

# **SOUTHERN AFRICA: FOOD SECURITY POLICY OPTIONS**

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**REFLECTIONS ON TWO DECADES OF RESEARCH ON  
SORGHUM-BASED FARMING SYSTEMS IN NORTHERN  
NIGERIA AND BOTSWANA**

D.W. Norman, H. Sigwele, and D. Baker

**SECTION 4: ACCESS TO FOOD**

**THE ROLE OF THE GOVERNMENT OF BOTSWANA IN  
INCREASING RURAL AND URBAN ACCESS TO FOOD**

K. F. Mokobi and S. Asefa

**THE ROLE OF NONFARM ACTIVITIES IN THE RURAL  
ECONOMY**

P. Kilby and C. Liedholm

**SECTION 5: COMMUNAL MAIZE PRODUCTION, STORAGE,  
AND MARKETING IN ZIMBABWE: IMPLICATIONS FOR  
POLICY MAKERS**

**THE GROWTH OF SMALLHOLDER MAIZE PRO-  
DUCTION IN ZIMBABWE (1979-1985):  
IMPLICATIONS FOR FOOD SECURITY**

D. D. Rohrbach

**POLICY IMPLICATIONS OF HOUSEHOLD GRAIN  
MARKETING AND STORAGE DECISIONS IN ZIMBABWE**

J. L. Stanning

**SECTION 6: WHEAT PRODUCTION AND IMPORTS IN  
THE SADCC REGION: WHAT ARE THE TRADE OFFS?**

**THE POLITICAL ECONOMY OF WHEAT CON-  
SUMPTION AND PRODUCTION WITH SPECIAL  
REFERENCE TO SUB-SAHARAN AFRICA**

D. Byerlee and M. L. Morris

**WATER-USE EFFICIENCY ON COMMERCIAL  
WHEAT FARMS IN ZIMBABWE**

S. Tembo and A. Senzanje

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# POLICY IMPLICATIONS OF HOUSEHOLD GRAIN MARKETING AND STORAGE DECISIONS IN ZIMBABWE

J. L. Stanning<sup>1</sup>

## INTRODUCTION

The emergence of the communal area farmer as an important provider of marketed surplus (Stanning, 1985; Rohrbach, 1986) has had a broad impact on the grain-marketing system at the national, regional, and household level. First, the shift in supply towards communal producers has made it more difficult for the Grain Marketing Board (GMB) to forecast intake. For example, in 1984-85, maize was imported at higher landed cost than the local selling price, because of a forecast shortfall. As it turned out, stocks would have been sufficient as intake was around 50% greater than predicted. While output in both commercial and communal areas exceeded early projection; communal projection was particularly low, relative to actual supply. National forecasts have improved in the last two seasons, but better informed estimates of on-farm retentions, including local sales, are crucial in developing a good forecasting model.

Second, in response to increased communal production and government's rural development policy, the GMB expanded services to rural producers--many of whom market small quantities of grain (Zimbabwe Government, GMB, 1987, Table 1.5). This resulted in operational difficulties and increased the unit cost of procuring grain. To assist communal farmers in communal areas located far from depots, a system of collection points was instituted in 1985-86. Government's ultimate objective, as stated in the *Transitional National Development Plan*, is to locate collection points within 10 km of every farmer (Zimbabwe Government, 1982).

Third, increased grain surpluses and government grain policy have had an impact on the size, composition, and seasonality of demand for grains in rural areas.

Finally, it is important to consider not only the impact of communal area surpluses on the grain-marketing system, but also the impact of government policy on the various segments of the communal sector. To date, Zimbabwe's basic policy objective of growth with equity has been largely seen as a mat-

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ter of redressing the gross imbalance between urban and rural sectors, on the one hand, and the commercial and peasant sectors on the other hand--by emphasising rural development and land resettlement schemes (Zimbabwe Government, 1986). Little attention has focussed on the possibility of inequalities in the distribution of the benefits of development within the rural areas. Yet, results reported in this paper indicate quite marked inequalities within the communal areas. This suggests that the good aggregate performance of communal producers leaves little room for complacency in seeking effective ways of meeting government's central objective of raising the living standards in the rural peasant sector.

This paper focuses on two related issues, the nature and seasonality of farm household grain transactions and the nature and seasonality of farm household income sources to assess:

- o the basis for improved national forecasts of grain deliveries;
- o marketing activities and market access within communal areas;
- o factors influencing the demand for grain in rural areas; and
- o distributional aspects of government grain policies.

## BACKGROUND<sup>2</sup>

### **The data base**

This analysis draws on part of a larger data base compiled for a study of factors influencing the storage, marketing, and consumption of grains at both the regional and household level in Zimbabwe's communal areas. The complete data base includes secondary time-series data on production and official marketings for all districts in Zimbabwe and survey data from farm households in different types of producing areas. The fieldwork locations are Hurungwe District, a grain surplus region 260 km northwest of Harare; Binga District, located southeast of Lake Kariba, generally a grain deficit area; and Bushu Communal Land, 95 km west of Harare, which provides a modest grain surplus in some years, but also operates under the constraint of high population pressure on land resources.

Farm household surveys were carried out monthly from May 1985 to July 1987 to collect information on household grain flows and storage patterns and related variables such as household characteristics, resources, and income flows.

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<sup>2</sup>A more detailed description of survey methodology is to be found in Stanning, 1986.

This paper discusses only the results from field surveys conducted in Hurungwe District. The significance of this particular fieldwork area is its location in Mashonaland West which, as a province, dominates communal sector per capita maize output and per capita official marketings (Stanning, 1986). Hurungwe is the most populous and productive communal district in this province. Over the past six years (1981-82 to 1986-87), maize purchases have increased at an average rate of around 30% (Table 1).

#### Survey methodology in Hurungwe District

Two-stage, stratified random sampling was used to select representative farm households to participate in the survey. First, extension-worker areas in Hurungwe District were stratified into three categories according to whether farmers in those areas had good, moderate, or poor access to market.

Table 1. Quantity of grains purchased by the Grain Marketing Board from Hurungwe District, 1974-75 - 1986-87, Zimbabwe (mt).

Year	Maize	Sorghum	Rapoko <sup>a</sup>
1977-78	7,959	2.0	a
1978-79	7,922	4.4	a
1979-80	5,734	16.6	a
1980-81	8,628	18.5	a
1981-82	33,534	12.8	a
1982-83	38,050	21.4	a
1983-84	47,498	32.2	a
1984-85	65,231	153.3	6.3
1985-86	76,299	314.6	159.8
1986-87	96,392	206.0	27.6

<sup>a</sup>Prior to 1984-85, the GMB did not purchase rapoko.

Source: Computed by author from district totals derived from the GMB's annual record of quantities purchased from communal farmers, communal co-operatives, and approved buyers.

Second, fieldwork areas were selected from each category. Finally, cultivator lists, compiled by Agritex, were used to draw a random sample of households from each location. The sample area in Hurungwe covers a diversity of natural regions, ranging from a moderately high-rainfall region in the northeast centered around Chisape to a low-rainfall communal region around Fureche. .

### **Characteristics of sample households in Hurungwe District**

In Hurungwe District, sample households average 7-8 persons per household with more than 50% composed of children under 16 years (Table 2). Just under one-third do not own cattle which is probably a smaller proportion than reported for other communal areas (Rukuni, 1985). Hurungwe sample farmers have relatively favourable access to land with an average land holding of 3.9 ha. Maize is the dominant crop grown; serving as the main staple as well as an important cash crop. Maize's importance as a cash crop is probably related to its lower labour and cash input requirements, relative to alternatives such as cotton and oilseeds. The proportion of area under other grains such as sorghum and millets is extremely small. Cotton is the most important nongrain crop grown, although sunflower has increased in importance in recent seasons.

The majority of sample households grow more maize than they require for home consumption so they can sell some. Less than 12% of households reported that in most seasons they exhausted their grain supplies before the next harvest (Stanning, 1986).

## **ANALYSIS OF FARM HOUSEHOLD GRAIN TRANSACTIONS: CASE STUDY OF HURUNGWE DISTRICT**

### **Setting**

Farm-household grain transactions involve both inflows and outflows (Figure 1). Grain sources include own production, purchases, nonmonetary transactions, and carry-over stocks. Purchases may be in the form of grain or mealie meal (milled grain). Nonmonetary transactions include exchange of grain for services (e.g., labour) and commodities (e.g., cooking meat). In the communal subsector, meeting food requirements generally takes priority over other production goals (Stanning, 1986, Table 15). Therefore, own production is generally the dominant source of grain for most rural households; except in a drought season or if the household has limited production resources.

Table 2. Household characteristics in survey locations in Hurungwe District, 1985-87, Zimbabwe.

Household Characteristics (N=83)	Sample Mean	Survey Location Mean				
		Chis-ape	Mudzimu	Mzila-wempi	Fur-eche	Zvi-pani
<b>Demographic</b>						
Total size (no.) <sup>a</sup>	7.7	7.2	7.7	5.9	7.7	10.1
Children (%) <sup>b</sup>	55.8	45.1	51.2	51.6	60.0	63.0
Present size (no.) <sup>c</sup>	7.1	6.1	6.6	5.7	7.4	9.7
Adult equivalents (no.) <sup>d</sup>	5.1	4.6	4.7	4.0	5.2	7.0
<b>Livestock</b>						
Cattle owned (no.) <sup>e</sup>	6.8	6.1	4.3	6.7	3.9	12.8
Non-cattle owners (%) <sup>f</sup>	32.0	18.0	36.0	25.0	21.0	0.0
<b>Landcrops</b>						
Field area (ha) <sup>g</sup>	3.9	3.2	4.0	4.6	3.1	4.9
Cropped area (ha) <sup>h</sup>	3.3	2.6	3.0	3.6	2.4	4.6
Maize area (%) <sup>i</sup>	73.0	87.0	81.0	82.0	73.0	56.0
Other grains (%) <sup>i</sup>	3.3	2.5	3.0	5.0	4.0	3.0
Cotton (%) <sup>i</sup>	12.6	4.5	0.0	7.0	17.0	24.0
Other non-grains (%) <sup>i</sup>	11.1	7.0	16.0	0.0	6.0	17.0

<sup>a</sup>Average total household size, unweighted.

<sup>b</sup>Children under 16 years, per total household size.

<sup>c</sup>Average number of members living on the farm, unweighted.

<sup>d</sup>Number of household members living on the farm in adult equivalents.

<sup>e</sup>Average number of cattle.

<sup>f</sup>Percentage of sample households with no cattle.

<sup>g</sup>Average land holding in hectares, excluding garden area.

<sup>h</sup>Average area (ha) under crops per household in 1984-85 season.

<sup>i</sup>Percentage distribution of cropped area, by crop type.

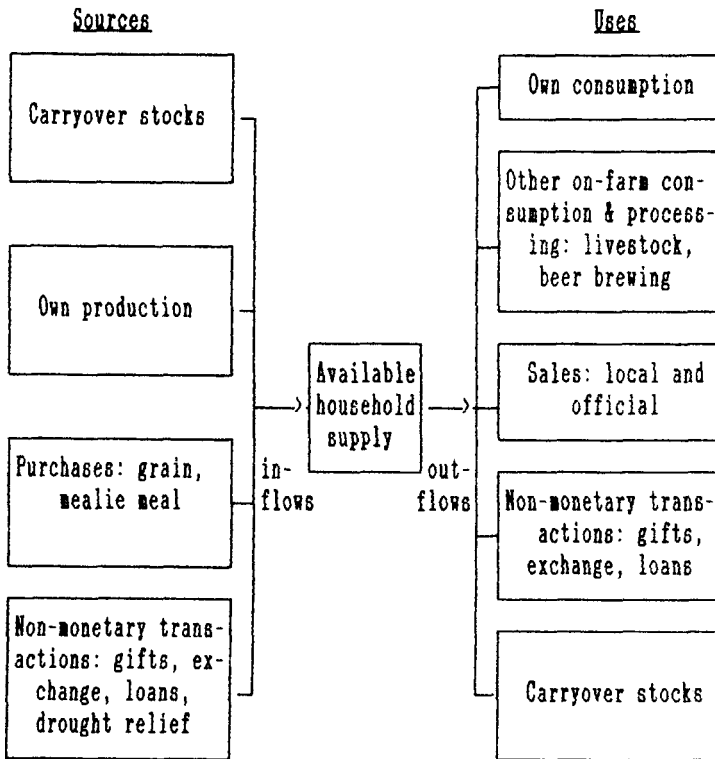
Source: Household survey, Hurungwe District, Zimbabwe.



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 Figure 1. Model of farm household grain transactions
 

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Households use grain in a variety of forms. There is an on-farm demand for grain for both human consumption and livestock feeding. Households also use grain for nonfood purposes such as labour payment, exchange (particularly for cooking beef), and beer brewing. Surplus grain are sold, either locally or to the parastatal marketing agency, the Grain Marketing Board (GMB).

In Zimbabwe, the relative importance of different forms of grain disposal for any particular grain varies between regions and among households in the same area--depending on both the total and relative availability of different grains, and the particular uses for which certain grains are best suited. For instance, since households give greater priority to home consumption over marketing, the main determinant of market transactions is total production. In regions where maize is the staple food, sorghum and millets are largely used in beer brewing, not for direct consumption. On the other hand, in low-rainfall areas, sorghum and millets are not only used for brewing local beer, but also for home consumption and feeding poultry.

The remainder of this section presents empirical findings from the analysis of grain transactions of sample farmers in Hurungwe District during June 1985 to May 1986. Since maize dominates grain production and exchange in this district (Table 2), the discussion focuses on maize transactions. Purchased mealie meal accounts for a very small proportion of maize utilised. Therefore, it is converted to a maize-grain equivalent and incorporated in the maize transaction data<sup>3</sup>.

### **Producer-maize transactions**

The aggregate self-sufficiency of sample households is self-evident (Table 3). Own production accounted for 90% of total maize available to households. Of the remaining balance, only 1% is purchased. The bulk of these purchases (85%) was maize grain, not mealie meal. Nonmonetary transactions were the most important source of maize inflows, other than own productions.

In this category, grain received in repayment for loans of cooking meat--advanced prior to harvest--were predominant. Overall, households in the area are self-sufficient in maize; and deficit households make up their requirements through nonmonetary transactions and local purchases of maize grain.

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<sup>3</sup>The conversion factor used was 1.16, based on estimates of the extraction rate of mealie meal from maize grain.

**Table 3. Farm household maize transactions, Hurungwe District, June 1985 - May 1986, Zimbabwe.**

	Quantity (mt)			
	Total Sample	Mean <sup>a</sup> (n = 78)	Per capita	Sum (%)
<b>Sources</b>				
Own production	497.0	6.37	0.90	91.0
Purchases	5.7	0.08	0.01	1.0
Nonmonetary transactions	42.1	0.54	0.08	8.0
<b>Total</b>	<b>544.8</b>	<b>6.99</b>	<b>0.99</b>	<b>100.0</b>
<b>Uses</b>				
Own consumption	73.1	0.94	0.13	13.4
Sales	407.0	5.22	0.74	74.7
Other on-farm consumption and processing	22.3	0.29	0.04	4.1
Nonmonetary transactions	42.4	0.54	0.08	7.8
<b>Total</b>	<b>544.8</b>	<b>6.99</b>	<b>0.99</b>	<b>100.0</b>

<sup>a</sup>Only 78 households were included in the calculation of the table, due to missing data for some households.

Source: Data from the Food-grain Study, Hurungwe, Zimbabwe

Data on the disposition of grains clearly show that in aggregate terms, sample households had a large maize surplus. Some 75% of available maize was marketed, over 90% of which was purchased by the GMB. Grain retentions for home consumption accounted for only 13% of available supplies. This represents a per capita consumption of 134 kg of maize per annum, or 184 kg per adult equivalents. This is slightly on the low side, but accessibility to fresh vegetables and income to purchase other foods (e.g., meat, bread, and oil) reduces the quantity of grain needed.

After accounting for home consumption and sales, the remaining maize surplus is utilised for other purposes. A detailed breakdown of these uses is shown in Table 4. Repayments of advances of cooking meat is most important and feeding pigs accounts for the second largest share. It is interesting to note that almost as much maize is used for nonfood farm consumption, processing, and nonmonetary transactions as for home consumption, in terms of its total share of maize disposals (Table 4). This suggests decisions about on-farm retentions are not solely based on family nutritional requirements.

Analysis of the share (%) of maize production and sales by percentile groups, suggests marked inequality in maize market participation (Table 5). Around three-quarters of the sample marketed some maize during the survey period. However, analysis of transactions indicates that 10% of the households accounted for 43% of the marketed surplus. In contrast, one-half of the sample households accounted for no more than 6% of the total maize marketed.

### **Seasonality of household maize transactions**

On the basis of climate and activity patterns, rainfed agriculture in Zimbabwe's communal areas can be divided into three seasons:

- o Post-harvest season (June-September). During this period, farmers have generally completed harvesting maize, and it is being dried and threshed at the homestead for on-farm storage or sale. During the early part of this season, cotton is still being picked, which may delay the threshing of maize. Farmers with access to draft power or hired tractors do winter ploughing; but generally agricultural activity slackens as the season progresses and farmers are free to engage in non-agricultural activities, such as building, thatching, artisanry, postharvest festivals, and visiting relatives.

**Table 4. Farm consumption and nonmonetary transactions of maize, Hurungwe District, June 1985-May 1986, Zimbabwe<sup>a</sup>.**

Uses	Total Sample	Sample Mean	Sum
<u>Farm consumption and processing</u>	(kg)	(kg)	(%)
Pig feed	10,947	140.3	16.9
Brewed beer for sale	5,688	72.9	8.8
Poultry feed	3,085	39.6	4.8
Brewed beer for ceremony	2,230	28.6	3.4
Cattle feed	<u>337</u>	<u>4.3</u>	<u>0.5</u>
Subtotal	22,287	286.0	34.4
<u>Nonmonetary transactions</u>			
Repaid loans of cooking meat	20,204	261.6	31.5
Loaned to local farmers	6,461	82.8	10.0
Labour payments	5,415	69.4	8.4
Gifts	5,242	62.7	8.1
Exchange	3,658	46.9	5.7
Brewed beer for labour payments	892	11.4	1.4
Repaid other commodity loans	<u>373</u>	<u>4.8</u>	<u>0.5</u>
Subtotal	42,443	544.0	65.6
<b>TOTAL</b>	<u>64,730</u>	<u>830.0</u>	<u>100.0</u>

<sup>a</sup>Excluding direct consumption as human food

Source: Food-grain Study, Hurungwe District, Zimbabwe.

**Table 5. Maize production and marketed surplus, by percentile groups, Hurungwe District, June 1985-May 1986, Zimbabwe.**

	Lowest 25 percent	Second quartile	Third quartile	Highest 25 percent	Highest 10 percent
Production	5	9	25	61	32
Marketings	0	6	19	75	43

Source: Food-grain Study, Hurungwe District, Zimbabwe.

- o Planting and growing season (October-January). While the initiation of planting activities is determined by the timing of the rains, farmers generally begin to plant towards the end of October. Late plantings of maize are made in early January. The availability of draft power and planting-labour bottlenecks are major production constraints for some households.
- o Cultivation and harvest season (February to May). Farming activities are generally concentrated at the beginning and end of this season with a relatively slack pre-harvest period during March and April. Farm household grain stocks begin to run low and green maize can be an important source of subsistence for deficit households.

To illustrate the seasonal patterns in household maize flows, Tables 6 and 7 present for each month, both the percentage of households participating in each type of transaction and the proportion of total maize transacted from June 1985 to May 1986. As might be expected, activity is greatest during the postharvest period. Both maize sales and maize transfers to repay commodity loans advanced by local farmers are concentrated in July through to September (Table 7). Maize is widely used for other purposes. Use for other purposes also peaks during August and September, but dropped to a fairly consistent level for the remaining months. Except for a slight post-harvest peak, the quantity of maize used in home consumption is relatively stable throughout the year, averaging 0.8 bag per household per month.

Since over 80% of the households were self-sufficient in maize during the survey period, little maize came from other inflow sources (Table 6). Overall, maize inflows are concentrated during the postharvest months when households received maize in repayment of loans. Maize purchases are concentrated between December and February when on-farm stocks are falling, but before green maize is available for consumption. Maize from other sources (e.g., gifts and labour payments) are also most important during the postharvest period.

Due to panseasonal pricing and limited local markets, there is little incentive for farmers to store more maize than required for their own use. By the end of October, most households had disposed of surplus maize. The mean stock level was below 10 bags per household, equivalent to 1.4 bags per capita (Table 8). Most households had on-farm maize stocks through to February 1986. Thereafter, the percentage of households with maize in storage declined sharply as households used the current crop for home consumption. The low level of on-farm stocks at the end of April shows that very little maize is carried forward to the next season. Farmers explained this by pointing to both the poor storability of hybrid maize and there did not need to maintain on-farm stocks because they anticipated good harvest in the current season.

Table 6. Sources of maize inflows by month, Hurungwe District, June 1985 - May 1986, Zimbabwe<sup>a</sup>.

Month	Purchases		Nonmonetary transactions					
			Loans Received		Loan Repayments received		Other	
	Farms	Total <sup>b</sup>	Farms	Total <sup>c</sup>	Farms	Total <sup>d</sup>	Farms	Total <sup>e</sup>
Jun	1	3	5	12	6	6	1	3
Jul	0	0	0	0	15	45	4	3
Aug	0	0	0	9	18	17	3	29
Sep	4	4	4	26	10	9	3	3
Oct	3	4	0	0	4	0	5	15
Nov	8	8	1	1	1	5	5	11
Dec	10	17	4	19	6	0	14	14
Jan	17	11	1	5	0	1	16	14
Feb	16	9	6	29	3	0	14	5
Mar	11	3	1	5	0	0	15	3
Apr	8	2	3	2	0	0	3	0
May	3	1	1	3	0	0	1	0

<sup>a</sup>Data for "farms" indicate percentage of sample households receiving grain from the respective source in that month. Data for "total" indicates the percentage of total inflows for the respective item in that month. <sup>b</sup>Total purchases were 5.70 mt. <sup>c</sup>Total loans received = 1.96 mt. <sup>d</sup>Total loan repayments received = 32.06 mt. <sup>e</sup>Total other inflows = 7.99 mt.  
Source: Food-grain Study, Hurungwe, District, Zimbabwe.

Table 7. Uses of maize inflows by month, Hurungwe District, June 1985 - May 1986, Zimbabwe<sup>a</sup>.

Month	Home Consumption		Sales		Other farm consumption and nonmonetary transactions					
					Loans given		Loans repaid		Other	
	Farms	Total <sup>b</sup>	Farms	Total <sup>c</sup>	Farms	Total <sup>d</sup>	Farms	Total <sup>e</sup>	Farms	Total <sup>f</sup>
Jun	100	11	13	5	6	3	13	10	32	3
Jul	100	10	30	34	5	14	44	32	27	3
Aug	100	7	37	56	6	9	60	33	52	20
Sep	100	7	12	3	9	21	33	20	65	17
Oct	100	9	5	0	3	5	5	2	54	9
Nov	100	8	4	0	8	7	1	0	44	6
Dec	100	9	9	1	15	17	1	0	66	7
Jan	100	9	8	0	4	7	0	0	70	7
Feb	100	7	15	0	3	1	3	0	67	5
Mar	100	8	9	0	4	7	3	2	68	8
Apr	100	8	11	0	5	7	1	1	59	8
May	100	8	3	0	2	2	1	1	49	7

<sup>a</sup>Data for "farms" indicate percentage of sample household using maize for the respective use in that month. Data for "total" indicates the percentage of total maize used for the respective purpose in that month. <sup>b</sup>Total home consumption was 73.1 mt. <sup>c</sup>Total sales was 407 mt. <sup>d</sup>Total loans given = 6.5 mt. <sup>e</sup>Total loans repaid = 20.7 mt. <sup>f</sup>Total other = 37.5 mt.

**Table 8. Household-maize storage by sample household in Hurungwe District, June 1985 - May 1986, Zimbabwe.**

Month	Month end maize storage			
	Farms with stocks (%)	Mean	Total (mt)	Per capita (mt) <sup>a</sup> (kg)
June	99	6.1	474	66.7
July	100	5.1	406	57.1
August	100	1.5	120	17.0
September	100	1.1	85	13.4
October	99	0.9	65	9.2
November	98	0.8	64	9.0
December	96	0.7	51	7.2
January	99	0.4	33	4.6
February	86	0.3	22	3.1
March	63	0.2	10	1.5
April	43	0.1	6	0.8
May	22	0.1	10	1.4

<sup>a</sup>Data rounded to the nearest mt.

Source: Food-grain Study, Hurungwe District, Zimbabwe.

### Maize transaction categories, by farm type

This section examines maize transactions--and their relationship to production and various household characteristics--in order to identify key determinants of household level maize flows. This analysis will be followed up in future empirical work.

Sample households in Hurungwe were classified on the basis of net maize transactions over the period June 1985 - May 1986. Total net transactions are disaggregated into monetary and non monetary transactions, according to the model presented in Figure 1. On-farm consumption (including nonfood consumption) and storage are specifically excluded from the analyses since these are not transactions--although they obviously influence household transaction levels.

Turning first to monetary transactions, sales, and purchases of maize (Table 9). A small, but significant proportion ( $\pm 17\%$ ) of households were net buyers of maize during the survey period. These households purchased



**Table 9. Net monetary transactions and per capita availability of maize, by household type, Hurungwe District, June 1985-May 1986.**

Net monetary transactions (91 kg bags)	Farms (%)	Market-ed <sup>b</sup> (bags)	Output/capita <sup>c</sup> (bags)	Maize area <sup>c</sup> (ha)	Farm size <sup>c</sup> (ha)	Resi-dents <sup>d</sup> (no)	Cattle <sup>c</sup> (no)
<b>SOLD</b>							
>301bags	1	530	38	6.9	7.7	15.0	19
201-300 bags	3	250	24	4.5	9.3	11.5	27
151-200 bags	7	175	41	4.0	6.5	7.8	13
101-150 bags	16	121	25	3.6	5.7	8.9	17
51-100 bags	11	78	17	2.2	5.6	8.1	13
26- 50 bags	14	33	11	2.7	4.6	6.6	4
5- 25 bags	16	19	7	1.9	2.6	5.7	5
< 5 bags	10	2	3	2.4	3.2	8.3	3
<b>NONE<sup>a</sup></b>	6	0	3	1.2	2.4	7.5	2
<b>PURCHASED</b>							
< 5 bags	16	0	3	1.3	2.3	5.0	1
> 5 bags	1	0	3	1.6	2.4	4.0	2

<sup>a</sup>No transactions. <sup>b</sup>Mean quantity marketed. <sup>c</sup>Mean. <sup>d</sup>Mean no. household members living on the farm.

Source: Data from Food-grain Study, Hurungwe District, Zimbabwe.

relatively small quantities of maize, compared to their production. Net-buyer households produced less maize per capita than net-seller households and grew a smaller area of maize. Net-buyer households also operated smaller farms, had fewer household members, and owned less cattle than net-seller households.

More than three-quarters of the Hurungwe sample were net-seller households in 1985-86, although the amount of maize marketed varied considerably between households. Just under one-third of households marketed either no maize or less than 25 bags. This suggests they would be reasonably vulnerable to a shortfall of maize in a less favourable season. When this group (sales < 25 bags) is added to the number of net-buyer households, together they account for 50% of the sample population.

A strong association exists between the amount of maize marketed, per capita availability of maize, and output related variables such as maize area, farm size, availability of draft power. This supports the common assumption

that the main determinant of marketed surplus is total grain harvested. Regression analysis confirms this relationship. Regressing total production on total quantity marketed gave an adjusted  $R^2$  of 0.96. In other words, 96% of the variation in household marketing was explained by variations in production. The strong positive relationship between household size, maize production, and maize sales is in line with findings from other rural-household studies in Africa (Low, 1986, Table 4.3).

Almost all sample households engaged in nonmonetary maize transactions. However, a large proportion of households (60%) exchanged or received less than five bags of maize (Table 10).

Most nonmonetary transactions are related to payments or receipts of grain in exchange for cooking meat. As expected, the analysis showed that generally households with more cattle were net receivers of maize and those with fewer cattle were net exchangers of maize. However, it was quite common for individual households to both receive and give maize in exchange for cooking meat, since households slaughter livestock at different times.

Households receiving in excess of five bags of maize grain also tended to market more maize than other households. This suggests that nonmonetary transactions increased their postharvest maize surplus.

There is some evidence that nonmonetary transactions enable deficit households to increase their maize supplies, since the percentage of net-deficit households for all maize transactions (Table 11) is slightly smaller than the percentage of net-buyer households (Table 9). This difference must be due to nonmonetary transactions received by net-buyer households.

When monetary and nonmonetary maize transactions are aggregated, the overall pattern of total net-maize transactions is similar to that for monetary transactions. Households fall into a similar range of net-transaction categories, although the percentage of surplus households in each category increased slightly. The influence of per capita availability on output related variables was as expected; higher output elicited greater surpluses.

#### **Maize transactions and market access**

Access to market influences maize transactions through its effects on returns to marketing. Specifically, it is hypothesized that in a situation with constant yields and constant prices; increased distance to market increases transport costs, lowers returns--resulting in a lower marketed surplus.

**Table 10. Net nonmonetary transactions and per capita availability of maize, by household type, Hurungwe District, June 1985 - May 1986.**

Net monetary transactions (91 kg bags)	Farms <sup>b</sup> (%)	Market-ed <sup>b</sup> (bags)	Output/capita <sup>c</sup> (bags)	Maize area <sup>c</sup> (ha)	Farm size <sup>c</sup> (ha)	Resi-dents <sup>d</sup> (no)	Cattle <sup>c</sup> (no)
<b>EXCHANGED</b>							
> 20 bags	2	18	8	1.2	2.4	4.0	0
16- 20 bags	3	47	10	3.2	7.7	7.0	14
11- 15 bags	9	47	7	2.8	4.9	10.7	4
5- 10 bags	13	39	10	2.4	4.1	7.2	1
< 5 bags	38	85	19	2.4	4.1	6.8	8
<b>NONE<sup>a</sup></b>	2	73	42	1.6	3.2	2.0	1
<b>RECEIVED</b>							
> 5 bags	20	27	5	1.9	3.0	8.2	7
5- 10 bags	6	131	34	4.7	6.2	6.5	16
11- 15 bags	5	85	7	2.8	3.6	9.3	11
16- 20 bags	0	na	na	na	na	na	na
21- 25 bags	2	112	23	4.1	4.9	5.0	7
> 25 bags	2	135	10	2.0	3.2	15.0	28

See Table 9 for footnotes.

**Table 11. Net transactions by households and per capita availability of maize, by household type, Hurungwe District, June 1985-May 1986.**

Net monetary transactions (91 kg bags)	Farms <sup>b</sup> (%)	Market-ed <sup>b</sup> (bags)	Output/capita (bags)	Maize area <sup>c</sup> (ha)	Farm size <sup>c</sup> (ha)	Resi-dents <sup>d</sup> (no)	Cattle <sup>c</sup> (no)
<b>OUT</b>							
> 201 bags	5	228	29	5.3	8.8	12.7	21
151- 200 bags	9	111	38	3.6	6.5	7.8	15
101- 150 bags	16	81	24	3.2	6.1	8.7	14
51- 100 bags	12	32	16	2.3	4.5	8.3	12
26- 50 bags	18	11	12	2.6	4.3	6.9	3
5- 25 bags	19	8	5	2.1	3.0	6.9	6
< 5 bags	9	0	3	0.8	2.8	6.2	2
<b>NONE<sup>a</sup></b>	0	na	na	na	na	na	na
<b>IN</b>							
< 5 bags	9	1	2	1.2	1.9	5.7	1
> 5 bags	3	1	1	1.2	1.6	7.0	0

See Table 9 for footnotes.

However, the importance of distance to market may be offset by either inherent land quality and seasonal factors which raise yield, or by better quality marketing services offered at more distant marketing centres. Under these complicating circumstances, the relationship between distance to market and marketed surplus is not clear. This was the case in Hurungwe where there was no significant correlation between the quantity marketed and distance to market, at distances below 40 km. However, at distances over 40 km, the amount of maize marketed declined sharply with distance to market (Table 12).

Only a small proportion of total marketings ( $\pm 4.0\%$ ) was delivered to the two GMB collection points (Mudzimu and Chidamoyo) that fall within the survey locations. All maize deliveries to collection points were transported less than 10 km, generally using farmers' own transport such as scotch carts. Since the mean level of transactions was quite small (1.5 mt) the households utilising collection points were probably those marketing small quantities of maize. This suggests that collection points provide market access primarily to

**Table 12. Maize sales by distance to market and share purchased by different buyers, Hurungwe District, June 1985 - May 1986.**

Distance Interval (km)	Marketings <sup>a</sup> (mt)	Mean <sup>a</sup> (mt)	Sum (%)	Buyer (% share)			
				Local Store Farmer	GMB collection	GMB depot	
<10	43.6	1.5	10.8	1	1	38	60
11-20	39.1	3.9	9.7	0	0	0	100
21-30	151.0	7.9	37.5	0	0	0	100
31-40	119.0	8.5	29.5	0	0	0	100
41-50	40.9	3.7	10.2	0	0	0	100
51-60	3.6	3.6	0.9	0	0	0	100
61 <	5.0	5.0	1.2	0	0	0	100
Total	402.3	4.7	100.0	na	na	na	na

<sup>a</sup>Total marketings differ slightly from Table 3 due to missing cases. Some households marketed more than once, so mean is less and number of marketings exceeds the number of sample households.

Source: Data from Food-grain Study, Hurungwe District, Zimbabwe.

smaller producers. However, before supporting collection points as a means of more widely distributing the benefits of government grain policies, it is valuable to understand why some farmers who were near a collection point, still delivered their maize to a more distant GMB depot; because the GMB depot provided better quality service.

- o Maize delivered to GMB depots is graded on an individual-farmer basis. This ensures that farmers with a good grade of maize are paid accordingly. On the other hand, farmers reported that because collection points operating in 1985 did not have facilities to grade maize, the producer received an average price based on all deliveries to the collection point. To my knowledge this procedure is still followed.
- o Maize delivered directly to the depot is assessed immediately, whereas maize delivered to a collection point often waits several weeks, without adequate protection from the elements, before it is bulked and transported to the nearest depot. This results in a deterioration in quality and delays payment to the producer.
- o Apparently many transporters in Hurungwe only deliver maize to depots and do not service local collection points. Since farmers typically use their own transport to deliver maize to a collection point, this is often impractical if a producer has a large surplus to market.

## HOUSEHOLD INCOME FLOWS

### Setting

A distinct characteristic of rural households is that their income comes from several sources (Stanning, 1986 Table 12). Although crop production is generally the major source of income, households also engage in noncrop, farming activities such as pig and poultry raising; and nonagricultural activities such as construction and handicrafts. These production activities are inter-related, not only in sharing the same services of factors owned by the household, but also through the internal flow of products (e.g., a part of the maize output is used as feed for pig or poultry).

Earnings from production are typically supplemented by both wage income, earned by family members employed off the farm (e.g., wages from casual labour), and by remittances sent by absentee members and relatives working in urban areas.

Full specification of farm-household income includes the value of agricultural products producers consume directly or use for exchange, as well as monetary income flows. This requires that values be imputed for agricultural products that are consumed on the farm. Data have been collected to estimate total income for survey households, but only cash income flows

have been analysed to date. Gross cash income is analyzed, excluding production input costs and services purchased by the farmer. Gross cash income is income at the disposal of the farm household. As such, it impacts on the ability of households to purchase consumption requirements and farm inputs, and to meet other family living expenses (e.g., clothing and school fees). Therefore, information about the sources, level, intra seasonal and intra household distribution of disposable cash income is important in understanding and assessing the coping mechanisms of rural families.

### **Cash income flows**

Data on household income received from all sources (including remittances in kind) were collected each month from sample households over a 12 month period (May 1985 - June 1986). Household cash income averaged Z\$1,700 over this period (Table 13).

Maize was by far the most important income source, accounting for 29% of total cash income; followed by remittances from absentee family members and relatives working in urban areas (17%). The relative size of remittances was greater than anticipated and warrants further examination. In particular, the question arises whether remittances are of equal importance to all households or whether they are significantly correlated with particular household types. Local businesses emerged as the third most important source of cash income.

But since this income was almost entirely earned by a few farmers with business interests at local growth points, it is not of widespread significance. Cattle, cotton, and local wage employment were secondary sources of cash income of similar importance.

Overall, families attempt to secure their cash needs from several sources. Although agricultural production activities (crop and noncrop) clearly predominate, links with the urban economy and local nonagricultural activities are also relatively important sources of cash (Figure 2).

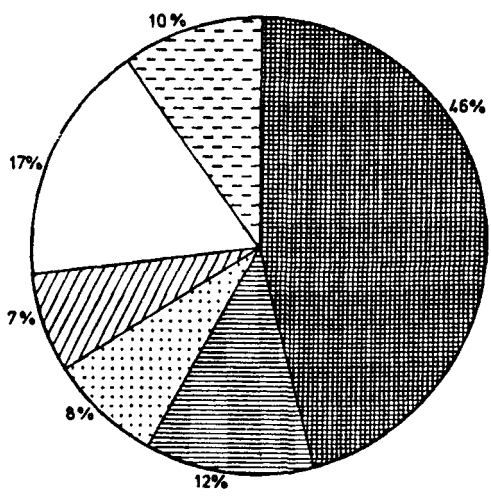
Analysis of gross cash income and nonfarm cash income, by percentile groups, suggests marked inequality in income distribution (Table 14). Non-farm cash incomes were distributed slightly more unequally than total cash income, with 25% of the sample households accounting for nearly 60% of total earnings. The income share of the lowest 50% of the households was below 15%. This suggests that many families in the survey area have limited access to income-generating activities and, therefore, depend largely on their own production to meet consumption requirements.

### **Seasonal patterns of cash income flows**

There were distinct seasonal patterns in household income receipts, primarily determined by seasonality in crop production. Table 13 and Figure 2 show

Figure 2: Proportional pie chart showing total and seasonal composition of household cash income, Hurungwe District, June 1985 - May 1986, Zimbabwe.

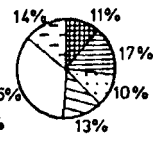
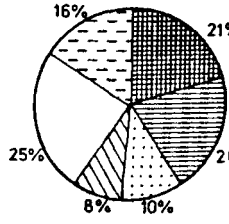
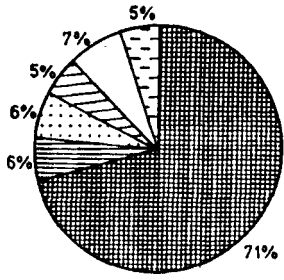
Total Cash Income (June 1985 - May 1986)



June - Sept

Oct - Jan

Feb - May



- Crop Production
- Livestock Production
- Non-Agriculture
- Wage Labour
- Remittances
- Local Business

**Table 13. Composition of household cash income and distribution by season, Hurungwe District, June 1985-May 1986, Zimbabwe<sup>a</sup>.**

Source	Total annual income		Seasonal distribution		
	Z\$ <sup>b</sup> (‘000)	Sum %	June to September <sup>c</sup> (row %)	October to January <sup>d</sup> (row %)	February to May <sup>e</sup> (row %)
Maize	38.5	29	82	17	2
Remittances	22.1	17	22	48	31
Local business	12.9	10	27	51	21
Cotton	11.8	9	87	13	0
Cattle	10.5	8	26	51	23
Local wage employ.	9.2	7	38	34	28
Other field crops	6.2	5	76	18	6
Small livestock & livestock prod.	5.5	4	24	54	22
Garden	3.0	2	43	32	25
Home industry	1.6	1	55	29	15
Other grains	1.4	1	72	11	18
Miscellaneous non-agric. activities	8.3	6	36	44	20
Total = \$(‘000)	131.2	na	68.7	42.9	19.6

<sup>a</sup>Mean is calculated on the basis of complete cases. The no. of complete cases varies slightly between seasons. <sup>b</sup>Sample mean equals Z\$1,631 (SD = 1883). <sup>c</sup>For June-Sep. the sample mean was Z\$838 (SD = 1,228). <sup>d</sup>For Oct.-Jan. the sample mean was Z\$543 (SD = 707). <sup>e</sup>For Feb.-May, the sample mean was Z\$250 (SD = 265).

Source: Data from the Food-grain Study, Hurungwe District, Zimbabwe.



**Table 14. Percentage share of gross cash income and non-farm cash income, by percentile groups, Hurungwe District, June 1985 - May 1986, Zimbabwe.**

Income Type	Lowest 25%	Second quartile	Third quartile	Highest 25%	Highest 19%
Gross cash income	6.2	14.0	22.9	56.9	36.0
Nonfarm cash income	4.5	13.1	23.2	59.2	42.5

Source: Data from Food-grain Study, Hurungwe District, Zimbabwe.

that peak income coincided with the months of harvesting and crop sales (June - September), while incomes were lowest during the pre harvest period (February-May). Average monthly income was around Z\$140 per household, but varied from an average high of Z\$480 in September to an average low of Z\$52 in March. Such seasonal patterns in income generate household surpluses (savings) for a few months after harvest and deficits during preharvest period--when households are most likely to purchase consumption goods to supplement dwindling stocks of grain.

The seasonal distribution of income sources differs somewhat from the aggregate pattern. While all sources, with the exception of small grains, provide their lowest contribution to earnings between February and May, certain income sources such as remittances, local businesses, cattle and small livestock, and livestock products were most important during October through January. This corresponds to the planting season and holiday period. In contrast, two income sources--wage employment and sales of garden products--were relatively stable throughout the year.

#### **Income categories by farm type**

The dominance of farm production in household income (Table 13) suggests that families with higher income have a better resource endowment. Analysis of the relationship between income categories and farm type supports this hypothesis (Table 15).

Table 15. Income categories by farm type, Hurungwe District, June 1985-May 1986, Zimbabwe.

Gross cash income (Z\$)	Farms (%)	Farm size <sup>a</sup> (ha)	Residents <sup>b</sup> (no)	Cattle owned <sup>a</sup> (no)	Absent household head (%)	Employed family member <sup>c</sup> (%)
< 500	14.1	3.9	6.8	1	0	10
501- 750	15.3	2.8	4.9	1	10	20
751-1000	10.3	2.4	6.3	3	38	38
1001-1250	12.8	3.6	6.0	4	13	38
1251-1500	12.8	4.5	5.3	10	11	22
1501-1750	7.7	3.2	6.7	5	50	50
1751-2000	5.1	5.3	8.3	14	25	25
2001-2250	2.5	4.9	9.5	6	0	0
2251-2500	3.8	3.6	10.0	12	0	50
2501-3000	2.5	4.5	10.0	18	0	100
3001-3500	2.5	10.9	9.5	25	0	100
3501-4000	3.8	8.1	12.0	15	0	50
4001-4500	1.2	8.1	11.0	12	100	100
4501-5000	2.5	4.5	15.5	31	0	0
> 5001	2.5	8.1	13.5	23	0	0
Total	100.0	4.2	7.1	6.8	17.0	28

<sup>a</sup>Mean. <sup>b</sup>Household members living on farm. <sup>c</sup>Households with at least one employed family member.

Source: Data from the Food-grain Study, Hurungwe District, Zimbabwe.

Households receiving the lowest cash incomes were labour-poor households, operating below-average-size holdings, and owning very few cattle. Within the cash-income level of Z\$1,000 - \$3,000 per annum, there was a less obvious association between higher incomes and greater production resources, although the overall trend in household size and cattle ownership follows the trend in cash-income receipts. An interesting relationship exists between the incidence of absentee household heads, proportion of households with at least one family member working away from home, and cash-income categories. Low-income households had a higher incidence of absentee

household heads than households with higher cash income. On the other hand, households with incomes in excess of Z\$2,000 per annum most frequently had another family member in urban employment.

Household heads from low-income, resource-poor households are more likely to be absent in wage employment due to the comparative advantage of wage employment over farming in Hurungwe District. If these households are also relatively young, the process is reinforced--since younger men tend to have greater wage-employment opportunities than older ones. Households with better resource endowments clearly have a higher potential for generating productive and remunerative on-farm employment for more household members.

Therefore, the need for the head to supplement earnings through off-farm employment is less pressing. On the other hand, if households in this category are older, mature households; they are able to exploit off-farm income opportunities through other household members such as adult sons and unmarried daughters. This is the case among resource-rich, labour-rich sample households in Hurungwe and concurs with findings from previous studies in Southern Africa (e.g., de Vletter, 1981; cited in Low, 1986).

Further analysis of available household remittances and off-farm employment data will provide a clearer picture of the nature and importance of linkages between the rural household economy and the urban wage sector, for different types of farmers.

The positive association between maize transactions and farm resources outlined previously (maize transaction categories, by farm type) and the dominance of farm output in generating cash incomes, suggests that households with a higher net maize surplus will have higher incomes. This is generally confirmed when maize transaction categories are examined alongside income flows (Table 16). Net-deficit households and those with a surplus of less than five bags of maize had below average cash incomes. There was also a tendency for these households to earn a larger share of cash income from non agricultural sources. Consequently, income receipts were less seasonal. In contrast, income was more seasonal among surplus households, since they received a large proportion of their income from crop production.

**Table 16. Maize-transaction category and gross cash income flows by source and season, Hurungwe District, June 1985 - May 1986, Zimbabwe<sup>a</sup>.**

Net household transactions <sup>b</sup> (91 kg bags)	Farms (%)	Gross cash income (Z\$)		Source (% share)		Season (% share)		
		Mean	Std. dev.	Farm	Non-farm	Jun-Sept.	Oct-Jan.	Feb-May
<b><u>BAGS OUT</u></b>								
> 250	3	6,475	3,675	92	8	88	6	6
201-250	2	12,911	0	33	67	44	41	15
151-200	9	2,838	1,450	75	25	51	42	7
101-150	16	1,830	1,063	67	23	61	21	18
51-100	12	2,437	1,260	59	41	54	33	13
20- 50	18	743	536	59	41	44	35	21
5- 25	19	1,243	475	64	37	26	35	39
<b><u>NONE<sup>c</sup></u></b>	0	na	na	na	na	na	na	na
<b><u>BAGS IN</u></b>								
< 5	9	669	447	46	54	49	35	16
> 5	3	621	18	12	88	23	44	34
<b>Total</b>	<b>100</b>	<b>1,631</b>	<b>1,883</b>	<b>59</b>	<b>41</b>	<b>52</b>	<b>33</b>	<b>15</b>

<sup>a</sup>Data rounded to the nearest percentage. <sup>b</sup>Net of all transactions made by all households. <sup>c</sup>No sales.

## CONCLUSIONS AND POLICY IMPLICATION

The preceding sections have examined the level and seasonality of household maize transactions and income flows of Hurungwe Communal farmers. The investigation was undertaken in a province where maize sales to the GMB have increased at around 30% per annum over the last six years. Therefore, this situation provides an opportunity to investigate policy issues associated with the emergence of the communal farmer as an important contributor to marketed surplus. The main findings and conclusions are considered in relation to the four key issues identified at the beginning of this paper.

### **Forecasting communal maize sales to the GMB**

Around three-quarters of the sample households marketed maize over the period, June 1985-May 1986. Average sales were just over 5 mt per household, although the level of marketings varied considerably between households; with many farmers marketing small amounts.

The size of harvest was the only consistent explanatory variable associated with marketed surplus. Nonoutput variables such as distance to market were not highly associated with marketed surplus, although little maize was transported more than 50 km.

Almost all maize sales were made to the GMB and participation in local markets was very limited.

Per capita maize consumption was estimated at 134 kg per annum. Maize was widely used for nonfood purposes such as to repay loans of cooking meat advanced prior to harvest (most important); followed by its use as a pig seed. Nonfood uses of maize were almost as significant as home consumption, in terms of its total share of disposals. This suggests that decisions about on-farm retentions are not solely based on family nutritional requirements and that there is a need to better understand factors influencing communal farmer's use of maize for non-food purposes.

These findings suggest that improved forecasts of communal area sales will require better informed forecasts of communal production; and must also take into account the nature, level, and trend in the use of maize for non-food purposes--in addition to subsistence requirements--to obtain realistic projections of retentions.

### **Marketing activities and market access**

Marketing activities and market access, in terms of linkages to the GMB, are reasonably well developed in the survey area since producers are served by GMB depots at Karoi and Magunje District Growth Point and there are also a number of collection points in the district.

A large proportion of total marketings was delivered to one of the two GMB depots serving the area. Quite a few farmers whose closest delivery point was a GMB collection point, marketed their maize at one of the GMB depots because they believed the depot provided better marketing services. This suggests that the benefits obtained by selling at a GMB depot compensate for the additional cost of transporting maize a greater distance. Future expansion of the GMB infrastructure in rural areas needs to recognize that quality of service, as well as market access, influence market participation.

The small number of producers in the sample who delivered maize to a collection point makes it difficult to draw conclusions about the types of farmers benefitting from this facility. However, since households utilising collection points marketed small quantities of maize, this suggests that collection points are providing market access to the rural poor.

Maize sales are concentrated in the postharvest period. This places considerable pressure on the local transport systems and also means that the GMB carries the full burden of storing the nation's surpluses.

#### **Factors influencing the demand for grain in rural areas**

Household grain consumption is influenced by several factors, including household size, income, and the price of maize and other consumer goods. This paper does not investigate these factors, but empirical work to study these relationships is under way. Therefore, the present discussion is limited to policy issues primarily related to household demand for purchased grain.

During the survey period, own production was the dominant source of grain for sample households. Therefore, there was little demand for maize from additional sources. Maize purchases accounted for less than 10% of total maize consumption. These purchases were concentrated during December-February when on-farm stocks were lowest and before maize from the current harvest was ready. Households purchased primarily local maize grain, rather than maize meal, because it both stores better and is generally cheaper. Thus, in a good season there is very little demand for meal in a grain surplus area such as Hurungwe because deficit households can purchase their requirements from local farmers.

However, analysis of the net transactions position of households indicate that the self-sufficiency of households is somewhat precarious. Just under one-third of the households marketed less than 2.25 mt of maize. Thus, in a less favourable season they could move into a deficit position.

When monetary and non monetary transactions are aggregated, the self-sufficiency of households improves since non monetary transactions (e.g., gifts, labour payments, and receipts of grain in exchange for other commodities) enable deficit households to make up their shortfall.

These findings suggest that the demand for purchased grain in rural areas is likely to vary considerably across regions and between seasons. In good years, the demand is minimal--whereas in poor years, demand increases. However, the level of demand in poor years depends on the extent that on-farm production no longer meets subsistence requirements. In the more productive communal areas, which include Hurungwe, lower production would decrease the market surplus; but need not significantly increase the demand for purchased grain if production was sufficient to meet food requirements.

It is often suggested that more maize-processing facilities should be sited in rural areas because it is inefficient to transport maize to urban areas for milling, only to reexport it to rural areas. This argument requires careful consideration since it appears to assume that maize surplus areas have a sufficient and regular demand for purchased maize to justify investment in commercial milling plants. This is unlikely, based on the situation in Hurungwe.

In communal areas with considerable seasonal instability in marketed surplus, rural consumers could be served by establishing district level centres to act as both grain-purchasing and grain-selling depots. Also, the arrangement could benefit existing small-scale grinding mills in rural areas by maintaining the demand for their services in poor seasons. Yet, the financial viability of such centres would have to be studied closely to establish if the potential savings in transport costs would offset the implementation cost.

Increased communal maize production in Zimbabwe has caused a downward trend in rural demand for maize meal. At the same time, the variability about this trend has probably increased because most communal producers farm in medium and low-rainfall areas, subject to periodic drought. Zimbabwe is still adjusting to this phenomena and needs to consider ways of efficiently servicing a rural demand with considerable interseasonal variation.

### **Distributional consequences of government grain policies**

Several findings indicate marked inequality in the distribution of both maize marketings and cash income among sample households. Since Hurungwe is one of the better communal areas, this is particularly significant.

Analysis of maize transactions indicated that 43% of marketed maize surplus was accounted for by 10% of the sample households. In contrast, 50% of the households accounted for no more than 6% of the total maize marketed.

There was strong positive association between the amount of maize marketed, per capita availability of maize, and output related variables such as maize area, farm size, and availability of draft power. Households with better resource endowments and larger labour resources produced the largest maize surplus. Net deficit and marginally surplus households tended to be

labour poor households operating below-average-size farms and owning few cattle.

Since maize, the most important income source, accounted for 20% of total cash income; it was not surprising that there was marked inequality in the distribution of cash income, with the top 25% of the households accounting for 57% of earnings. The income share of the lowest 50% of the households was only 20%. Nonfarm cash income, of which remittances were the most significant, was distributed slightly more unequally than total cash income. The nonfarm income share of the lowest 50% households was below 15%, which suggest that half the families in the survey area have limited access to nonfarm income-generating activities; and therefore, depend largely on their own production activities to meet their consumption requirements. The relationship between income categories and farm type was as expected; low incomes were associated with households having the least resources.

Government's post-independence emphasis on the peasant sector has done much to redress the imbalance in access by communal farmers to extension, credit, and marketing services. These efforts have produced visible results. Communal production and marketing of key food crops such as maize, which had been the domain of large-scale farmers, has grown in importance. However, these developments have not affected all segments of the communal farm sector equally, as illustrated by the grain transaction and income data from Hurungwe District. Since Zimbabwe's basic policy objective is growth with equity, there is a pressing need to identify programmes and policies in both agriculture and other sectors which will enable a larger proportion of the communal farm sector to share in the benefits of development.

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