

Republic of Rwanda
Ministry of Agriculture, Livestock, and Forests

"Results of a Survey on Farm Level Sorghum Marketings"

Agricultural Survey and Statistics Service

English version of a working paper prepared for a conference/debate on the theme: "Contribution to a Better Understanding of the Production and Marketing of Sorghum in Rwanda".

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1. INTRODUCTION: POLICY ISSUES RELATED TO SORGHUM.

This paper presents new information collected by SESA on the sorghum subsector which can be used to inform the policy process on this commodity. Some important questions related to sorghum policy issues include:

A. Food security stocks. Who produces and who consumes sorghum, and how would they be affected by production shortfalls? Could sorghum food security stocks help mitigate the effects of production shortfalls?

B. Regional specialization of production. Which regions and what types of farmers produce a surplus of sorghum? Which regions and farmers purchase sorghum? What are the production constraints facing sorghum producers and rural consumers?

C. Sorghum market stability. What functions are currently being performed by the private sector in moving sorghum from producers to consumers? Is production expansion keeping up with population growth? Is production highly variable from year to year?

D. Sorghum pricing policy. How do rural and urban sorghum prices behave? Do yearly price changes correspond to shifts in supply and demand? Do farmers view price levels as a constraint to expanding production? What role does the price support program play? What are the problems/constraints to implementing a price support program? Who would benefit from price support?

This seminar is designed to present new information available to help answer some of these questions. This paper does not answer all the questions raised in items A-D above; the answers depend not only on facts but on government spending priorities and political objectives. Feedback from conference participants on this information will be helpful to SESA in completing additional analysis and designing new studies.

2. NATIONAL RURAL SORGHUM PURCHASES AND SALES; INTERNATIONAL MOVEMENT OF SORHGUM.

A large part of the marketed sorghum in Rwanda is imported; a large part of the sorghum produced in Rwanda is not marketed.

Table 1
BASIC STATISTICS ON SORGHUM IN RURAL RWANDA
(1986 AGRICULTURAL YEAR):

ACTIVITY	1986 TOTAL (METRIC TONS)	
NATIONAL PRODUCTION:	158,901	
NATIONAL PURCHASES:		
DRY GRAIN:	65,834	
GERMINATED GRAIN:	4,113	
FLOUR:	1,552	
TOTAL PURCHASES:	71,499	
NATIONAL SALES:		
DRY GRAIN:	33,084	
GERMINATED GRAIN:	655	
FLOUR:	0	
TOTAL SALES:	33,739	
NATIONAL GIFTS GIVEN:		
DRY GRAIN	2,835	
GERMINATED GRAIN	189	
FLOUR	111	
TOTAL GIFTS GIVEN:	3,135	
NATIONAL GIFTS RECEIVED:		
DRY GRAIN	3,417	
GERMINATED GRAIN	113	
FLOUR	289	
TOTAL GIFTS RECEIVED:	3,839	

Source: Estimates by the Agricultural Survey and Statistics Service, Ministry of Agriculture, Rwanda.

Note: Conversion factors from dry grain to germinated grain and sorghum flour (technically ground sorghum) are assumed to be 1 to 1.

The following calculations are derived from the figures given in Table 1:

- A. The percentage of sorghum marketed (sales divided by production) = 21.2%
- B. Rural sorghum utilization (Production minus gifts given minus sales plus purchases plus gifts received) = 197,365 metric tons.
- C. Per capita rural sorghum utilization (Rural sorghum utilization/5,800,000)= 34 kilos per capita annually.
- D. Net Rural Imports (Purchases + Gifts Received - Sales - Gifts Given) = 38,464 metric tons.
- E. Percentage of Rural Utilization that comes from Imports (Net Rural Imports/Rural Utilization) = 19.5%
- F. Percentage of Sorghum Sold in Rural Markets which is Imported (Net Rural Imports/(Rural Purchases + Gifts Received)=50%

Prior to this research, it was commonly believed that Rwanda was nearly self-sufficient in sorghum. Official import/export statistics show less than 5000 tons of sorghum imports total for 1985 plus 1986. The estimates in Table 1 show that rural Rwandan households are purchasing and receiving as gifts 38,464 more metric tons of sorghum than they are selling and giving as gifts. This means that 19.5% of rural sorghum utilization in 1986 came from sorghum imports--mostly informal imports. (Assuming that none of the difference came from changes in stock positions; there is no evidence to indicate that this occurred.) 1986 was considered to be a normal to good crop year, so sorghum imports must fall at or above the 19% level in most years. Assuming that urban areas import more sorghum on a per capita basis than the rural areas, national sorghum imports are probably even higher than 19% of national utilization in most years. These imports are necessary to satisfy the needs of the rural population.

Over 50% of the sorghum which found its way to rural markets in 1986 was imported. Prices and food availability in the states which supply Rwanda's sorghum must have a large effect on prices in Rwanda.

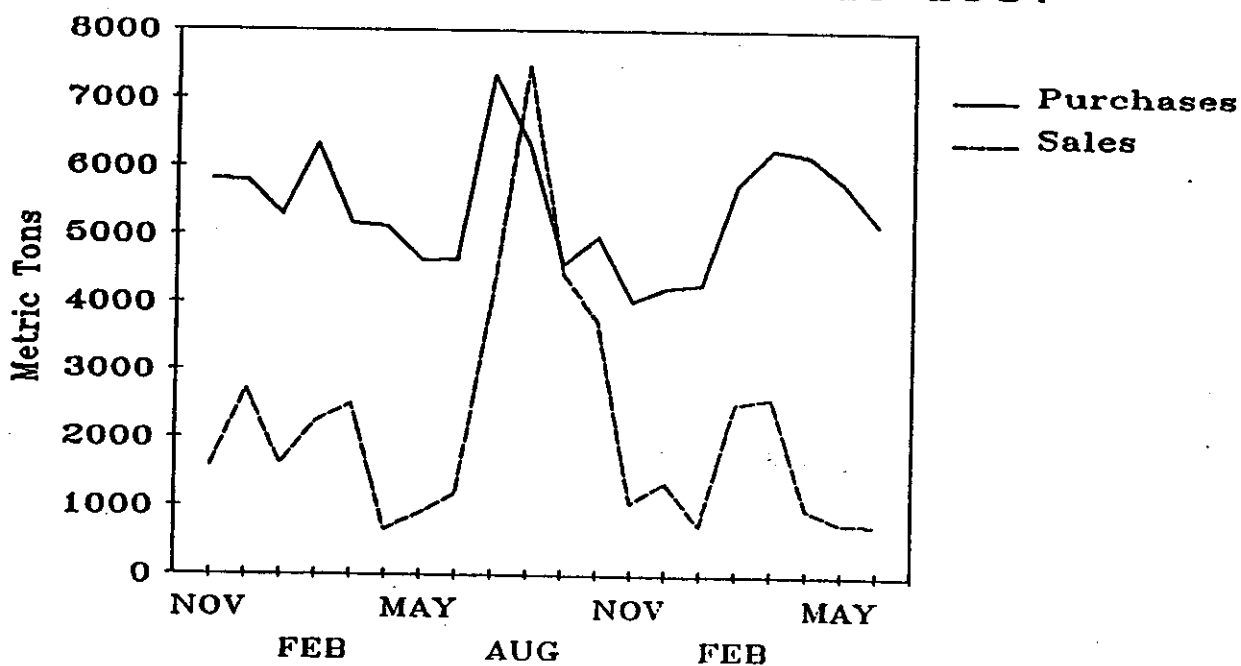
The figure on percentage of sorghum marketed does not reflect sales of sorghum beer. Production and marketing of beer is a very important income generating activity; 18% of rural households sold sorghum beer in 1986. Sorghum is an important ingredient in banana beer. Quantities of own-production sorghum going into marketed beer are unknown. If marketings of sorghum

in the form of beer could be accounted for, the percentage of sorghum marketed by farmers would probably be much higher than 20%

Figure 1 shows that national levels of farmer purchases exceed national rural sales in every month of the survey except August 1986.

Figure 1

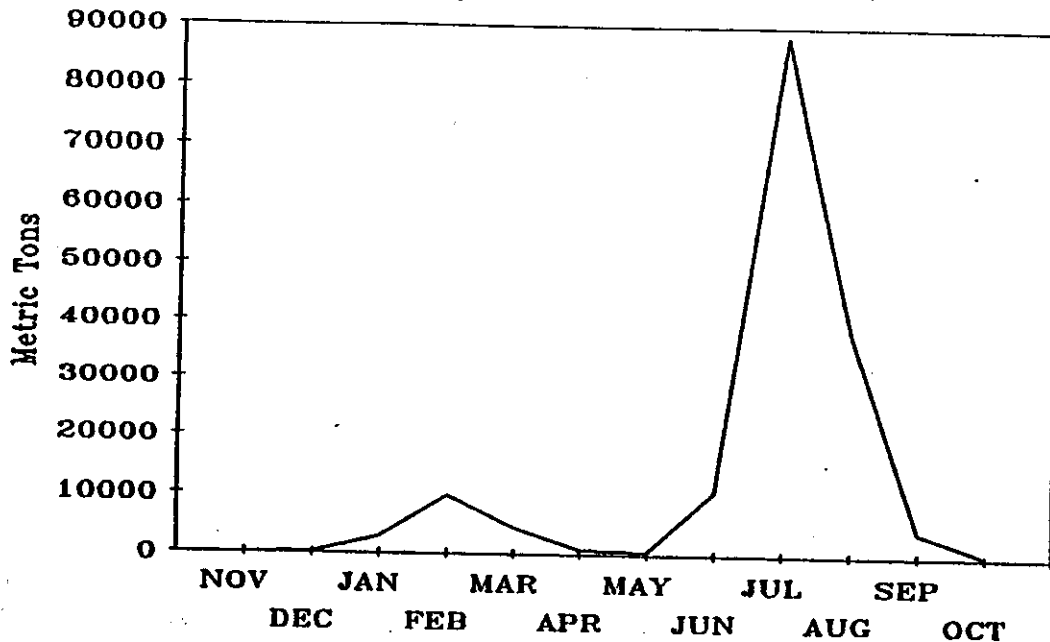
National Monthly Rural Sorghum Purchases and Sales in Rwanda November 1985 - June 1987



Source: Estimations by the Agricultural Survey and Statistics Service, Ministry of Agriculture, Livestock, and Forests, Rwanda.

Figure 2

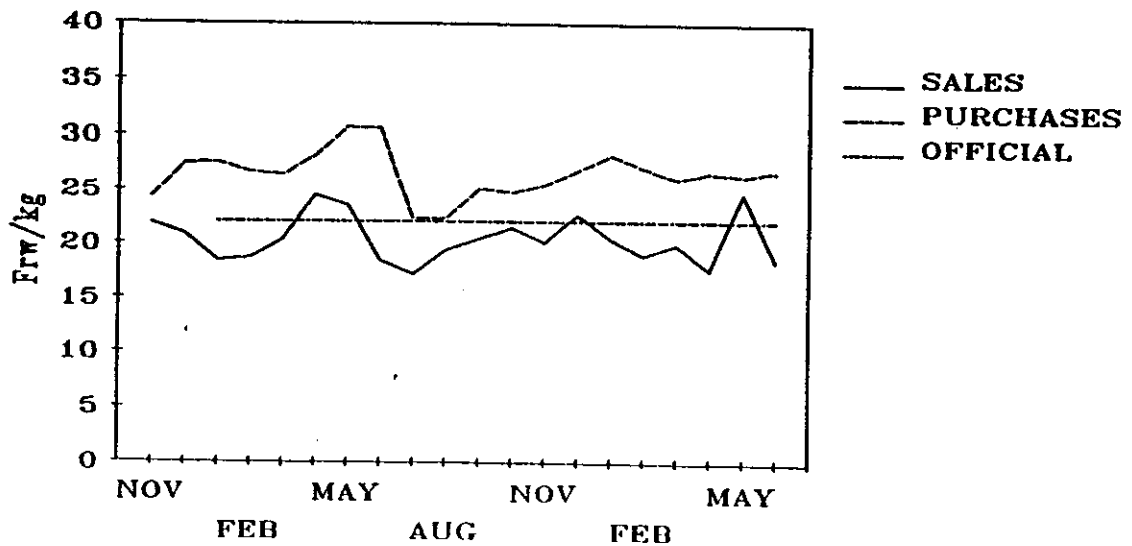
Monthly Sorghum Production in Rwanda, 1986 Agricultural Year



Source: Estimations by the Agricultural Survey and Statistics Service, Ministry of Agriculture, Livestock, and Forests, Rwanda.

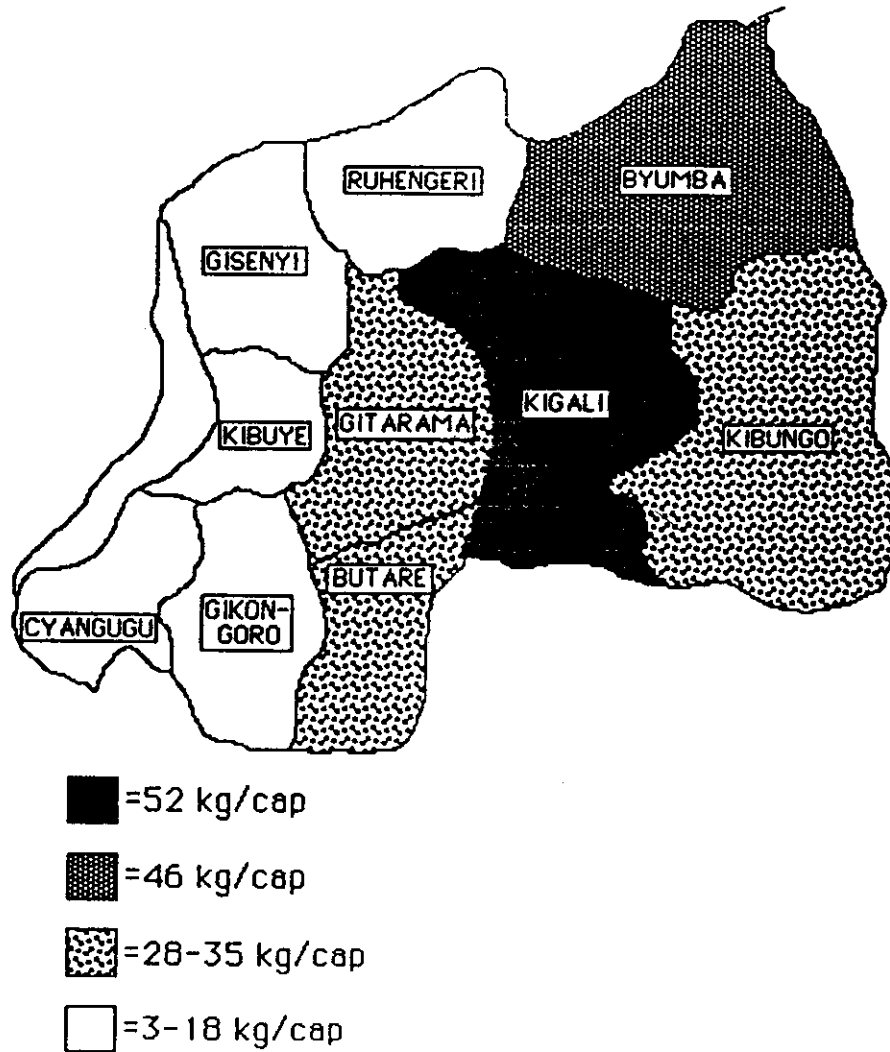
Figure 3

Average National Monthly Rural Farm Level Sorghum Buying and Selling Prices in Rwanda November 1985 - June 1987



Source: Estimations by the Agricultural Survey and Statistics Service, Ministry of Agriculture, Livestock, and Forests, Rwanda.

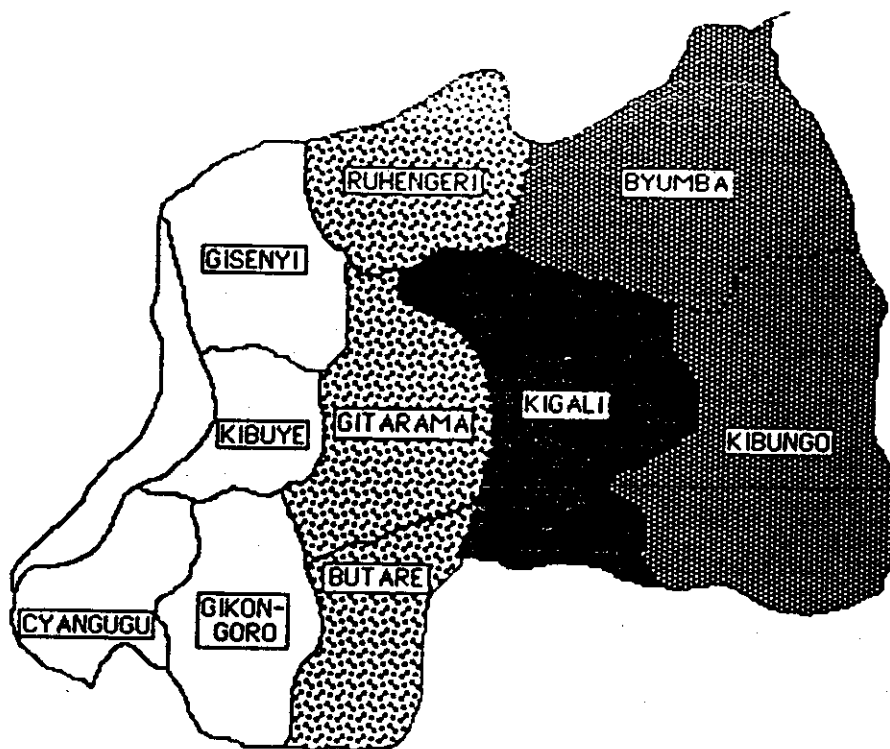
Figure 4
Per Capita Rural Sorghum Production
by Prefecture
1986 Agricultural Year







Source: Estimations by the Agricultural Survey and Statistics Service, Ministry of Agriculture, Livestock, and Forests, Rwanda.

Figure 5

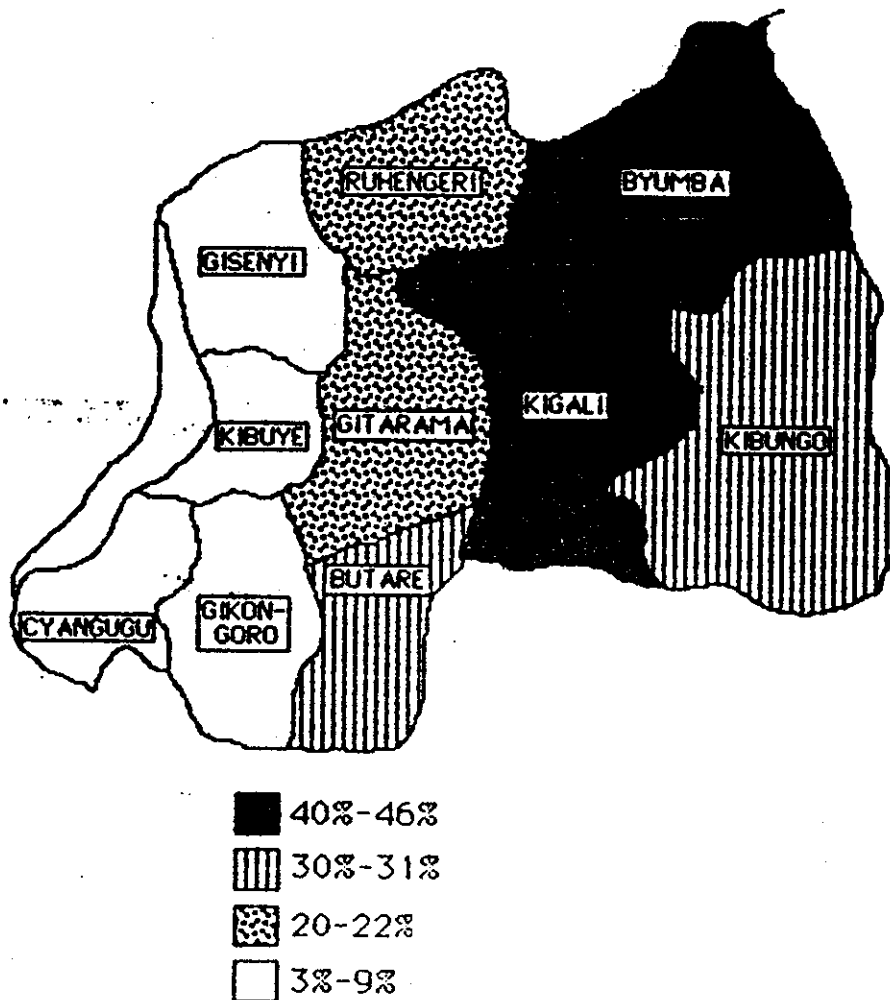
Relative Transactions Position in Sorghum
in the Rural Areas of Each Prefecture
1986 Agricultural Year



-  =Sales more than 3 times greater than purchases
-  =Sales and purchases roughly equal (<16% difference)
-  =Purchases 2 - 4 times greater than sales
-  =Purchases 11 - 85 times greater than sales

Source: Estimations by the Agricultural Survey and Statistics Service, Ministry of Agriculture, Livestock, and Forests, Rwanda.

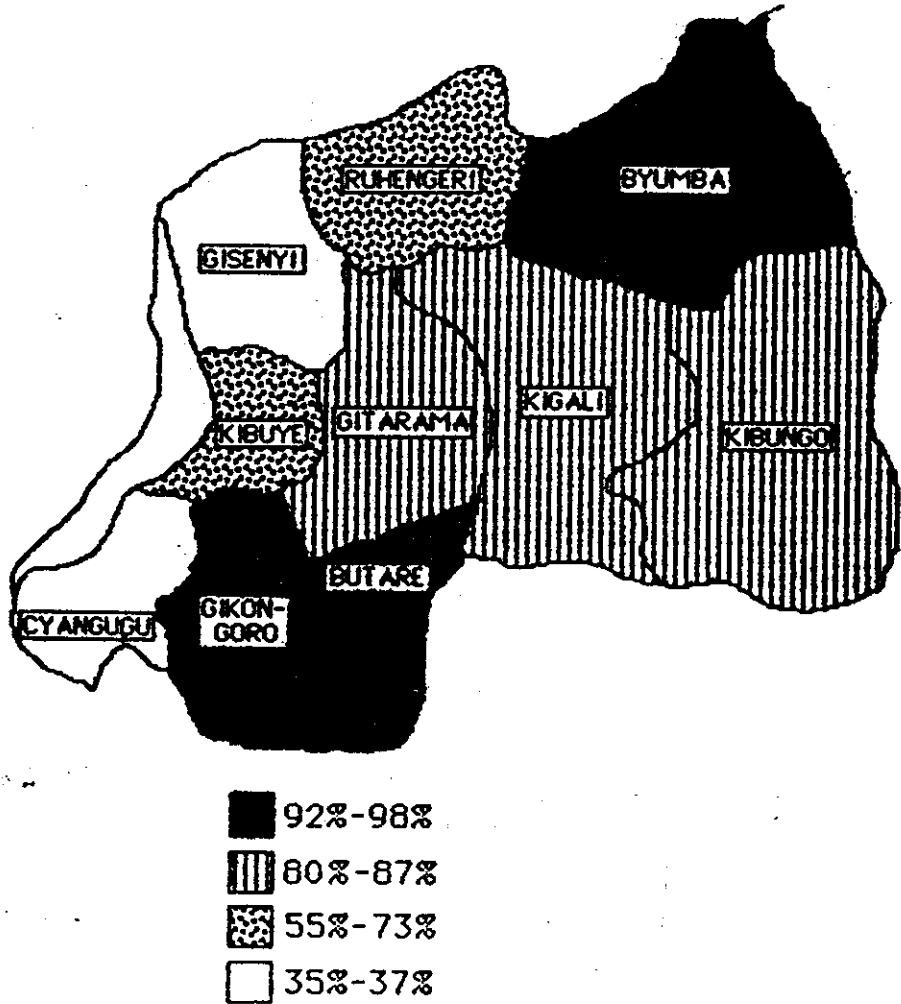
Figure 6
Percentage of Rural Households
Which Were Net Sorghum Sellers
1986 Agricultural Year



Source: Estimations by the Agricultural Survey and Statistics Service, Ministry of Agriculture, Livestock, and Forests, Rwanda.

Figure 7

Percentage of Rural Households Harvesting Sorghum
1986 Agricultural Year



Source: Estimations by the Agricultural Survey and Statistics Service, Ministry of Agriculture, Livestock, and Forests, Rwanda.

3. RELATIONSHIP BETWEEN FARM LEVEL PRICES AND PRODUCTION.

Farm level sorghum prices are influenced by the seasonality of production--prices are lowest when farmers harvest; OPROVIA farm level purchases in 1986 did not bring farm level prices up to the official minimum.

Figure 2 illustrates that sorghum is harvested every month of the year except in November, but that the large majority of sorghum is harvested between June and August.

Figure 3 shows farm level prices to be at their lowest during the June-July-August harvest period. As part of the 1986 fixed floor price program, OPROVIA bought approximately 3000 metric tons of sorghum from people who waited in line at their outlets and from Cooperatives in July and August. The average price received by farmers selling their sorghum in July and August was well below the official minimum of 22 RwF/kilo. What are the implications of the combination of significant imports and these data for programs designed to raise prices through parastatal purchases?

4. GEOGRAPHICAL DISTRIBUTION OF SORGHUM PRODUCTION AND MARKETING.

Kigali Prefecture has the highest per capita rural sorghum production in Rwanda, and it is the only prefecture which exports significant quantities of sorghum grain.

Figures 4, 5, 6 and 7 show how production and marketing of sorghum grain is regionalized in Rwanda. Kigali has the highest per capita rural production and is the only prefecture in which the rural population sells significantly more sorghum than it purchases (although a few surplus farmers are found in each prefecture). Thus Kigali is the only prefecture which would experience net benefits in the rural areas in the event of a farm level sorghum price increase.

Figure 6 shows that in no prefecture does the percentage of net sorghum sellers exceed 46%, and that the percentage of farms which are net sellers follows the relative transactions position of the prefecture closely.

Figure 7, when compared with figure 5, shows that the percentage of households growing sorghum in a prefecture has a weak relationship with the relative sales position of the prefecture. A smaller percentage of in the western prefectures grow sorghum, and these prefectures import sorghum; but Gikongoro has a high percentage of households which grow sorghum, and is a sorghum importer.

5. NUMBER OF FARMS WHICH ARE NET SORGHUM AND BEAN BUYERS.

A majority of farms buy sorghum. A majority of farms buy beans. Farms that buy sorghum tend to buy beans, and vice versa.

Table 2 shows that over 67% of rural households buy sorghum. Sorghum imports therefore play an important role in helping to stabilize prices for sorghum buyers.

A floor price policy, if successful in raising prices, would hurt more farmers than it would help, because over two-thirds of farmers are net sorghum purchasers, so they would pay more for their sorghum.

Table 2 shows that sorghum beer sellers account for a large amount of the sorghum trade, both in buying and selling sorghum. Much of the sorghum which is purchased in the rural areas of Rwanda may go to families which perform beer processing activities as a source of off-farm income. A loss of income for beer processors would be a possible outcome of increased sorghum prices.

Tables 3 and 4 link the findings for sorghum with the previously reported on findings for beans (see SESA publications from a conference on beans in May 1987). Families which are small net sellers of one of the two commodities tend to be small net buyers of the other commodity.

Families which are net buyers of one commodity tend to be net buyers of the other commodity. Large buyers of beans tend to be large buyers of sorghum, and vice versa. As a group, families which bought less than 30 kg of sorghum purchased 51 kg of dry beans. These families, which are probably the poorest, depend more on the market for their beans than for their sorghum.

Table 5 (below) shows that those who bought the most sorghum were either involved in processing sorghum for sale as beer, or producing very little sorghum on farm. Families which had net sorghum purchases of over 60 kg obtained 77% of the sorghum they used through purchases and gifts. Families which bought 30-59 kg of sorghum (net) in 1986 obtained roughly half their sorghum through transfers. Clearly these two groups would also be hard hit by sorghum price increases.

Table 2
 TOTAL NET SALES (GIFTS EXCLUDED) OF DRY SORGHUM GRAIN,
 GERMINATED SORGHUM, AND SORGHUM FLOUR
 BY HOUSEHOLD TYPE
 NOV. '85 - OCT. '86
 (NEGATIVE NUMBERS INDICATE PURCHASES)

HOUSEHOLD CATEGORY:	% OF FARMS	NO. OF FARMS	NET TONS SOLD BY CLASS	% OF SALES	AVE. AREA PER FARM (HA)
NET SORGHUM SELLERS:					
HOUSEHOLDS THAT SOLD SORGHUM AND BEER	4.5%	49409	5507	19.9%	1.6
HOUSEHOLDS THAT SOLD SORGHUM, BUT NO BEER:					
>60 KG SOLD	6.2%	68476	19473	70.2%	1.9
30-59 KG SOLD	3.4%	36916	1497	5.4%	1.4
<30 KG SOLD	9.4%	103399	1234	4.4%	1.1
NO NET SORG. TRANSACTIONS	9.0%	99035			1.0
NET SORGHUM BUYERS:					
HOUSEHOLDS THAT BOUGHT SORGHUM AND SOLD NO BEER:					
<30 KG BOUGHT	34.5%	378334	-4892	-7.5%	0.9
30-59 KG BOUGHT	10.4%	113743	-4966	-7.6%	1.2
>60 KG BOUGHT	9.2%	101264	-12895	-19.7%	1.4
HOUSEHOLDS THAT BOUGHT SORGHUM AND SOLD BEER	13.4%	146515	-42710	-65.2%	1.4

SOURCE: Estimates by the Agricultural Survey and Statistics Service, Rwandan Ministry of Agriculture.

NOTE: 0.6% of the households sold beer, but had no net sorghum transactions. To simplify the table, these households were lumped with households that did not sell beer, and who had no net sorghum transactions.

Table 3
**AVERAGE NET DRY BEAN SALES BY NET SORGHUM TRANSACTION CLASS
(GIFTS EXCLUDED)**

HOUSEHOLD POSITION IN SORGHUM:	% OF FARMS	AVERAGE NET DRY BEAN SALES PER HOUSEHOLD (KG)
NET SORGHUM SELLERS:		
HOUSEHOLDS THAT SOLD SORGHUM AND BEER	4.5%	18
HOUSEHOLDS THAT SOLD SORGHUM, BUT NO BEER		
>60 KG SOLD	6.2%	104
30-59 KG SOLD	3.4%	-33
<30 KG SOLD	9.4%	-21
 NO NET SORGHUM TRANSACTIONS	 9.0%	 -45
NET SORGHUM BUYERS:		
HOUSEHOLDS THAT BOUGHT SORGHUM AND SOLD NO BEER:		
<30 KG BOUGHT	34.5%	-51
30-59 KG BOUGHT	10.4%	-47
>60 KG BOUGHT	9.2%	-57
 HOUSEHOLDS THAT BOUGHT SORGHUM AND SOLD BEER	 13.4%	 -52
 RWANDA (AVERAGE FOR ALL CLASSES)	 100.0%	 -34

SOURCE: Estimates by the Agricultural Survey and Statistics Service, Rwandan Ministry of Agriculture.

Table 4
AVERAGE NET SORGHUM SALES BY NET DRY BEAN TRANSACTION CLASS
(GIFTS EXCLUDED)

NET BEAN TRANSACTIONS BY HOUSEHOLD	% OF FARMS	AVERAGE SORGHUM NET SALES PER HOUSEHOLD (KG)
>60 KG SOLD	7%	190
30-59 KG SOLD	4%	25
<30 KG SOLD	11%	-10
NO NET TRANSACTIONS	5%	-49
<30 KG BOUGHT	24%	-42
30-59 KG BOUGHT	18%	-41
>60 KG BOUGHT	31%	-85
 AVERAGE (ALL CLASSES)	 100%	 -34

SOURCE: Estimates by the Agricultural Survey
and Statistics Service, Rwandan Ministry of
Agriculture.

6. NUMBER OF FARMS WHICH ARE NET SELLERS OF SORGHUM AND BEANS.

A small minority of farm families produce most of the marketed surplus in sorghum and in beans. Large net sorghum sellers tend to be large net bean sellers.

Table 2 shows that relatively few households are net sellers of sorghum (a total of 23%). 6.2% of the rural households account for over 70% of net sales. Therefore, of the farmers that are net sellers of sorghum, only a small proportion (those that sell the largest quantities) would stand to receive significant benefits from such a price fixing program.

Tables 3 and 4 demonstrate that it is essentially the same group of families which is responsible for most of the net marketed surplus in both beans and sorghum: families which sold over 60 kilos of either product.

7. RELATIVE WEALTH OF SORGHUM BUYERS COMPARED TO SORGHUM SELLERS.

Sorghum sellers appear to be better off than sorghum buyers, in terms of kilocalorie production and land holdings.

Tables 2 and 5 also give important indications of the relative well being of families in the different transactions classes. Table 2 shows that the average farm size of those who sold the most sorghum was higher than any other group. Land is probably one of the most important determinants of sorghum production and marketings. Surface area of the farm therefore plays a significant role in determining the net position of the household. It is unlikely that raising prices would call forth much extra sorghum production without concomitant reductions in acreage allotted to other important crops.

Table 5 also shows large sellers producing more kilocalories on an annual per capita basis than any other group. Clearly this group is at low risk in terms of chronic food insecurity. Table 5 also shows us that without exception, net sorghum grain seller groups produce more calories per capita than net sorghum grain buyer groups.

The groups which produce the fewest kilocalories per capita are those which also have the smallest surface area to cultivate: families which bought less than 30 kg (net) and those which neither bought nor sold (net). These two groups (over 42% of rural households) also had the lowest amount of sorghum available on farm of any of the groups. This may indicate either A) They have little interest in sorghum and/or sorghum products due to ecological or social conditions, B) They are too poor to be able to afford to purchase sorghum to augment their diets, or C) They prefer to buy their sorghum in the form of beer.

Hypothesis A) above is supported by the fact that over 50% of the households in these two groups (14.7% of the population) do not grow sorghum. Hypothesis B) is supported because non-sorghum producing families with few sorghum transactions tend to harvest even fewer calories per capita per year than families in the same transaction categories which do produce sorghum (not shown in a table).

Table 5
 TOTAL OF PER CAPITA DRY GRAIN SORGHUM GRAIN,
 GERMINATED SORGHUM, AND SORGHUM FLOUR AVAILABILITY
 BY NET TRANSACTION CLASS OF HOUSEHOLD
 NOV. '85 - OCT. '86

HOUSEHOLD CATEGORY:	% OF FARMS	KG OF SORGHUM PRODUCED PER CAPITA	KG OF SORGHUM TRANS- FERRED /CAP	KG OF SORGHUM AVAIL- ABLE /CAP	KCAL/CAP/DAY PRODUCED (MAJOR CROPS)
NET SORGHUM SELLERS:					
HOUSEHOLDS THAT SOLD SORGHUM AND BEER	4.5%	102	24	78	3320
HOUSEHOLDS THAT SOLD SORGHUM, BUT NO BEER:					
>60 KG SOLD	6.2%	113	55	58	3855
30-59 KG SOLD	3.4%	74	11	63	2830
<30 KG SOLD	9.4%	40	3	37	2422
NO NET SORGHUM TRANSACTIONS	9.0%	21	-0	21	2025
NET SORGHUM BUYERS:					
HOUSEHOLDS THAT BOUGHT SORGHUM AND SOLD NO BEER:					
<30 KG BOUGHT	34.5%	12	-4	16	1737
30-59 KG BOUGHT	10.4%	12	-10	22	2112
>60 KG BOUGHT	9.2%	8	-27	35	2140
HOUSEHOLDS THAT BOUGHT SORGHUM AND SOLD BEER	13.4%	32	-54	86	2274
RWANDA	100.0%	30	-7	37	2216

SOURCE: ESTIMATES BY THE AGRICULTURAL SURVEY AND STATISTICS SERVICE, MINISTRY OF AGRICULTURE, RWANDA.

NOTES: TRANSFERS INCLUDE SALES, GIFTS GIVEN, GIFTS RECEIVED, AND PURCHASES. SEED IS CONSIDERED AS A PART OF SORGHUM AVAILABILITY. 0.6% OF HOUSEHOLDS SOLD BEER AND HAD NO NET TRANSACTIONS IN SORGHUM. TO SIMPLIFY THE TABLE, THESE HOUSEHOLDS WERE LUMPED WITH HOUSEHOLDS THAT DID NOT SELL SORGHUM BEER, AND HAD NO NET TRANSACTIONS. ALL CELL AVERAGES EXTRAPOLATED FROM HOUSEHOLD LEVEL PER CAPITA VALUES.

8. SOURCES OF REVENUE; EXPENSES.

Farms which have few sorghum transactions appear to spend the greatest proportion of their income on food; this same group relies most heavily on coffee and tea as a source of family revenue.

Each cell of Tables 6 and 7 denotes the percentage of persons in a particular class which listed an expense or revenue item as number one for them, not the percentage of total income spent or received by a class for an item. Also note that beer selling as a source of revenue includes banana beer.

Table 6 shows that farms which have no net sorghum transactions and farms which bought less than 30 kilos of sorghum rely heavily on industrial crops (primarily coffee), labor, and beer for their income. Is it possible that these families are the poorest? Future studies may want to investigate this important question.

Table 7 reveals that food was most frequently mentioned as the number one expense item by families in all transactions classes, and that families with few transactions mention food expenses the most frequently. Thus Table 7 tends to confirm the hypothesis stated in the preceding discussion that families with few transactions appear to be the worst off in terms of their ability to produce adequate food, although it is possible that some of these households are specializing in cash generating activities and purchasing food.

TABLE 6
MOST IMPORTANT SOURCE OF REVENUE
BY NET SORGHUM TRANSACTION CLASS

SOURCE OF REVENUE	SOLD SORG, AND BEER	>60 KG SOLD	30-59 KG SOLD	<30 KG SOLD	NO TRANS- ACTIONS	<30 KG BOUGHT	30-59 KG BOUGHT	>60 KG BOUGHT	BOUGHT SORG, SOLD BEER	TOTAL
SELLING BEER	46.0%	38.8%	40.3%	46.6%	24.7%	36.3%	37.2%	33.5%	31.1%	36.1%
SALE OF FOODSTUFFS	31.2%	43.4%	25.0%	16.5%	11.7%	9.2%	18.5%	16.8%	22.3%	17.2%
INDUSTRIAL CROP	2.1%	10.9%	8.8%	13.5%	24.5%	20.5%	17.7%	16.6%	13.1%	16.7%
LABOR ON ANOTHER FARM	3.7%	2.2%	6.1%	11.3%	13.6%	18.2%	12.6%	13.2%	6.8%	12.5%
WORK AT A PROJECT				2.4%	3.9%	2.0%	1.7%	1.5%	4.0%	2.1%
SALARY				.8%	6.1%	2.8%	2.6%	2.5%	5.6%	2.8%
SALE OF LIVESTOCK	1.1%	.8%	6.0%	1.1%	2.9%	1.3%		3.7%	2.4%	1.8%
ARTISANRY	6.5%	2.6%	8.3%	1.6%	4.3%	3.3%	2.1%	3.5%	3.7%	3.4%
COMMERCE	2.2%	1.3%		1.3%	3.1%	1.7%	3.8%	7.9%	6.8%	3.2%
GIFTS FROM RELATIVES					.8%	1.4%	.8%		.6%	.7%
RENTING FIELDS	3.5%				1.0%		2.3%		.7%	.6%
OTHER	3.5%		5.6%	3.9%	2.5%	2.1%	.7%	.9%	2.0%	2.1%
NO RESPONSE				1.1%	.9%	1.1%			1.0%	.7%

TABLE 7
LARGEST EXPENDITURE BY NET SORGHUM TRANSACTION CLASS

	SOLD SORG. AND BEER	>60 KG SOLD	30-59 KG SOLD	<30 KG SOLD	NO TRANSAC- -TIONS	<30 KG BOUGHT	30-59 KG BOUGHT	>60 KG BOUGHT	BOUGHT SORGHUM SOLD BEER	TOTAL
FOOD	28.6%	32.0%	51.0%	52.0%	58.1%	64.1%	54.2%	48.4%	57.9%	55.1%
CLOTHES	21.6%	19.2%	21.6%	17.7%	6.4%	9.2%	15.2%	11.9%	12.6%	12.7%
LABOR	11.5%	19.9%	1.7%	5.9%	8.5%	2.3%	3.7%	8.3%	10.3%	6.5%
MEDICINES	16.9%	11.7%	3.9%	5.6%	1.3%	5.3%	6.7%	6.5%	3.9%	5.9%
TAXES	3.5%		.9%	2.5%	1.0%	3.4%	2.7%	3.8%	1.7%	2.6%
SCHOOL FEES	2.2%	2.9%	5.6%		2.4%	1.5%	3.0%	2.3%	3.4%	2.2%
KEROSENE		7.7%		4.7%	7.6%	1.3%	1.5%	2.7%	1.9%	2.7%
BEER	5.3%		3.5%	2.2%	1.2%	2.2%	1.2%	4.7%	1.7%	2.2%
SOAP				.9%		2.2%	2.7%	2.8%		1.4%
KITCHEN WARE	3.2%	2.5%	1.4%	1.8%	2.2%	2.3%	4.9%	1.9%	1.4%	2.4%
RENTING FIELDS	4.2%		4.0%	1.4%	2.3%	.5%	3.3%	3.3%	2.8%	1.9%
SEED				3.0%	1.3%	1.6%		1.6%	.9%	1.2%
TOOLS	2.3%	.7%	3.9%		3.8%	2.2%	1.0%	1.1%	.8%	1.7%
OTHER	.7%	3.4%	2.4%	1.2%	3.0%	1.4%		.8%	.6%	1.4%
NO RESPONSE				1.1%	1.0%	.3%				.3%

9. CONSTRAINTS OF NET SORGHUM AND BEAN BUYERS

Over half of the farm families are net purchasers of both beans and sorghum. Net buyers of beans which have no net sorghum transactions make up 6.7% of rural households. These families produce the least food per capita and have the smallest farms. Soil fertility and land are their most frequently mentioned biggest production constraints.

TABLE 8
FARMERS' NET POSITION IN BEANS AND SORGHUM
GIFTS EXCLUDED
(PERCENTAGE OF FARM FAMILIES)

FAMILY POSITION IN BEANS	FAMILY POSITION IN SORGHUM		
	NET PURCHASERS	NET SELLERS	NO NET TRANS.
NET PURCHASERS	54.5%	12.6%	6.7%
NET SELLERS	10.3%	9.7%	1.6%
NO NET TRANS.	2.7%	1.2%	0.7%

SOURCE: Estimates by the Agricultural Survey and Statistics Service, Ministry of Agriculture.

Table 8 provides a summary of the analysis of tables 3 and 4. Fifty-four percent of families in the rural areas are net buyers of both beans and sorghum. Six point seven percent of rural families are net buyers of beans and have no net transactions in sorghum.

The family's position as presented in table 8 was tabulated with their reponse to a recall question regarding their biggest production constraint. Results are presented in table 9. Net buyers of both crops and net buyers of beans with no net sorghum transactions listed soil fertility and surface area as their biggest production constraint much more frequently than families in most other categories. Together these two types of families make up over sixty percent of the rural population. A price increase would probably not enable these families to increase acreage planted, given the difficulty of improving or buying land in Rwanda.

Table 9 includes the average surface area of farms in each category and average family kilocalorie production. Consistent with reponses to the constraints question, families which were net buyers of beans and sorghum and families which bought beans and had no net transactions in sorghum also had the smallest farms and produced the fewest kilocalories per capita. These families are therefore likely to be a high risk group in terms of food security.

TABLE 9

BIGGEST PRODUCTION CONSTRAINT BY FAMILY NET POSITIONS
IN BEANS AND SORGHUM

POSITIONS IN BEANS AND SORGHUM

SELL BEANS, SELL BEANS, SELL BEANS, NO BEAN OR NO BEAN BUY BEANS, BUY BEANS, RWANDA
SELL SORG BUY SORG NO SORG SORG TRANS, SELL TRANS, BUY NO SORG SELL SORG BUY BEANS, BUY BEANS,
TRANS SORG SORG TRANS SORG SORG TRANS

MAJOR PRODUCTION CONSTRAINT

MAJOR PRODUCTION CONSTRAINT	20.2%	25.2%	16.7%	16.7%	14.3%	28.6%	37.1%	26.1%	33.6%	30.2%
FERTILIZER OR SOIL										
FERTILITY	14.9%	22.5%	33.3%	33.3%	7.1%	14.3%	28.6%	21.7%	36.8%	29.2%
LAND	20.2%	26.1%	16.7%	16.7%	42.9%	21.4%	20.0%	23.2%	8.7%	15.6%
LABOR	31.6%	16.2%	16.7%	16.7%	35.7%	21.4%	7.1%	18.8%	13.6%	16.4%
NOT ENOUGH RAIN	7.9%	6.3%	5.6%	5.6%		7.1%	4.3%	5.8%	4.2%	5.0%
TOO MUCH RAIN								2.2%	.7%	.7%
LACK OF SEED										
PESTICIDE AVAILABILITY		.9%								
LOW COMMODITY PRICES	3.5%							.7%	.2%	.1%
OTHER REASONS	1.8%	2.7%	16.7%			3.6%	2.9%	1.4%	2.3%	.6%
NO RESPONSE						3.6%				2.2%
										.1%
AVERAGE SURFACE AREA (HA)	1.7	1.7	1.7	1.7	2.3	1.2	0.9	1.2	1.0	1.2
AVERAGE FAMILY KCAL/CAP/DAY PRODUCTION	4181	3036	3436	3436	3104	2173	1710	2142	1742	2216
PERCENTAGE OF FAMILIES IN CATEGORY	9.7%	10.3%	0.7%	0.7%	1.2%	2.7%	6.7%	12.6%	54.5%	100.0%

10. CONSTRAINTS OF NET SELLERS.

About 10% of farm families are net sellers of both crops. These families produce more kilocalories on average than other categories of farm families, and they have the largest farms. Lack of rain is their most frequently mentioned number one production constraint.

Table 9 shows that 9.7% of rural households are net sellers of both beans and sorghum. Table 9 also shows that these families produce almost twice the national average kilocalories per household member. This high production is related to the larger average surface area cultivated by farms which sell both crops shown in table 9. Net sellers of both crops listed lack of rain most frequently as their number one production constraint.

11. ASSEMBLY COSTS OF SORGHUM WHICH IS SOLD IN RWANDA

When rural families sell their sorghum, they sell in very small lots. Merchant assembly costs are therefore likely to be quite high, due to the number of purchases which must be made in order to establish a stock.

Table 10 offers some important information about probable assembly costs. The group which sold the largest amount of sorghum had the largest average size of sale: 44 kilos, or less than a sack. The average sale size for the entire country was only 25 kilos. When one takes these extremely small quantities sold per transaction into consideration, the necessity of the small assemblers becomes apparent. Truckers and large scale merchants/truckers cannot afford to bring their vehicles to the farm, because individual farmers have so little to sell at any given time. Thus, margins on foodcrops may be relatively high simply because of the high cost of many intermediaries, not due to "dishonest merchants". Rwanda must make efforts to help merchants reduce assembly costs; continued emphasis on strengthening the transportation network may be one way to help achieve lower assembly costs.

Table 10

AVERAGE WEIGHT (KG) PER SORGHUM DRY GRAIN TRANSACTION
BY NET TRANSACTION CLASS OF HOUSEHOLD

HOUSEHOLD CATEGORY:	SALES	PURCHASES
NET SORGHUM SELLERS:		
HOUSEHOLDS THAT SOLD SORGHUM AND BEER	28	9
HOUSEHOLDS THAT SOLD SORGHUM, BUT NO BEER:		
>60 KG SOLD	44	16
30-59 KG SOLD	15	8
<30 KG SOLD	9	4
NO NET SORGHUM TRANSACTIONS	5	3
NET SORGHUM BUYERS:		
HOUSEHOLDS THAT BOUGHT SORGHUM AND SOLD NO BEER:		
<30 KG BOUGHT	10	4
30-59 KG BOUGHT	9	8
>60 KG BOUGHT	10	16
HOUSEHOLDS THAT BOUGHT SORGHUM AND SOLD BEER	10	30
RWANDA	25	14

SOURCE: AGRICULTURAL SURVEY AND STATISTICS SERVICE,
MINISTRY OF AGRICULTURE, RWANDA.

NOTE: HOUSEHOLDS THAT SOLD SORGHUM BEER, BUT WHICH HAD
NO NET TRANSACTIONS IN SORGHUM ARE LUMPED WITH
HOUSEHOLDS WHICH HAD NO BEER SALES AND NO NET SORGHUM
TRANSACTIONS.

Table 11
Intended Use of Sorghum Purchased by Rwandan Farmers
at the Time of Purchase

Net Transaction Class	Intended Use					Total
	Consumption	Resale	Seed /cons	Sorghum Beer	Other	
Net Sorghum Sellers:						
Households that Sold Sorghum and Beer	9%	67%	2%	21%	1%	100%
Households that Sold Sorghum, but No Beer:						
>60 Kg Sold	33%	60%	0%	5%	0%	100%
30-59 Kg Sold	30%	1%	1%	65%	3%	100%
>30 Kg Sold	44%	45%	3%	7%	1%	100%
No Net Sorg. Trans.	1%	99%	0%	0%	0%	100%
Net Sorghum Buyers:						
Households that Bought Sorghum and Sold No Beer:						
<30 Kg Bought	53%	30%	3%	14%	2%	100%
30-59 Kg Bought	60%	3%	1%	34%	2%	100%
>60 Kg Bought	38%	23%	1%	38%	0%	100%
Households that Bought Sorghum and Sold Beer	8%	2%	0%	89%	1%	100%
Rwanda	23%	16%	1%	59%	1%	100%

Source: Agricultural Survey and Statistics Service, Ministry of Agriculture, Rwanda.

Notes: This table includes Dry Grain Sorghum, Germinated Sorghum, and Sorghum Flour. Households with no net transactions in sorghum that sold sorghum beer are lumped with households that sold no beer and which had no net sorghum transactions.

12. HOW RWANDANS USE SORGHUM THEY PURCHASE.

Most of the sorghum purchased in rural Rwanda goes to beer brewing. An exception to this rule are families which purchase very little sorghum, who consume the sorghum they purchase directly.

The use to which Rwandan households in the rural areas intend put sorghum (see Table 11) they have purchased varies considerably between transaction classes. Most striking is the group which bought sorghum grain and sold sorghum beer. They intended to manufacture beer out of 89% of the sorghum they purchased. For the rural population as a whole, 59% of all sorghum purchases (roughly 50,000 tons) were for sorghum beer production. A sorghum grain price increase would mean that these families would have to pay more for the sorghum they depend on as a source of off-farm income.

Families which purchase relatively small net quantities of sorghum annually (less than 60 kg) are most likely to use purchased sorghum in direct consumption, rather than for beer brewing. These small net purchasers may rely heavily on cabarets for sorghum beer, or they may be too poor to be able to afford even the modest luxury of sorghum beer.

13. FAMILIES WHICH BUY FOR CONSUMPTION AND SELL FROM PRODUCTION

Twenty-six percent of rural households engage in both buying and selling of sorghum for non-commercial purposes. The relative quantities sold by net buyers and bought by net sellers are small.

The proportion of families that engage in both non-commercial buying and non-commercial selling is given in Table 12. The purpose of this table is to investigate the common belief that farmers are forced to sell at harvest time at a low price, only to buy back later at a high price. Table 12 shows that during the 1986 agricultural year, only 26% of rural households bought sorghum for an end-use (consumption, seed, beer, etc.) and also sold sorghum out of their own production.

Thus a maximum of one quarter of rural households engage in the practice of selling and repurchasing at a later date. It is commonly believed in Rwanda that a large percentage of households are forced to sell at harvest at a low price, and then have to buy back from a merchant later at a high price. Since this belief may be the rationale for some of Rwanda's anti-merchant sentiment and intervention into food markets to raise prices at harvest time, it is worth while to delve deeper into the probable causes of this selling and buying behavior.

The percentage of households which sell at harvest for a low price because they need cash and buy back later at a higher price because they need the food is probably much lower than 26%. Some of situations (besides a need for cash at harvest followed by a need for sorghum later) which might cause a farmer to buy and sell the same product within a year:

1. A bad harvest followed by a good harvest. (The family needs to buy just before the good harvest, then has more than enough.)
2. The family sells old sorghum, and replaces it with higher quality (purchased) sorghum.
3. The family wanted to plant a new or improved variety of sorghum.
4. The family miscalculated their sorghum needs for the year. Unexpected births, marriages or deaths required sorghum for ceremonial purposes.
5. The farm family harvested and sold off-season sorghum when prices were high, and then purchased sorghum after the main harvest when prices were low.
6. The family doesn't want to risk losing sorghum during storage.

Investigation of the importance of sales by net purchasers and purchases by net sellers yields the following facts (not shown in a table):

1. Purchases of sorghum grain by net sellers who bought and sold make up a volume equal to 22% of these families' gross sales.
2. Sales of sorghum grain by net buyers who bought and sold constitute 16% of these families' gross purchases.

Table 12
 PERCENTAGE OF RWANDAN FAMILIES EXPERIENCING
 NO SORGHUM TRANSACTIONS, SORGHUM PURCHASES ONLY, BOTH
 SORGHUM PURCHASES AND SALES, AND SORGHUM SALES ONLY
 FROM NOV. 1985 THROUGH OCT. 1986

(BUYING FOR RESALE AND SALES FROM PURCHASES NOT INCLUDED)

HOUSEHOLD CATEGORY	NO TRANSACTIONS	BOUGHT ONLY	BOUGHT AND SOLD	SOLD ONLY	TOTAL
NET SORGHUM SELLERS:					
HOUSEHOLDS THAT SOLD SORGHUM AND BEER			49	51	100
HOUSEHOLDS THAT SOLD SORGHUM, BUT NO BEER					
>60 KG SOLD			47	53	100
30-59 KG SOLD			61	39	100
<30 KG SOLD			54	46	100
NO NET TRANS.	96		4		100
NET SORGHUM BUYERS:					
HOUSEHOLDS THAT BOUGHT SORGHUM, AND SOLD NO BEER					
<30 KG BOUGHT		83	17		100
30-59 KG BOUGHT		81	19		100
>60 KG BOUGHT		87	13		100
HOUSEHOLDS THAT BOUGHT SORGHUM SOLD BEER		66	34		100
RWANDA	9	54	26	11	100

Source: Agricultural Survey and Statistics Service,
 Ministry of Agriculture, Rwanda.

Note: Table includes dry sorghum grain, germinated
 sorghum, and sorghum flour. Sorghum beer sellers with
 no net transactions are combined with families that
 didn't sell beer and which had no net sorghum
 transactions.

III. Summary and Conclusions

More sorghum is imported into Rwanda than was previously believed. 50% of the sorghum sold in rural markets is imported. About 20% of rural utilization is imported. Variation in supplies of sorghum from neighboring countries, as well as production in Rwanda is therefore very important in maintaining stable sorghu prices and consumption.

Less than 7% of farm families provide over 70% of the sorghum sold by net sorghum sellers. The farms in this group have the largest farms and harvest the greatest total crop output per capita measured in kilocalories. These families would benefit most from a fixed floor price policy. Indications are that most of them are not likely to increase aggregate crop production in response to price support programs given current production technology.

Two thirds of rural households are net sorghum purchasers. Small net purchasers appear to be the most at risk in terms of inadequate food supply. Small net purchasers are most likely to consume sorghum they purchase as sorghum, not beer. Larger net purchasers buy more sorghum for beer making purposes. A sorghum price increase will hurt all households which purchase sorghum, and it may hurt the nutritional status of the already poorly nourished most. Given this information, the World Food Program is probably correct in distributing its food aid as sorghum flour, since sorghum flour cannot be converted to sorghum beer.

Kigali has the highest per capita production of sorghum. Kigali is the only prefecture in which the rural population sells significantly more sorghum than it buys.

The private marketing system appears to be functioning well. The study uncovered no evidence to support the claim that merchants are making unfair profits on sorghum. The private sector is providing the following valuable services:

1. Transfer of sorghum from rural Kigali to other areas.
2. Transfer of sorghum from neighboring countries to Rwanda.
3. Assembly of the very small lots of sorghum marketed by farmers.
4. Distribution of sorghum to consumers.
5. Provision of inputs for an important small scale rural income generating activity (beer making).

While not providing conclusive evidence, the body of data presented in this document raise serious questions about the economic feasibility and justification for government programs intended to support prices above market levels, or the use of a stocks program to stabilize prices of sorghum.

ANNEX I: MONTHLY SORGHUM PURCHASES AND SALES BY PREFECTURE

Table A1
 QUANTITY OF SORGHUM GRAIN (METRIC TONS) BOUGHT BY RURAL RWANDANS
 1986 AGRICULTURAL YEAR

	85					86					TOTAL		
	NOV	DEC	JAN	FEV	MAR	AVR	MAI	JUN	JUL	AOU		SEP	OCT
BUTARE	444	509	633	689	611	633	381	322	637	237	365	228	5690
BYUMBA	470	379	535	640	593	687	517	533	711	539	247	946	6798
CYANGUGU	256	258	237	195	166	126	202	128	237	232	141	222	2401
GIKONGORO	1169	1593	1465	2282	1656	1579	1510	1468	1622	2511	1121	1225	19201
GISENYI	412	499	233	183	230	198	144	271	410	433	428	211	3652
GITARAMA	317	533	502	595	459	398	451	249	349	354	380	259	4846
KIBUNGO	866	672	479	366	399	301	457	604	892	634	388	304	6361
KIBUYE	1533	574	494	569	363	503	475	566	650	626	1026	912	8291
KIGALI	100	235	295	293	227	306	226	108	1481	505	166	321	4264
RUHENGERI	235	531	405	511	448	381	242	372	351	239	278	334	4328
RWANDA	5802	5783	5280	6323	5152	5113	4603	4623	7342	6310	4540	4961	65832

SOURCE: Estimates by the Agricultural Survey and Statistics Service, Rwandan Ministry of Agriculture.

NOTE: QUANTITIES BOUGHT FOR RESALE NOT INCLUDED, UNLESS THEY WERE TO BE SOLD IN THE FORM OF SORGHUM BEER. GERMINATED SORGHUM AND SORGHUM FLOUR NOT INCLUDED.

Table A2
 QUANTITY OF SORGHUM GRAIN (METRIC TONS) BOUGHT BY RURAL RWANDANS
 1ST SEASON 1987

	1986			1987				
	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
BUTARE	548	429	574	1155	754	985	1290	787
BYUMBA	284	558	295	559	1027	907	461	722
CYANGUGU	141	179	118	145	169	157	153	185
GIKONGORO	1061	1291	809	1054	1334	1655	1131	1224
GISENYI	261	205	148	373	358	243	174	287
GITARAMA	312	329	522	578	715	552	502	529
KIBUNGO	370	362	510	358	555	536	649	452
KIBUYE	627	430	614	517	469	580	542	364
KIGALI	145	154	227	462	561	208	496	166
RUHENGERI	262	274	440	535	306	348	372	437
RWANDA	4012	4210	4256	5737	6248	6171	5771	5152

SOURCE: Estimates by the Agricultural Survey and Statistics Service, Rwandan Ministry of Agriculture.

NOTE: Quantities bought for resale not included, unless they were to be sold in the form of sorghum beer. Germinated sorghum and sorghum flour not included.

Table A3
 QUANTITY OF SORGHUM GRAIN (METRIC TONS) SOLD BY RURAL RWANDANS
 1986 AGRICULTURAL YEAR

	85		86										TOTAL
	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	
BUTARE	104	97	172	7	21	2	20	65	662	874	382	247	2654
BYUMBA	322	222	590	1212	1668	73	212	213	352	279	395	332	5869
CYANGUGU	27	2	3		90				28	32			182
GIKONGORO			34	2					39	143	7	2	226
GISENYI				216	38	41	3	7	23		3		332
GITARAMA	117	71	88	50	38	60	39	54	562	682	352	71	2185
KIBUNGO	494	448	509	364	293	242	205	232	321	1091	535	1825	6560
KIBUYE	8								33	103	4	2	150
KIGALI	485	1859	201	199	59	55	237	582	2034	4125	2542	1190	13568
RUHENGERI	12		3	171	277	164	178	21	144	155	188	45	1359
RWANDA	1570	2698	1600	2221	2485	638	894	1174	4200	7484	4407	3713	33084

SOURCE: Estimates by the Agricultural Survey and Statistics Service, Rwandan Ministry of Agriculture.
 NOTE: Quantities not produced on the farm not included.

Table A4
 QUANTITY OF SORGHUM GRAIN (METRIC TONS) SOLD BY RURAL RWANDANS
 1ST SEASON 1987

	1986		1987					
	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
BUTARE	94	159	144	15	62		.	16
BYUMBA	93	156	311	1299	1890	187	191	353
CYANGUGU					17	20		10
GIKONGORO	2		13					
GISENYI				217	13	8	35	
GITARAMA	50	135	26	68	63	45	69	48
KIBUNGO	431	581	79	307	104	190	170	33
KIBUYE	13							
KIGALI	359	317	99	79	138	58	164	125
RUHENGERI			52	520	294	462	130	166
RWANDA	1043	1349	724	2505	2581	970	759	750

SOURCE: Estimates by the Agricultural Survey and Statistics Service, Rwandan Ministry of Agriculture.

NOTE: Quantities not produced on the farm not included.