American people, via the Food Security III Cooperative Agreement (GDG-A-00-02-00021-00) between Michigan State University and the United States Agency for International Development, through the Bureau for Economic Growth, Agriculture and Trade's Office of Agriculture and Food Security, with supplemental funding from the Africa Bureau's Office of Sustainable Development.

The views expressed in here are solely those of the authors and should not be taken to reflect the official positions of any organization or agency.

EXECUTIVE SUMMARY

Maize meal is a staple food in South Africa, particularly among the poor. The South African government by the mid-1980s enacted a series of legislations aimed at reducing the role of government within the market and placing increasing reliance on market forces and the private sector. *Ex post* studies of the impact of maize market reform in neighboring countries found that, in general, the reforms led to lower maize milling/retailing margins in real terms. However, in the case of South Africa, recent analysis indicates that maize market reform has not reduced processing and retailing margins in the maize meal supply chain. To the contrary, these margins have actually risen over the past decade resulting in maize meal retail prices in South Africa being generally higher than in any other maize-producing country in the region.

The observations of a relatively large wedge between maize wholesale and commercial maize meal prices, coupled with an apparent lack of investment response by informal small-scale processors and retailers provide the motivation for this paper. The study objectives are to determine actual and potential consumer demand for the types of maize meal capable of being produced by small-scale mills, to measure the potential impact of small-scale grain retailing and milling channels on households' disposable income and food security, and to identify the factors responsible for the negligible role of small-scale milling sector in South Africa. To this end, surveys of households, small-scale millers, and large-scale millers were conducted within our case-study area, the Eastern Cape Province, a deficit maize-producing province. Contingent valuation methods were used to assess the potential demand for hammer-milled maize produced by informal millers compared to commercial maize meal at various relative pricing scenarios.

The study highlights four main findings. First, the maize marketing system in the Eastern Cape is not articulating the preferences of many consumers. About 38% of the respondents reported having purchased maize grain locally or used the services of small informal maize mills over the survey year. However, of these respondents, 23% stated that there are periods during the year when they would have wanted to purchase maize grain but it was unavailable in their area.

Second, many local small millers are unaware of this potential demand for their services and the role they could play in promoting food security in the area. A large share of consumers reported that they would purchase hammer-milled maize meal from informal millers at a price discount to that of commercial sifted meal. For example, 69.4% of all households surveyed preferred straight-run maize meal to commercially produced sifted meal at a price discount of 29%. During the 2003/04 season, it would have been possible to import maize to the Umtata area and mill it into straight-run meal at a cost roughly 3% to 41% less than the price of packaged commercial meal (of comparable quality to the straight run meal).

Third, positive benefits could accrue to consumers through the reduction in the proportion of monthly income devoted to maize meal purchases, particularly in the case of low-income consumers, if the informal marketing and milling networks could be developed to operate through the year.

Fourth, lack of market information, the inability of milling agents to perceive marketing opportunities (and possible anti-competitive behavior of the part of large commercial mills) appear to be the major barriers to small-scale millers entering into production milling.

These findings hold some key policy implications imperative to increasing low-income consumers' disposable income and food security. Efforts to reduce costs within the maize marketing system and enhance low-income consumers' access to less expensive staple food will promote the country's objectives of national food security, efficiency, and competitiveness.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

FANRPAN	Food, Agriculture, and Natural Resources Policy Analysis Network
KSD	King Sabata Dalindyebo
MSU	Michigan State University
NAMC	National Agricultural Marketing Council
NALEDI	National Labour & Economic Development Institute
SAFEX	South African Futures Exchange
SAGIS	South African Grain Information Services
USAID/EGAT	U.S. Agency for International Development/Bureau for Economic Growth, Agriculture, and Trade

1. INTRODUCTION

Maize meal is a staple food, particularly among the poor in South Africa. The ultra-poor devote over 50% of their monthly income on food, of which, up to 20% is spent on maize meal alone (Watkinson and Makgetla 2002). Given its importance as a staple food commodity, improvements within the maize marketing system that reduced maize meal prices would improve household food security and raise disposable incomes, particularly among the poor.

The South African government between 1944 and 1997 largely controlled maize marketing and pricing. By the mid-1980s a series of legislations were enacted that reduced the role of government within the market and placed increasing reliance on market forces and the private sector. These developments mirrored policy changes occurring in the agricultural sectors of other African countries.

Ex post studies of the impact of maize market reform in neighboring countries, such as Zimbabwe, Zambia, Mozambique, and Kenya, found that, in general, the reforms led to lower maize milling/retailing margins in real terms (Arlindo 2001; Jayne et al. 1995; Jayne et al. 1999). Two explanations have been given for the resulting reduction of maize milling/retail margins in these countries. Firstly, market reform opened the system to greater competition as small-scale millers and retailers who were previously excluded from entering the market were now allowed to procure and transport grain freely across district boundaries. Greater competition in milling and retailing exerted downward pressure on the margins of the large-scale firms' products thereby benefiting consumers (Jayne and Argwings-Kodhek 1997; Rubey 1995; Tschirley, Donovan, and Weber 1996). Secondly, the newly emerging small-scale millers were able to produce a range of maize meal products including relatively inexpensive whole maize meal. Studies indicated that these marketing channels became the primary means by which low-income consumers procured their staple maize meal. The emergence of these alternative maize meal products further contributed to the downward pressure on maize meal prices that were observed in these countries after maize marketing reforms (Jayne et al. 1999).

However, in the case of South Africa, recent analysis indicates that maize market reform has not reduced processing and retailing margins in the maize meal supply chain (Ndibongo Traub and Jayne 2004). To the contrary, these margins have actually risen over the past decade resulting in maize meal retail prices in South Africa being generally higher than in any other maize-producing country in the region. Furthermore, unlike the other countries in the region, after the initiation of market reform, informal small-scale milling and retailing networks appear not to have developed appreciably in South Africa. This is especially puzzling considering that there is a very large wedge between producer prices for maize and retail prices of maize meal. Over the past several years, producer prices in South Africa have averaged between 800-1200 rand per ton (118-177 US$/MT), while retail maize meal prices have exceeded R2800 (412 US$/MT).

This large wedge between maize grain and maize meal prices would seemingly provide a profitable space for investment in small-scale mills, especially in areas where smallholder farmers produce maize, but also in densely populated areas such as the townships where the demand for relatively inexpensive maize meal would seemingly be very high.

These observations of a relatively large wedge between maize wholesale and commercial maize meal prices, coupled with an apparent lack of investment response by informal small-scale processors and retailers provide the motivation for this paper. The study objectives are to determine actual and latent consumer demand for the types of maize meal capable of being produced by small-scale mills, to measure the potential impact of small-scale grain retailing and milling channels on households' disposable income and food security, and to identify the factors responsible for the negligible role of small-scale milling sector in South Africa. Based on this assessment, we lastly consider policy options to address the barriers within the marketing system that are impeding consumers' ability to benefit from these potentially positive changes in the structure of the grain marketing system.

To this end, we employed structure-conduct-performance techniques to understand the current maize marketing system within the Eastern Cape Province[1], which was chosen for several reasons. Firstly, the Eastern Cape is a deficit maize producing province, with over 90% of its maize grain requirements sourced from outside of the province (MSU/FANRPAN 2004); secondly, it is the poorest province within South Africa (South African Demarcation Board website 2005); and thirdly, it has a relatively high rural population with two-thirds of the entire population residing in the rural areas (Statistics South Africa 2002).

The paper is divided into five parts. The first section gives a general description of the marketing activities and actors involved in the maize sub-sector within the Eastern Cape Province. The second and third sections describe the survey sampling methodology and the methods used to derive the findings. The fourth section presents the main findings from the case-study area. The fifth section summarizes the salient points and makes suggestions for both policy makers and future researchers.

[1] The University of Pretoria and the NAMC conducted a similar study simultaneously in the Limpopo Province. The Limpopo Province is a deficit maize-producing province where a substantial proportion of their rural population is involved in small-scale maize grain production.

2. BACKGROUND

2.1. Eastern Cape Demographics

The Eastern Cape is located on the South-Eastern seaboard of South Africa and is the second largest province in terms of land mass (South African Demarcation Board website 2005). It is made up of six District Municipalities; O.R. Tambo, Amatole, Chris Hani, Ukhalamba, Alfred Nzo, and Cacadu District Municipalities. The major towns and cities in the Eastern Cape include Aliwal North, East London, Grahamstown, King Williams Town, Port Elizabeth, Uitenhage, and Umtata. In 1996 the population was approximately 6.3 million representing 15.5% of the total South African population. Although 55% of the population is considered functionally urbanized, the province has a relatively high rural population with only a third living in official towns (O.R. Tambo District Municipality 2004).

In terms of income-levels, the Eastern Cape is the poorest province in South Africa. It is afflicted by the twin economic ills of poverty and unemployment consequently the provincial Gross Geographic Production per capita is substantially less than the national average. In 1999 the GDP per capita for the province was R9092, compared to R18727 for the national measure (South African Demarcation Board website 2005).

2.2. Salient Features of Maize Marketing System within the Eastern Cape

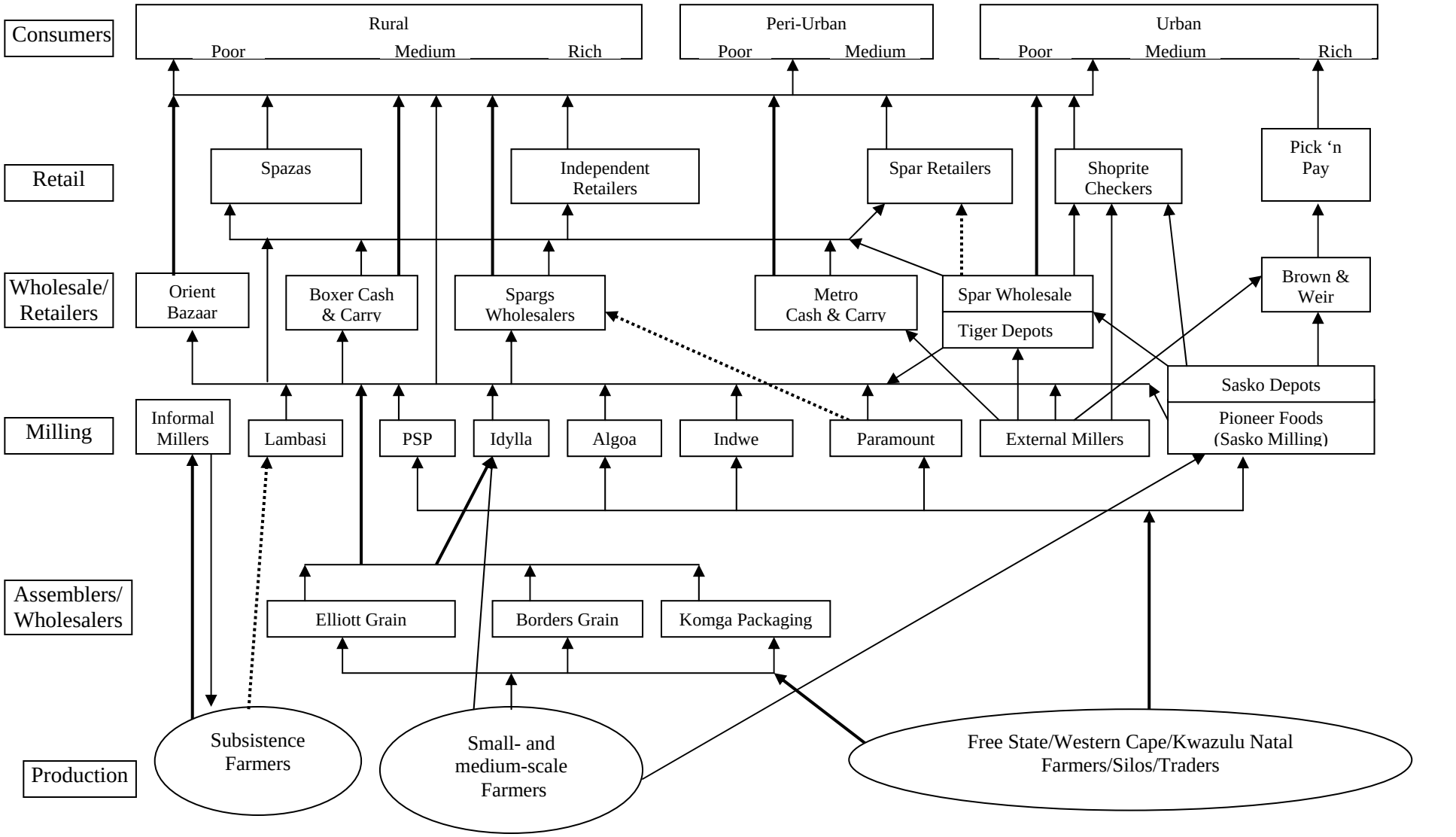
An initial survey of large- and small-scale millers, grain wholesalers and retailers was conducted from August to November 2004. Attempts were made to sample the entire population of large and small millers in order to generate a clear picture of the maize marketing and milling supply chain in the Eastern Cape. Sampling methods are discussed in Section 3.

Figure 1 depicts the flow of maize grain through the maize sector within the Eastern Cape Province. Starting at the bottom of the marketing channel diagram, we see that the maize consumed in the region is sourced from three entities: subsistence farmers, small-to-medium scale regional grain farmers, and grain imported from the Free State, Kwazulu-Natal, and/or Western Cape Province. In general, the maize grain sourced outside the province, particularly from the Free State, makes up anywhere from 80% to 90 % of total raw input to commercially produced maize meal within the province. This is due to several reasons, including the inconsistency in the supply and/or poor quality of maize grain grown in the Eastern Cape.[2]

The milling industry in the Eastern Cape is comprised of two types of maize millers: large-scale commercial producers and small-scale informal millers. Large millers can be further divided into regional vs. national millers, while small-scale millers are sub-divided into stationary vs. mobile *bakkie* millers. Within the system the small-scale millers are largely responsible for providing maize-milling services to subsistence maize grain producers, and to a small degree, rural and peri-urban consumers who source maize grain at the wholesale level and pay a fee to have their grain ground into meal.

[2] G. O'Brien, Tiger Wheat Milling General Manager, personal interview, East London, Eastern Cape. 8 October, 2004.

Figure 1. Flow of Maize Grain and Meal within the Eastern Cape Province



Large-scale milling is undertaken in the province by seven firms, six of which are regionally owned and operated mills, while one is associated in ownership to Pioneer Foods, a national food manufacturing company. In terms of sourcing raw material inputs, there are three options available to regional millers: these include local producers; local maize grain assemblers and/or silos; and, traders and farmers from outside the province. Among the commercial millers, three mills, Idylla, Lambasi, and Sasko source maize grain from local maize producers. In the case of Lambasi Mill, 100% of their inputs are from local producers throughout their marketing year, while, between May and October, 40% and 15% of Idylla Mill and Sasko's maize grain inputs are from local producers, respectively. Idylla Mill also sources raw maize grain during times of local shortage through a regional maize grain assembler, Elliot Grain. The remaining millers source their grain inputs outside of the Eastern Cape, from Provinces such as Kwazulu-Natal, Western Cape, and/or the Free State.

The millers have a range of buyers, from individual households to national wholesale and retail enterprises. In the case of Sasko Mills, their final products flow to national retailers such as Spar, Pick n' Pay, Shoprite, and Metro Cash & Carries, as well as regional retailers/wholesalers such as Spargs and Boxer. The estimated proportion of maize meal sales attributed to Sasko within the Eastern Cape was 70% for the 2003/2004 marketing year (MSU/FANRPAN Large-scale Miller Survey Instrument 2004). The regional commercial millers' output markets consist of households (spazas), which are small, independent retailers operating normally out of a home within a given community, as well as regional independent wholesalers and Cash & Carries. Their combined proportion of maize meal sales within the province amounted to 11% for the 2003/2004 marketing year (MSU/FANRPAN Large-scale Miller Survey Instrument 2004).

In terms of maize meal retailing, Pick n' Pay, Spar, and Shoprite retail stores service medium to higher-income consumers in the urban and peri-urban areas. On the other hand, wholesalers such as Spar, Spargs, and Boxer serve both urban and rural consumers having low to medium income levels. In the case of the spazas, the majority of their customer base is comprised of low-income consumers in rural and peri-urban areas.

3. METHODS

The overall study objectives require that we employ analytical techniques to answer two questions. The first question asks whether there is *latent demand* (i.e., demand that is not articulated in the market for various reasons, and is, therefore, unobserved) on the part of consumers for straight-run maize meal products capable of being produced by small-scale hammer-millers. Since latent demand is unobserved, we employ contingent-valuation techniques to determine demand for straight-run meal as a function of various price levels relative to the price of commercially packaged maize meal products and location. Given the price discount found, financial cost accounting techniques were used to determine the feasibility of providing straight-run maize meal using maize grain imported into the Eastern Cape. This estimate was then used to determine the potential cost-savings to consumers as well as the impact on household disposable incomes.

The second question addresses the issue of barriers within the market that impede the development of the small-scale informal millers. Specifically, if there exists demand for straight-run meal and such products can be produced at costs which allow for an effective price discount, then why have we seen only marginal development of the small-scale milling sector in the Eastern Cape? Small-scale millers not involved in production milling were asked to list all the reasons why they had never entered into such activities. Their responses are summarized in Section V of the report.

The discussion to follow briefly describes the computations used to generate the various descriptive tables used in the analysis.

3.1. Actual Staple Carbohydrate Expenditures

Household surveys were carried out between August-October 2004 to understand the pattern of staple food expenditure patterns in urban, peri-urban and rural areas, and among low- middle- and upper-income groups in the greater Umtata area. The survey focused on maize, wheat, rice, and potato products. The total expenditure on a given commodity was obtained by multiplying the total quantities purchased by the price, then summing the per-household expenditure within each income group. There were two recall periods to account for potential seasonality in consumption: the January-March 2004 period (lean season when local grain supplies were likely to have been exhausted), and the post-harvest August-October 2004 period when maize grain was likely to be available. It was found that little seasonal variation existed in households' consumption of staple carbohydrates; therefore, the monthly consumptions patterns of the most recent period (August to October 2004) are reported.

Household incomes were derived as the sum of proceeds from employment, and informal/formal business enterprises by household members in the previous month. Incomes accruing from pensions and/or social grants were also included. Households within the sample were then ranked by income and stratified into three income terciles in order to assess the difference in consumer demand for maize grain and straight-run meal by income. The first tercile represents the households with the lowest income levels and the third tercile those with the highest annual income levels.

3.2. Latent Demand for Alternative Maize Products Using Stated Preference Techniques

To determine the consumer demand for maize grain, we examined household maize and maize meal purchasing patterns. However, this may give an incomplete picture of the demand for maize grain and/or meal milled by small mills if the product is often unavailable for purchase during some or all times of the year for some consumers. Questions were asked about the availability of maize grain and maize meal from small millers at different times of the year. Based on prior information and rapid appraisals, local maize grain appears to frequently be unavailable for purchase by small mills, retailers, and consumers later in the season after local subsistence production is exhausted. For this reason, the small-scale bakkie millers and stationary millers do not have access to maize for milling unless it is imported from surplus areas of the country. Hence, there are prior reasons to believe that the underlying but unexploited demand for maize grain and meal produced by small mills may possibly be greater than would be indicated by simply asking households how much grain they purchased, or asking small mills how much grain they milled during the season.

To estimate the *latent* demand for maize meal milled by small-scale mills in the Umtata area, we resort to a class of survey methods called "stated preference" or "contingent valuation" techniques. The pioneering work on contingent valuation techniques was initiated by Lancaster (e.g., see Lancaster 1966). Consumers are asked to indicate their likely purchasing choices when presented with the availability of a range of goods each with specific price and quality attributes. These techniques are useful when consumer preferences are of interest for a commodity or good that is familiar to respondents but not necessarily available in the market, thus it is not possible to simply examine prevailing consumer demand patterns to understand the potential, or "latent", demand for the product. Stated preference techniques have been extensively assessed for their ability to provide accurate results, and the weight of the evidence in the economics literature concludes that they can generally provide reliable estimates when the economic dimensions of the question are clear and precise, and when the good in question is familiar to consumers (Huang 2001; Adamowicz 1998; Adamowicz, Louviere, and Williams 1993; Hensher and Bradley 1993; Dickey, Fisher, and Gerking 1987). Clearly, straight-run maize meal is a familiar good for most households in the Eastern Cape, whether rural or urban, due to its use in cultural practices of boy's initiation and/or traditional wedding celebrations, and because much of the maize grown by small-scale rural households in South Africa is consumed as straight-run meal. For these reasons, using stated preference techniques to elicit households' willingness to pay for maize meal produced by small-scale mills in the Eastern Cape Province is considered an appropriate context to apply such techniques.

3.3. Counter-Factual Cost Build-Up

The purpose of computing counter-factual import costs of maize to Umtata during the 2003/04 marketing year is to use this as a reference price for adding transport, milling, and transaction costs of small-scale mills to determine the range of prices at which small-mills might be able to sell meal to consumers. We then compare these potential prices with prices of packaged commercial meal available in retail stores to determine consumers' willingness to pay for meal milled by small-scale mills at different price ratios *vis-à-vis* the price of packaged commercial

Table 1. Characteristics of Typical Maize Meal Consumer, Umtata Area, Eastern Cape Province, 2004

Characteristics	Households ranked by income tercile					
	Poorest (n[1]=183)		Medium (n=177)		Highest (n=180)	
		%		%		%
Median annual household income (Rand)	4800	-	15000	-	60000	-
Most common*:*						
Maize meal brand preference	White Star	37.4%	White Star	41.2%	White Star	48.5%
Retail procurement source	Local	82.5%	Local	69.5%	National	43.3%
Unit of purchase	12.5 kg	76.5%	12.5 kg	89.8%	12.5 kg	65.6%
Purchase frequency	Monthly	81.3%	Monthly	79.0%	Monthly	76.7%
Mean household expenditure on:						
Super-sifted meal (Rand)	36.27	-	37.06	-	36.80	-
Special sifted meal (Rand)	27.36	-	33.27	-	30.99	-
Sifted meal (Rand)	23.38	-	22.59	-	26.92	-

Notes: [1] n denotes the number of households within each income tercile
Source: MSU/FANRPAN Consumer Survey 2004

meal. The nearest large silo is in Clocolan, in the lower part of the Free State, so this location is used for determining the cost of maize grain imported to the Umtata area.[3]

Twelve key characteristics were used in order to establish the typical maize meal consumer within the three income terciles (Table 1). These characteristics were used to establish the most pertinent unit of maize grain to use in the counterfactual cost-build up, the frequency of purchase, as well as the impact on households' disposable incomes across the three income terciles.

The counterfactual scenario assumes small-scale roller millers producing super-sifted, special, and sifted maize meal as products.[4] To generate the counter-factual price range of maize meal produced from maize grain originating in the Free State, we computed lower- and upper-bound prices. The lower-bound prices were computed as the SAFEX price for white maize minus the transportation differential to Clocolan plus handling costs, transportation costs from Clocolan to Umtata, miller service fees, and a 10% mark-up to cover miscellaneous operating expenses such as capital costs, etc. The upper-bound prices were computed in the same way, except that the SAFEX-Clocolan transportation differential was not subtracted. The lower-bound price assumes

[3] During the 2003/04 marketing year approximately 89% of all the raw maize grain used in the production of maize meal within the Eastern Cape came from the Free State. Clocolan is the southern most semi-urban center located within the surplus maize producing area of the Free State.

[4] Given the technology available to the informal milling sector, super-sifted, special, and sifted meal are not the same as products with the same name produced by large commercial millers. For the informal sector, it is a matter of changing sieves to obtain these consistencies and their extraction rate is the same across the board, i.e., approximately 92% - 95% extraction rate. Essentially, the consumer gets back almost all of what is put in; the difference lies in the fineness of the meal.

that the silo at Clocolan is willing to sell to buyers in the Eastern Cape at the same price as the SAFEX price minus the Randfontein-Clocolan transport differential. The upper-bound price assumes that the silo at Clocolan is only willing to sell to buyers in the Eastern Cape only at a price substantially above that which could be obtained by selling to SAFEX.

In order to quantify any cost advantage to the informal market, we also obtained maize-purchasing price information for white maize grain from the largest commercial miller surveyed in the Eastern Cape. This mill stated that a rough proxy for their purchasing price was SAFEX minus the transport differential plus transportation costs. To provide an estimate of the miller's purchasing price, we used the average SAFEX white maize price from August through October, subtracted the transportation differential to Bloemfontein (where the miller purchased the majority of their maize), then added the transportation cost to the mill's location. The commercially produced maize meal prices were the average purchasing prices paid by households within the Umtata area surveyed between August and October 2004.

To generate the informal miller's maize grain price, we used information given by one of the four hammer/roller-millers in the survey area who was involved in the sale of maize meal. This miller was located in the Engcobo area and purchased maize grain from a local grain distributor. His purchasing prices for white maize grain between August and October 2004, plus a 10% mark-up on his purchasing price, as well as his stated milling fees for consumers who purchased maize grain from him for milling purposes were added together to arrive at the final retail cost for the various consistencies of maize meal produced.

3.4. Perceived Barriers and Market Inefficiencies

To determine the proportion of maize grain found within the Eastern Cape maize market originating outside of the province, we analyzed information from millers surveyed indicating the total quantity of maize grain purchased disaggregated by the main province from which these millers' sourced their maize grain. The population of millers used in the construction of these tables includes seven of the large-scale commercial millers and four small-scale hammer-millers that, besides providing milling services, offered straight-run maize meal as a retail product.

A series of frequency tables, which summarizes the main causes of production inefficiencies as stated by small-scale millers surveyed, were constructed. In particular, the small-scale hammer-millers were asked two questions in order address the issue of profitability. Firstly, those (51 in all) not involved in production milling were asked to list the three main reasons why they did not get involved in producing meal for the market. Secondly, all 55 millers within the sample population were asked to list the main factors that limited the profitability of their milling enterprise.

4. DATA

In order to address the paper's objectives, household-level, small-scale millers, and large-scale miller survey instruments were utilized.

4.1. Household Sampling Methodology

The consumer-level data used in this study comes from a cross-sectional random survey of 540 households within the greater Umtata area. The survey was conducted between August and October 2004.

The households sampled in the consumer survey portion of the study came entirely from the greater Umtata area, which falls within the King Sabata Dalindyebo (KSD) Local Municipality. KSD is one of the seven local municipalities that make-up the O.R. Tambo District Municipality. The O.R. Tambo Municipality is situated in the north-eastern part of the Eastern Cape Province and incorporates a large portion of the former Transkei, a homeland state under the previous government. Mainly a rural district, with Umtata serving as its largest urban center, the population of the O.R. Tambo District municipality is approximately 1.7 million, of which 98% are Black and two-thirds reside in the rural areas. In terms of income, O.R. Tambo is the second poorest district municipality within the Eastern Cape with approximately 67% of household's annual incomes falling between the R0 – R6000 range (O.R. Tambo District Municipality 2004).

The greater Umtata area was divided into urban, peri-urban and rural catchments; each comprised of wards, which were the primary sampling units. The urban area consisted of thirteen wards, peri-urban of one, and the rural area of four. In order to obtain diversity in terms of income as well as urban verses rural locations, 180 households within each catchments area were surveyed.

Since no exact listing of community members was available, to ensure randomness in the population sample, probability proportional to population sampling was used within catchments areas that were comprised of at least four wards. In particular, within the urban and rural catchments areas, three wards were randomly chosen with probability proportional to population size. Then within each ward, locations (neighborhoods) were equally sampled with households randomly selected geographically by northwest, middle, and southeast corner. In the case of the peri-urban catchments area, since it consists of only one ward made-up of four locations, each location was equally sampled. Forty-five households were surveyed from within each location randomly selected by geographic location.

4.2. Small-Miller Sampling Methodology

Sixty small-scale millers were surveyed from five local municipalities between October and November of 2004; five of which did not operate for a fee. Since small-scale millers within the province are largely informal enterprises (i.e., unregistered businesses) and there exists no formal listing of their location, randomness within the sample population was hard to achieve. A population was developed by word-of-mouth within five local municipalities. These included the KSD Municipality (from which our consumer population was sampled) and the four local

municipalities bordering KSD; namely, Nyandeni, Mhlontlo, Engcobo and Umbashe Municipalities. We found a population of thirteen millers from the KSD Local Municipality, ten from Nyandeni, ten from Mhlontlo, eighteen from Engcobo, and four from Umbashe.

4.3. Large-Miller Sampling Methodology

Given the small population of large-scale commercial maize millers within the province, all seven millers were surveyed during October 2004. At the time of the study, one of these millers was in the process of shutting down its operations. The location of these mills within the province varied: two were located along the coast-line, East London and the Port Elizabeth Nelson Mandela Metropolitan Municipality, respectively; two within the O.R. Tambo District Municipality; two within the centrally located district municipality Chris Hani; and one mill within the northern most district municipality, Ukhalamba, which borders the Free State Province.

5. RESULTS

5.1. Staple Carbohydrate Expenditures

In 2004, the average expenditure on wheat products for the sample of households in the Umtata area was R152 per household per month (Table 2). By contrast, maize, rice, and potato products accounted for R62, R29, and R20 per household per month, respectively (Table 2).

When household expenditures are disaggregated by income levels, a notable difference is observed. The expenditure per household per month increases with income for wheat products and potatoes. By contrast, maize and rice expenditures increase from low to middle levels of household income and then decline from middle to relatively high levels of income, indicating that maize and rice are both "inferior" goods between the middle to high income groups. Maize, overall, accounts for less than a quarter of all staple carbohydrate expenditures, ranging from 24.7% for low-income consumers to 20.3% for high-income consumers. Rice products, on the other hand, consistently account for roughly 11% of total expenditures irrespective of income levels.

Wheat dominates staple carbohydrate expenditures across all income groups, accounting for 56.5% for low-income consumers, to 61.9% for high-income consumers. This finding indicates that consumers within the greater Umtata area are not exclusively or even primarily dependent on maize for their staple food requirements. When wheat products are disaggregated by type, it was found that the major proportion of expenditures on wheat was devoted to bread (ranging from 42.3% of staple carbohydrate expenditures for low-income consumers to 48.7% for high-income consumers).

These findings are counter to the national maize and wheat consumption numbers tabulated by Grain South Africa. Their spreadsheets show the annual domestic food consumption of white maize and wheat for the 2003/04 season amounted to 3.687 and 2.652 million tons, respectively (Grain South Africa website www.grainsa.co.za). These somewhat different findings from the Eastern Cape might indicate that there are regional differences in staple carbohydrate consumption patterns within South Africa. When the average monthly expenditures on primary staple carbohydrates were disaggregated by catchments area (Table 3), our findings remain consistent.

Table 2. Average Monthly Expenditure on Primary Staple Commodities

Staple Carbohydrates	Households ranked by income tercile					
	Poorest (n[1]=183)		Medium (n=177)		Highest (n=180)	
	Mean (R/mo.)	%	Mean (R/mo.)	%	Mean (R/mo.)	%
Maize Products	58.72	24.7%	69.71	25.9%	57.72	20.3%
Wheat Products	134.14	56.5%	147.3	54.7%	176.17	61.9%
Rice	26.67	11.2%	31.74	11.8%	29.54	10.4%
Potatoes	17.88	7.5%	20.34	7.6%	21.23	7.4%

Notes: [1] N denotes the number of households within each income tercile
Source: MSU/FANRPAN Consumer Survey 2004

Table 3. Average Monthly Expenditure on Primary Staple Commodities Disaggregated by Catchments Area

Staple type	Households' mean monthly expenditures					
	Urban (n^1=180)		Peri-Urban (n=180)		Rural (n=180)	
	Mean (R/mo.)	%	Mean (R/mo.)	%	Mean (R/mo.)	%
Maize Products	62.35	20.1%	66.30	27.6%	70.56	24.2%
Wheat Products	186.99	60.3%	120.43	50.1%	164.84	56.6%
Rice	37.10	11.9%	32.19	13.4%	31.39	10.8%
Potatoes	23.84	7.7%	21.31	8.9%	24.36	8.4%
		100.0%		100.0%		100.0%

Source: MSU/FANRPAN Consumer Survey 2004

Table 3 indicates that across catchments (rural, peri-urban, and urban locations), total monthly expenditures on maize products range from 20% to 28%; while expenditures on wheat based products range from 50% to 60% of total expenditures. These findings, although surprising are consistent with recent studies conducted in Kenya, which found higher proportions of household expenditures being devoted to wheat based products rather than maize based products (Muyanga et al. 2004).

5.2. Latent Consumer Demand for Maize Grain and Straight-Run Meal

To start understanding the potential unrealized demand for maize grain and/or straight run meal in the Umtata area, we asked respondents, "Were there times within the year when you wanted to purchase maize grain for milling purposes but found none available in the market?" However, this question is relevant only for households that may have actually tried to purchase or mill maize grain. Since the question is not applicable for households that did not attempt to purchase maize (and hence could not answer whether they could find grain available to purchase or not), we excluded these households. Table 4 shows the results for households that either grew maize grain and milled it, or purchased grain at some point in the past year.

Table 4. Are there Times of the Year when Households Surveyed Would Wish to Buy Grain to Mill but None is Available?

	Low income	Middle income	High income	Total sample
	---------- number (%) ----------			
Urban	2/11 (18.2%)	0/20 (0.0%)	4/13 (30.8%)	6/44 (13.6%)
Peri-urban	3/16 (18.7%)	4/8 (50.0%)	0/8 (0.0%)	7/32 (21.9%)
Rural	14/42 (33.3%)	12/38 (46.2%)	8/45 (17.8%)	34/125 (27.2%)
Total	19/69 (27.5%)	16/66 (24.2%)	12/66 (18.2%)	47/201 (23.4%)

Source: MSU/FANRPAN Consumer Survey 2004

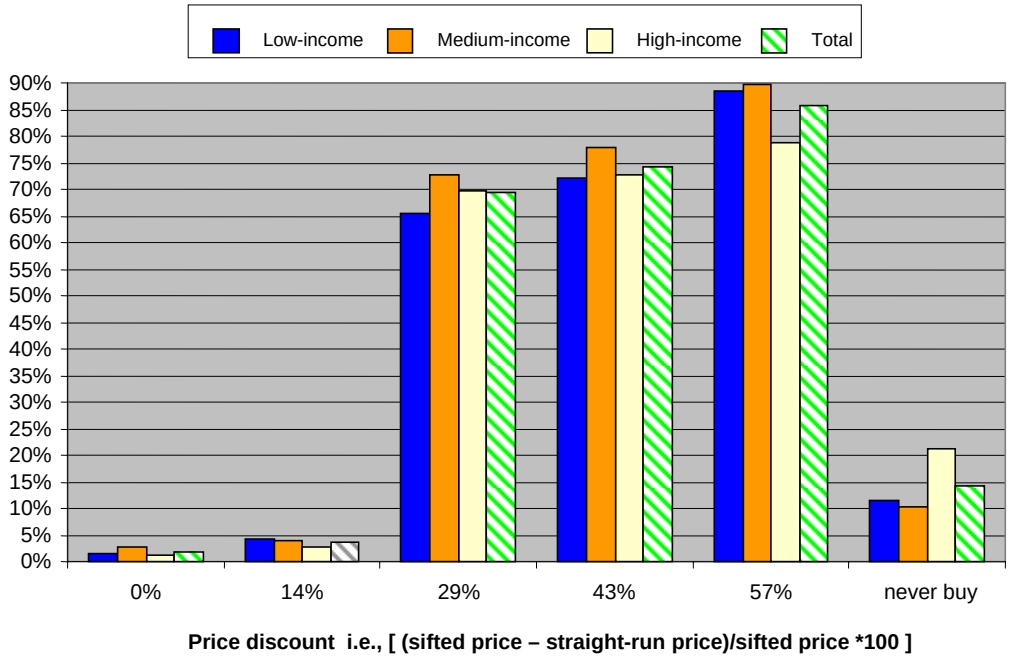
Because a greater proportion of rural households grow and mill grain than urban or peri-urban dwellers, a higher proportion of rural households answered this question. About 27.2% of these rural households reported trying to buy maize for milling purposes and could not find any maize available to buy. This proportion was 21.9% among peri-urban households attempting to buy maize, and only 13.6% among urban households. When stratified by income group, we found that a relatively small proportion of high-income households looking for grain were unable to find it, while 27.5% and 24.2% of low- and middle-income households looking for maize grain were sometimes unable to find any. Inability to find maize grain for purchase is indirect evidence of latent demand, i.e., that the observed volume of maize milled by small mills underestimates the demand that could exist if the maize grain market functioned in a way that made it available for consumers to purchase.

Given the sample population within the greater Umtata area, where only 12.2% of all households actually purchased hammer-milled maize meal during the 2003/04 marketing year, there appears to be strong evidence of latent demand for straight-run maize meal capable of being produced by hammer-millers. Of the 539 households who responded, 69.4% expressed a willingness to pay for a 5 kg bag of straight-run maize meal produced by a hammer miller instead of a 5 kg bag of commercial produced sifted maize meal, if the straight-run meal were available at a price discount of 29% or greater. This finding was determined by asking surveyed households whether they would prefer to purchase a bucket of straight-run maize meal from a local small mill at a various price levels (e.g., R10, R12, R13) per 5 kg bag, given that packaged sifted meal is available in the retail shops at R14 per 5 kg bag (which was roughly the actual price for packaged meal in retail stores during the survey period). Consumers' willingness to pay for straight-run meal was found to rise further as its price discount relative to commercial branded maize meal increased (Figure 2). Respondents' indicated that somewhere between a 29% and a 14% price discount, the demand for straight-run meal would fall off substantially. Hence, the potential of small-scale mills to play a significant role in the maize marketing system of the Eastern Cape region will depend crucially on the system's ability to make grain available to consumers and at a cost that, after taking account of hammer-milling costs and time costs, would be at least 25% less costly than commercial maize meal.

When the sample population is stratified by income group, households within the middle to low-income terciles were found to be more price-sensitive than those within the higher income tercile. In particular, 21.2% of all households within the highest income bracket said they would never buy straight-run maize meal produced by hammer-millers regardless of its price (Figure 2). This portion of households stating no demand for straight-run meal at any price is significantly higher than that within the other income terciles. Only 10.2% of households within the middle-income tercile and 11.5% of households within the poorest income tercile would never buy straight-run maize.

However, between the middle- to low-income groups, income does not appear to be a relevant factor in determining the households' willingness-to-pay. For instance, more households within the middle-income tercile (2.8%) were willing to pay as much as R14 for a 5 kg bag of straight-run meal versus commercially produced maize meal of equal price, than those within the low-income tercile (1.6%). Furthermore, approximately 72.8% of medium-income households preferred straight-run meal to commercially packaged meal if it were available at a 29% discount, compared to 65.5% of the households within the low-income tercile. This finding

Figure 2. Households' Willingness-to-Pay for Straight-Run Maize Meal



Source: MSU/FANRPAN Consumer Survey 2004

indicates that between the middle- to low-income households surveyed, straight-run maize meal cannot be regarded as an inferior good. Any policy changes aimed at developing the production of such a good would impact both low- to middle-income consumers.

5.3. Counter-Factual Cost Build-Up Analysis

To understand the extent to which the strengthening of small-scale grain retailing and milling channels could raise households' disposable incomes and food security, some simple simulations are constructed to estimate the difference in costs to consumers if they could choose between commercially produced maize meal and straight-run maize meal. This will enable us to estimate the approximate price discounts that would be expected to obtain between commercially packaged maize meal and straight-run maize meal produced by small local mills. Because the analysis in the proceeding section indicates that the latent demand for straight-run meal is contingent on its price relative to the price of commercial packaged meal, the study's findings and implications rest crucially on obtaining a solid estimate of the cost of importing maize into the Umtata area. After understanding the cost of importing grain to Umtata, we then add milling, local transport, transaction costs, and mark-up margins to determine the approximate price that consumers in the Umtata area would pay for straight-run meal if grain were consistently available.

To estimate the impact of these simulations, a typical consumer was identified within each income tercile, the average price they paid for 12.5 kg bag of various consistency of maize meal, and the proportion of their monthly income devoted to the various commodities (Table 1). We developed three estimates of maize meal prices:

1. The observed prices in the formal marketing system, i.e., the grain acquisition cost of large-scale millers, and the retail price of commercial maize meal selling in local shops. These prices are based on interviews of millers and prices observed in retail shops during the sample period;

2. The observed prices in the informal marketing system, i.e., the grain acquisition costs of small millers from the nearest local source, which was sometimes up to 140 kilometers away from the greater Umtata area; and

3. Computed (counter-factual) prices based on the cost of importing grain to Umtata from the Free State, plus imputed milling, local transport, transaction costs, and mark-up margins (Table 5).

Given the current market structure between August and October 2004, consumers within the Umtata area were able to source packaged meal through retail stores at prices ranging from R36.71 per 12.5 kg bag of super-sifted and R24.30 per 12.5 kg bag for sifted meal. Alternatively, through the informal market, a consumer could have traveled to Engcobo, (the closest area where maize grain was available for milling according to our field work, which is located 140 km north of Umtata), purchase the grain, mill it into hammer-milled meal, and including a 10% mark-up cost, pay R18.41 per 12.5 kg. The consistency of this meal could have ranged between special and sifted consistencies. However, this cost estimate does not include the transportation cost to and from Engcobo.

If the informal market were available as a source of maize meal within the Umtata area, consumers would have benefited through a reduction in maize meal prices. In particular, instead of paying R36.71 for super-sifted maize meal they could have paid between R21.77 to R23.34 per 12.5 kg bag; which is a price discount ranging from 36% to 41%. In the case of special maize meal, the lower-priced alternative could be produced at a price discount ranging from 25% to 30%, while for sifted this range is between 3% and 10%.

Table 5. Actual and Counter-Factual Monthly Expenditures on 12.5 kg Bag of Maize Meal: Aug – Oct 2004

Scenarios	Maize Grain Acquisition Price for millers (R/12.5 kg)	Retail Price to Consumers (R/12.5 kg)		
		Super-sifted	Special	Sifted
Actual				
Formal Marketing System [a]	11.08	36.71	30.54	24.30
Informal Production Millers [b]	13.09	18.41	18.41	18.41
Price % Discount [c=(a/b)*100]	15%	50%	40%	24%
Counterfactual				
Informal Production Millers [d]	13.33-14.87	21.77-23.34	21.34-22.92	21.87-23.45
Price % Discount [e=(d/a)*100]	-	36% - 41%	25% - 30%	3% - 10%

Source: Grain South Africa website, www.grainsa.co.za 2005; MSU/FANRPAN Consumer, Small-Scale Millers, and Large-Scale Millers Surveys 2004.

There are two points of interest from this table that need to be noted. Firstly, although the informal miller within Engcobo purchases his raw maize requirement at a price 15% higher than the commercial miller, he is able undersell the commercial miller at price discounts ranging from 24% to 50%. This tells us that the informal sector is able to produce straight-run maize meal within the critical discounted range which would entice consumers to switch over from commercially produced meal (recall from the previous section consumers surveyed indicated that at discounted prices somewhere between 14% - 29%, they would prefer straight-run maize meal to commercially produced meal).

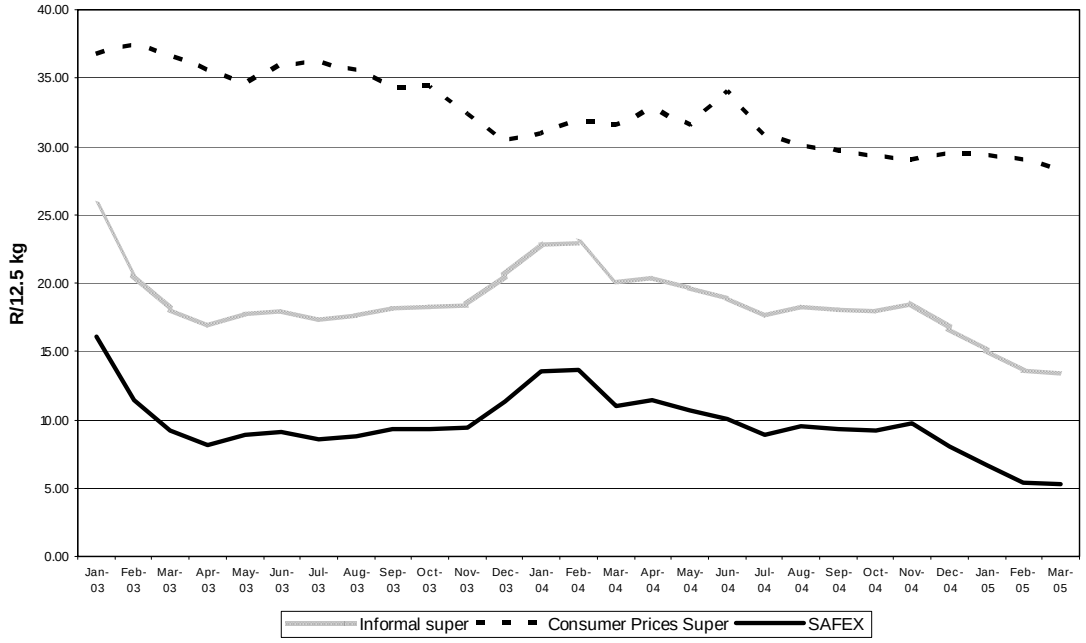
Secondly, the counterfactual cost build-up makes clear that small-scale millers within the Umtata area would have a smaller price advantage in sifted and special meal than they do in super-sifted meal. One possible explanation is the alleged dumping practices exercised by large-scale commercial millers outside of the Eastern Cape Province, particularly in the case of sifted and special meal. One such miller, interviewed from the Free State, stated that in terms of special and sifted meal he was fully aware that small-scale millers are able to undercut his prices, therefore he "dumps" his products into the Eastern Cape at reduced prices in order to maintain his company's market share. Since only one miller was willing to own to such a practice, this topic needs further research in order to establish if this practice is widespread, as well as its impact on the market and, therefore, maize meal consumers within the Eastern Cape Province.

These results indicate that households could reduce the proportion of monthly income devoted to maize meal purchases if informal local marketing and milling networks were strengthened. The results indicate that at price levels of importing maize to the Umtata area, there appears to substantial as-yet-unrealized demand for small-scale milling services, which could offer maize meal to consumers at prices below that of commercially produced packaged meal. Changes made within the Eastern Cape maize sub-sector to strengthen small-scale maize grain retailing and/or milling would have a positive impact on households' disposable income and food security. However, the gains in household disposable incomes would be relatively modest – about 5% for households in the bottom income tercile, 4% for the middle-income tercile, and virtually no impact on the upper income groups.

To see the potential impact in the market of the informal maize-milling sector over time, price series were generated for both the formal and informal markets within the Umtata area. Since local data is not available on super-sifted and special maize meal, the average prices paid by households surveyed between August and October 2004 for a 12.5 kg bag of each consistency of maize meal, as well as the national average price for a 2.5 kg bag of sifted maize meal complied by SAGIS, were used to extrapolate the 12.5 kg price for various maize meal consistencies within the Umtata area during the 2003/04 marketing year. The resulting series are plotted in Figures 3.1, 3.2., and 3.3. on the following pages.

These figures show the potential of the informal milling sector to significantly reduce the milling/retail margin within the maize milling and retailing sub-sector. The formal price series for super-sifted and special maize meals depict substantial miller/retail margins, which accrue to millers and/or retailers of commercially produced maize meal. With the introduction of the informal milling sector, these margins are significantly reduced through this sector's ability to offer a low-cost alternative to households. In order for the larger commercial millers to compete, the final retail price of their product would need to be reduced, particularly in the case of super-sifted and special maize meal.

Figure 3.1. Formal vs. Informal Markets: Super Maize Meal Price Comparison
January 2003 - March 2005 (Constant 2000 Rands)



Note: SAFEX prices are quoted per metric ton, but are expressed here in the same 12.5 kg unit sizes so as to be comparable with the prices of maize meal, which are commonly sold in this unit size.
Sources: SAFEX and SAGIS field interviews for this study.

Figure 3.2. Formal vs. Informal Markets: Special Maize Meal Price Comparison
January 2003 - March 2005 (Constant 2000 Rands)

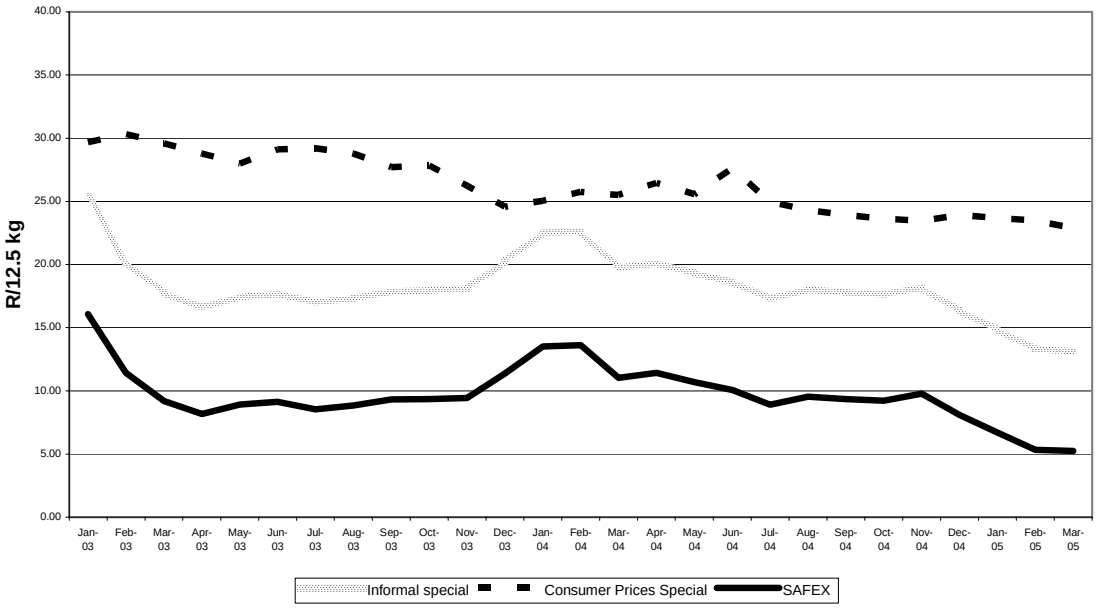
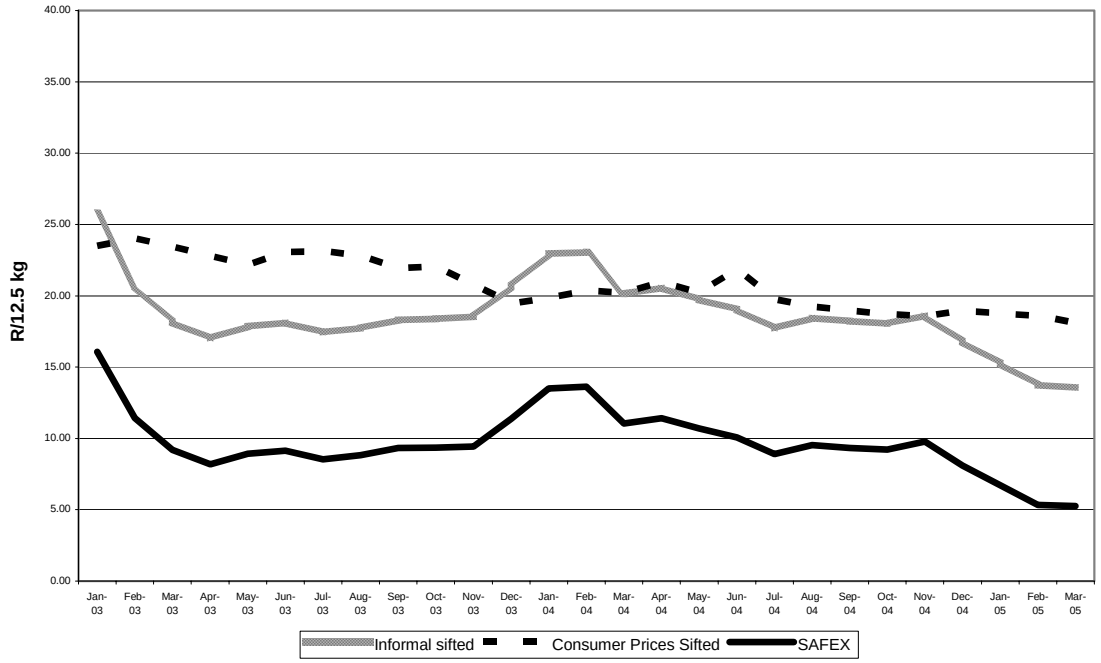


Figure 3.3. Formal vs. Informal Markets: Sifted Maize Meal Price Comparison
January 2003 - March 2005 (Constant 2000 Rands)



5.4. Perceived Barriers and Market Inefficiencies

During the May-October 2003 period, approximately 82% (62,175 MT) of all maize grain purchased in the Eastern Cape for milling purposes was sourced from the Free State (Table 6 on following page). This proportion increased to approximately 96% (65,900 MT) during the off-season period. Furthermore, the primary sources of maize grain for millers purchasing within the Eastern Cape, during the November - April period, included maize traders and/or wholesalers. Given that these sources are largely procuring their maize grain from outside the province[5], implies that outside of the harvest months and those immediately following, locally produced maize grain is virtually non-existent within the milling market.

It is clear that among the millers there exists demand for maize, but apparently inadequate grain is produced within the Eastern Cape to supply this demand. Moreover, production costs may be uncompetitive with imports from the Free State, although this topic may deserve research attention. If maize grain could be produced in the Eastern Cape and delivered to local millers below the cost of maize from the Free State, such developments might provide Eastern Cape millers with a lower-cost maize grain alternative during the November to April period and ultimately reduce maize meal prices for local consumers.

[5] A. Thompson, Engcobo Coke and Afrox Depot Owner, personal interview, Engcobo, South Africa, 4 November 2004.

Table 6. Total Quantity (MT) of Maize Grain Purchased by Large-Scale Commercial Millers, by Province of Origin: 2003/2004

Province	Harvest & Post-Harvest Periods			
	May - October		November - April	
	Q[1]	%	Q[1]	%
Free State	62175	82.3%	65900	96.1%
Eastern Cape	12325	16.3%	1359	2.0%
Kwazulu-Natal	1039	1.4%	1223	1.8%
Western Cape	-	0.0%	85	0.1%
Total	75539	100.0%	68567	100.0%

Note: [1]Q represents the total tonnage of maize grain purchased by Province
Source: MSU/FANRPAN Small-Scale Millers and Large-Scale Millers Surveys 2004.

All of the small millers within the five local municipalities were surveyed (n=55) to understand the reasons constraining their business, and why they are not entering into production milling, or the sourcing of grain to sell meal to consumers.

The most frequently given reason for not entering into production milling by the small-scale millers was that customers supplied their own grain (Table 7). In particular three bakkie millers (5.9% of total cases) and twenty-seven stationary millers (52.9%) gave this as a reason. However, given that fact that approximately 23% of households surveyed found times of the year when they would want to source maize grain for milling purposes but find none available, indicates that there is a market for maize grain if small-scale millers became involved in its retailing. Furthermore, if small millers made available maize grain for purchase throughout the marketing year, this would ensure a constant customer base, since from the consumer survey analysis, 100% of all households which planted maize had depleted their stock of maize grain by September.

Table 7. Main Reasons for not Entering into Production Milling

Reasons	Type of Operation			
	Bakkie Miller		Stationary Miller	
	N[1,2]	%	N[1,2]	%
People bring their own grain	3	5.9%	27	52.9%
Didn't think of it	1	2.0%	21	41.2%
Consumer preference for commercial meal	1	2.0%	17	33.3%
No access to credit	-	-	8	15.7%
Not profitable	-	-	7	13.7%
Do not produce enough grain	-	-	4	7.8%
Proper packaging is costly	-	-	4	7.8%
Technology is inappropriate	-	-	4	7.8%

Note: [1]N represents the number of millers.
[2]N Table is a summary of multiple-responses given by millers so column totals are greater than total cases.
Source: MSU/FANRPAN Small-Scale Millers and Large-Scale Millers Surveys 2004.

The second frequently given reason was that these millers had never thought of production milling as an option. One of the 3 bakkie millers and 21 of the 48 stationary millers listed this as a reason. However, when asked to clarify, the overwhelming reason given was an issue of access to maize grain outside the immediate post-harvest period. This lack of access was primarily due to issues of transportation, as well as the lack of ready cash to purchase maize grain. Given these factors, millers never considered production milling as a viable option.

Overall, 35.3% (1 bakkie miller and 17 stationary millers) of all millers indicated low consumers preference for commercially produced maize meal as a reason for not getting involved in production milling. However, the survey information reported earlier indicates that with price discounts of 29%, this study has found substantial demand for straight-run maize meal. And the evidence also seems to suggest that small millers could indeed import grain from the Free State and make meal available to consumers at this price discount while still allowing for a reasonable profit margin for their operations. However, the findings of this study are that small millers are not exploiting this potential market.

When asked to list the three main factors limiting profitability, the six most frequently given reasons include; frequent machine break-downs, grain quality, inconsistency of electricity, petrol prices, low grain supply, and inability to meet demand (Table 8).

In particular, 41.9% of the millers surveyed said one of the main reasons for limited profitability lay in the fact that their machinery broke frequently. When asked, millers stated that it could take anywhere from 4 to 12 weeks to replace parts and/or service machines.

In terms of grain quality, 18.2% of millers stated that rocks and/or coins within the consumers' grain damaged the sieve, which would then need to be replaced. It could be argued that if these millers sold maize grain, they could control the quality of maize that entered their production process and, thereby, reduce the damages to their milling equipment. This reduction in damages provides an incentive for supplying/retailing maize grain, which is something these millers, at the time of the study, were not currently doing.

Table 8. Main Factors Limiting Profitability

Reasons	Type of Operation			
	Bakkie Miller		Stationary Miller	
	N[2]	%	N[2]	%
Machine breaks frequently	3	5.5%	20	36.4%
Stones/coins in maize grain breaks machine	-	-	10	18.2%
Electricity not consistent	-	-	9	16.4%
Low grain supply	1	1.8%	7	12.7%
Inappropriate technology: can't meet demand	1	1.8%	6	10.9%
Price of petrol	1	1.8%	5	9.1%
Drought & weather conditions	1	1.8%	3	5.5%
Price of maize grain	-	-	3	5.5%

Note: [1]N represents the number of millers.
[2]N Table is a summary of multiple-responses given by millers so column totals are greater than total cases.
Source: MSU/FANRPAN Small-Scale Millers and Large-Scale Millers Surveys 2004.

Frequent blackouts and slow-response to repair electrical damage was a complaint of 16.4% of millers. Ultimately this affected their ability to provide a consistent service.

Increasing petrol prices was given, by 10.9% of millers surveyed, as a primary reason for limited profitability since it resulted in increased production costs and reduced revenue.

Low supplies of grain within their areas of operation lead to diminished profitability was cited by 14.5% of the millers. Since the majority of millers are involved in milling as a service, it would make sense then, that as soon as their customer base depleted their private stock of maize grain, their services would no longer be required. There are two solutions to this problem: maize grain retailing on the part of the millers; and/or increase maize production on the part of the consumers.

Finally, 12.7% of millers surveyed give their inability to meet demand, due to the limited through-put capacity of their mills, as a reason for diminished profitability. This fact would seem to indicate that there is a definite demand for straight-run maize meal, which in some areas is not being met.

6. CONCLUSIONS AND POLICY IMPLICATIONS

The key findings, based on the survey results of this case study of the Eastern Cape Province, can be summarized as follows:

1. At least 20% of average monthly staple carbohydrate expenditures is devoted to maize products across income groups;

2. About 38% of the respondents reported having purchased maize grain locally or used the services of small informal maize mills over the survey year (2003/04). Of these respondents, 23% stated that there are periods during the year when maize grain was unavailable for purchase, despite their attempts to purchase it. This finding indicates that the maize marketing system in the Eastern Cape is not articulating the preferences of many consumers. There appear to be impediments to the importation of maize grain into the Eastern Cape through informal trading and milling channels;

3. A large share of consumers reported that they would purchase their maize meal from the informal market at a price discount to that of commercial sifted meal. For example, 69.4% of all households surveyed preferred straight-run maize meal to commercially produced sifted meal at a price discount of 29%. Apparently, many local small millers are unaware of this potential demand for their services and the role they could play in promoting food security in the area;

4. During the 2003/04 season, it appears to have been possible to import maize to the Umtata area and mill it into straight-run meal at a cost roughly 3% - 41% less than the price of packaged commercial meal (of comparable quality to the straight run meal);

5. Positive benefits could accrue to consumers through the reduction in the proportion of monthly income devoted to maize meal purchases; particularly in the case of low-income consumers, if the informal marketing and milling networks could be developed to operate through the year; and

6. Lack of market information, the inability of milling agents to perceive marketing opportunities (and possible anti-competitive behavior of the part of large commercial mills) appear to be the major barriers to small-scale millers entering into production milling.

These findings hold some key policy implications imperative to increasing low-income consumers' disposable income and food security. These include:

- Providing greater business and marketing management to small local business people to assess potential marketing opportunities;
- Explore options to efficiently increase local maize grain production;
- Explore maize meal dumping practices of large millers; and
- Re-evaluate the impact of the food fortification initiative.

If the stated preference responses of consumers expressed earlier in this study are accurate, then there appear to be information asymmetries that inhibit consumers' access to low-priced maize meal. This may result in missed economic opportunities that could improve market performance

and overall efficiency. There is evidence that large-scale national millers are aware of the potential competition arising from the existence of local small-scale millers and therefore engage in practices, such as dumping to minimize this threat.[6] Policy makers need to be aware of the information asymmetry existing in the market, ensure that all market participants have equal access to market information through the development of market training programs for small-scale millers, and realize the need to curb unfair market practices that erect barriers and erode competition.

Furthermore, Government needs to evaluate the impact of the food fortification policy on the emergence of small-scale hammer-millers. The current requirements of the policy do not apply to hammer-millers involved in custom-milling; however, if they expanded their services to include production-milling, their output would need to be fortified in accordance with the regulations relating to the fortification of basic foodstuffs (South African Department of Health 2002). In its implementation of such a policy, Government will need to clearly address two key issues if a newly emerging small-scale production hammer-milling sector is to successfully enter the market and create positive benefits for consumers in terms of a low-priced maize meal alternative. Firstly, the maize meal produced by small-scale hammer millers is not de-germed and therefore has different nutritional benefits than commercially produced maize meal. There needs to be further investigation into the nutritional benefits of straight-run maize meal since the current fortification policy deals with degermed commercially produced maize meal.

Secondly, there needs to be a study into the appropriate technology needed for hammer-millers to meet the fortification criteria. Currently the technology designed to mix in the required nutrients assumes a large-scale operation in that it requires a conveyor belt to obtain the optimal mix (Hendricks et al. 2001). As in the case of Zambia, the South African government needs to explore the feasibility of technology, such as a modified mixing drum, which is more suited to the small-scale operations of hammer-millers.

Development of local maize grain production is emerging as a key component necessary to provide a low-cost alternative to commercial produced maize meal. However, it is unclear whether local maize can be grown at a cost of production less than the cost of importing it from nearby surplus areas. Further research is necessary to determine whether policy makers should focus on training Eastern Cape farmers in areas of production and management practices to reduce the cost of producing maize, as well as downstream tasks such as storing, cleaning, and bulking of maize grain. The viability of this strategy would depend on whether specific kinds of public support could feasibly drive down the cost of production so that local production becomes a less expensive way to procure grain than importation from nearby surplus production zones.

Maize meal continues to be a staple food within South Africa, particularly among low-income households. Efforts to reduce costs within the maize marketing system and enhance low-income consumers' access to less expensive staple food will promote the country's objectives of national food security, efficiency, and competitiveness. There is a need for policy makers to continue monitoring the maize marketing system within South Africa. Such a focus will ultimately benefit consumers through reduced maize meal prices.

[6] K. Le Clus, personal interview, University of the Free State, Bloemfontein, South Africa, June 2005.

REFERENCES

Adamowicz, W. 1998. Stated Preference Approaches for Measuring Passive Use Values: Choice Experiments and Contingent Valuation. *American Journal of Agricultural Economics* 80.1: 64-75.

Adamowicz, W., J. Louviere, and M. Williams. 1993. Combining Revealed and Stated Preference Methods for Valuing Environmental Amenities. *Journal of Environmental Economics and Management* 26: 271-92.

Arlindo, Pedro. 2001. Forecasting Agricultural Prices in an Underdeveloped Open Economy: The Case of Maize in Mozambique. Master's Thesis, Michigan State University.

Dickie, M., A. Fisher, and S. Gerking. 1987. Market Transactions and Hypothetical Demand Data: A Comparative Study. *Journal of American Statistical Association* 82: 69-75.

Free Market Foundation. 2003. Director's Report 2003. Online at Free Market Foundation website, http://www.htmupload/pubdoc996.doc Johannesburg, S. Africa.

Grain South Africa. 2004. http://www.grainsa.co.za Bothaville, South Africa.

Hendricks, M.K., R. Saitowitz, J.L. Fiedler, T. Sanghvi, I. le Roux, B. Makan, G. Hussey, H. Maglagang, and O. Dary. 2001. An Assessment of the Feasibility, Coverage and Cost of Fortifying Maize Meal and Sugar with Vitamin A in South Africa. *South African Journal of Clinical Nutrition* 14.2: 46-52.

Hensher, D.A., and M. Bradley. 1993. Using Stated Response Choice Data to Enrich Revealed Preference Discrete Choice Models. *Marketing Letters* 4: 139-151.

Huang, J. C. 2001. Precision of Dichotomous Choice Contingent Valuation Welfare Measures: Some Simulation Results. *Applied Economics* 33.1: 91-101.

Jayne, T.S., and G. Argwings-Kodhek. 1997. Consumer Response to Maize Market Liberalization in Urban Kenya. *Food Policy* 22.5: 447-458.

Jayne, T.S., M. Mukumbu, M. Chisvo, D. Tschirley, B. Zulu, M. Weber, R. Johansson, P. Santos, and D. Soroko. 1999. *Successes and Challenges of Food Market Reform: Experiences from Kenya, Mozambique, Zambia, and Zimbabwe*. MSU International Development Working Paper No. 72. East Lansing: Michigan State University.

Jayne, T., L. Rubey, D. Tschirley, M. Mukumbu, M. Chisvo, A. Santos, M. Weber, and P. Diskin. 1995. *Effects of Food Market Reform on Household Access to Food in Four Countries in Eastern and Southern Africa.* MSU International Development Paper No. 19. East Lansing: Michigan State University.

Lancaster K.J. 1966. A New Approach to Consumer Theory. *Journal of Political Economy* 74.2: 132-157.

MSU/FANRPAN Consumer Survey. 2004. East Lansing: Michigan State University.

MSU/FANRPAN Small-Scale Millers Survey Instrument. 2004. East Lansing: Michigan State University.

MSU/FANRPAN Large-Scale Millers Survey Instrument. 2004. East Lansing: Michigan State University.

Muyanga, M., T.S. Jayne, G. Argwings-Kodhek, and J. Ariga. 2004. *Staple Food Consumption Patterns in Urban Kenya: Trends and Policy Implications*. Draft for Review - Tegemeo Institute of Agricultural Policy and Development Working Paper. Tegemeo: Egerton University.

O.R. Tambo District Municipality. 2004. Economic Sectors and Investment Opportunities. Umtata, Eastern Cape Province, Ntinga: O.R. Tambo Development Agency.

Rubey, L. 1995. Maize Market Reform in Zimbabwe: Linkages between Consumer Preferences, Small Enterprise Development and Alternative Market Channels. Ph.D. dissertation. Michigan State University.

South African Demarcation Board. 2005. Website: http://www.demarcation.co.za. Pretoria, South Africa.

South African Department of Health. 2002. Regulations Relating to the Fortification of Foodstuffs. October. Website: http://www.doh.co.za. Pretoria, South Africa.

South African Futures Exchange (SAFEX). http://www.safex.co.za/. Johannesburg, South Africa.

South African Grain Information Service (SAGIS). http://www.sagis.org.za. Pretoria, South Africa.

Statistics South Africa. 2002. *Report on the Survey of Large and Small Scale Agriculture*. http://www.statssa.gov.za. Pretoria, South Africa.

Traub, L. N., and T.S. Jayne. 2004. *The Effects of Market Reform on Maize Marketing Margins in South Africa*. MSU International Development Working Paper No. 82. East Lansing: Michigan State University.

Tschirley, D., C. Donovan, and M. Weber. 1996. Food Aid and Food Markets: Lessons from Mozambique. *Food Policy* 21.2: 189-209.

Watkinson, E. and N. Makgetla. 2002. *South Africa's Food Security Crisis*. Pretoria, South Africa: National Labour & Economic Development Institute (NALEDI).

MSU International Development Publications

How to get copies

Copies of all MSU International Development Papers, Working Papers and Policy Syntheses are freely downloadable in PDF format from the following web sites:

MSU International Development Papers
http://www.aec.msu.edu/agecon/fs2/papers/recent.htm#recentidp
http://ideas.repec.org/s/msu/idppap.html

MSU International Development Working Papers
http://www.aec.msu.edu/agecon/fs2/papers/recent.htm
http://ideas.repec.org/s/msu/idpwrk.html

MSU International Development Policy Syntheses
http://www.aec.msu.edu/agecon/fs2/psynindx.htm
http://ideas.repec.org/s/msu/polbrf.html

Copies of all MSU International Development publications are also submitted to the USAID Development Experience Clearing House (DEC) at: http://dec.usaid.gov/