

PD-ABJ-162^{CD/E}
15N 87844

**USAID SOFALA RURAL REHABILITATION PROJECT
PROJECT IMPACT SURVEY**

NOVEMBER 1993

Prepared for

**Food for the Hungry International
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February 1, 1994

FHI SOFALA RURAL REHABILITATION PROJECT IMPACT SURVEY

I. INTRODUCTION

Since August 1990, the USAID funded Sofala Rural Rehabilitation Project (SRRP) has provided assistance to family and small scale commercial farmers within Sofala Province. Through trying times, including periods of insurgency and severe drought, the project has provided farmers with crop seeds, agricultural implements, agricultural extension and training, and assistance with small scale agricultural related enterprises. Initially the program provided assistance to three districts: Dondo, Nhamatanda, and Marrromeu. Additional assistance in the form of emergency seed and tools distributions were later made in Buzi District. In June of 1993 the program was expanded to include extension assistance to Buzi District, plus extension assistance and emergency seed and tool distributions to Gorongoza District. In July and August of 1991, FHI enlisted the assistance of an outside consultant to conduct a baseline social and economic impact survey to gather specific data to be used as benchmarks to measure the projects impact in the future and to gather information useful for determining future interventions.

In November of 1993 FHI conducted a follow up survey to the 1991 survey with the following objectives:

- 1) To measure project impact by gathering and comparing specific benchmark data with data gathered in the 1991 baseline survey.
- 2) To gather additional data not included in the 1991 survey, to document actual conditions and practices specifically related to agricultural production and agricultural extension activities.
- 3) To gather data to assist in evaluating the impact of SRRP activities in areas where data gathered in the 1991 baseline survey was inadequate for the task.

Like the 1991 baseline survey, the current survey focuses on the districts of Dondo, Marrromeu, and Nhamatanda. Data was gathered from 454 households in 13 accommodation centers and villages within the three districts which are further defined under the section on Sampling Methodology. Further surveying being conducted in the districts of Buzi and Gorongoza at the time of writing this report will be analyzed and presented later in a separate report.

Extension Assistance

73.1% of respondents reported having received extension assistance from the SRRP, in terms of the general population this would indicate that approximately 10,300 families were reached. Each Assistant Extensionist reached an average of 464 families per year, with an average of 4.47 visits per family per month. FII assisted farmers adopted an average of 2.79 of seven improved practices promoted by extension staff, compared to an adoption rate of 0.98 by unassisted farmers living in the same villages or centers.

Of respondents who reported receiving FII extension assistance, 93.2% said they have obtained higher yields by following the advise of extensionists. Contrasting the FII assisted center of Nharuchonga with the neighboring but unassisted center of Rua Domingos, 75% of Nharuchonga farmers sold produce from their fields compared with only 20.7% of Rua Domingos farmers.

The greatest perceived problem of farm families interviewed is that of insect and rodent pests (reported by 71% of respondents).

Conclusion

The survey indicates that full rehabilitation of the rural sector economy in Sofala Province is far from being achieved; at the same time the survey also shows a marked improvement in the socio-economic conditions, especially given the short period since the cessation of conflict and the end of the drought. Encouraged by the progress and challenged by the work yet to be done FII intends to intensify its efforts to assist Sofala Province to a rapid and healthy recovery.

Sources of Cash Income

As found in the 1991 baseline survey, a high percentage farm families generate income in Nhamatanda and Dondo districts through deforestation related activities. 35.3% of farmers reported sales of field crops as a source of cash income. Of farmers who raise vegetable crops, 39% reported income from vegetable sales. Small animals remain of little importance due to low livestock numbers, an exception is the sale of chickens in Marromeu District where 22.7% of farmers report sales.

Land Under Cultivation

65% of respondents reported increasing their cultivated land holdings in the past year, with average farm families holding between 1 - 2.5 hectares.

Major Food Crops

The survey identified the major subsistence food crops for each district and village, important information for extension and research planning. Throughout the three districts the most important food crop is maize, followed by sorghum. Among legume crops groundnuts and cowpeas are most widely planted, while sweet potato and cassava are the major tuber crops.

Vegetable Production and Crop Yields

72.8% of respondents reported having produced vegetables in 1993, compared with only 54.5% three years previous. Most important vegetables produced are tomatoes, collard greens, onions, lettuce, and chili peppers -- in that order.

Crop yields were under reported by most respondents in this survey as verified through previous physical sampling and project records.

Seed Source

83.8% of all respondents reported receiving seeds from FHI during the 1991-92 cereals season and the 1993 vegetable season. During the same period 53.6% of respondents in Nhamatanda district reported donations as their sole source of seeds. 30.4% of respondents reported having purchased seeds, while 20.8% obtained seed from their own fields.

Small Animal Production

66.7% of respondents own small animals, primarily chickens and ducks. Less than 10% of families reported owning goats, pigs, or rabbits.

EXECUTIVE SUMMARY

The SRRP Project Impact Survey was conducted to help measure project impact by gathering current data for comparison with data collected in a baseline survey conducted 1991. In addition this survey gathered information not included in the earlier survey, primarily related to agricultural production and agricultural extension activities. The survey focuses on the districts of Dondo, Marroneu, and Nhamatanda. Data was gathered from 454 households in 13 different accommodation centers and villages. The 454 households surveyed represent a sample of 2.99% of the target population.

Population Movements

The survey shows that the population served by the SRRP has been and continues to be in flux, indicating that future plans for SRRP assistance must allow flexibility to either shift assistance to areas where people are likely to return, or to other areas of equal need within Sofala Province.

Family Size and Average Age Distribution

Within the survey area the median family size is 6 persons per family, with an average of 2.7 school age children in each household. As only 36.7% of school age children attend school, extension methodologies which target children not in schools may have substantial benefit.

Socio-Economic Conditions

The overall picture is generally one of improving economic conditions. Ownership of small animals has increased since 1991, purchases of relative expensive items such as high protein foods and clothes have increased in all three districts. Average land holdings under cultivation have nearly doubled in all districts. Based on an average index of household possessions Dondo district enjoys the best economic conditions of the three districts, while Marroneu district shows the least economic development.

School Age Children Attending School

Only 36.7% of school age attend schools. The study found no significant statistical difference between the mean number of school age children attending school between the three districts surveyed. In the villages of Luabo, 25 Junho, and Matilde of Marroneu district the situation is particularly appalling with only 17.4% of school age children attending school.

DEFINITION OF TERMS AND ABBREVIATIONS

FI	Food for the Hungry, International
USAID	United States Development Agency
RRP	Sofala Rural Rehabilitation Project
RS	1991 Baseline Study
IP	Index of Household Possessions
DD	Rua Domingos Accommodation Center
GA	Mhambonga Accommodation Center
IFM	Integrated Pest Management
PA	Provincial Agriculture Directorate
DA	District Agriculture Directorate
IA	National Institute of Agricultural Investigation
CMC	National Seed Company of Mozambique
	Agricultural
	versus
	square
	vegetables)
	Mhambanda District
	percentile

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1.4 Sampling Methodology

The 454 households surveyed represent a sample of 2.99% of the total target population. In the smaller population centers, our samples generally approached or exceeded 5%. However in the larger centers, due to time constraints and the need to get our extension staff back in the field for the start of the cereals planting season, we settled on samples of 50 households. While we would have preferred an overall sample of 5% we feel that our sample size gives us reasonably accurate estimates, except where sample numbers below 25 require greater caution in generalizing.

(Note: of those interviewed 37% were male, 46.1% female, and in 16.9% of cases both male and female were present and responded to interview questions. 86.1% of families interviewed said a male was the head of the family, while 13.9% said the family was headed by a woman.)

1.5 Population and Sample Size

The total number of families residing in each center at the end of October 1993, the sample size taken from each center, and the percentages of the population sampled are given in the table below.

	Total Number of Families	Number of Families Interviewed	% of Total Families Interviewed
Dondo			
Macharote	2753	50	1.82
Mafarinha	872	50	5.73
Bloco 9	1698	51	3.00
Sub-total	5323	151	2.84
Marronen			
Baliera	285	14	4.91
Chueza	1071	49	4.58
Sacasse	566	29	5.12
Rama-Rama	296	15	5.07
Luabo/Matilde/	181	10	5.52
Sub-total	2399	117	4.88
Nhamatanda			
Jasse	1766	50	2.83
Nharuchonga	265	16	6.04
Nhampoca	1265	50	3.95
Ramos	3105	55	1.77
Muda	1053	15	1.42
Sub-total	7455	186	2.49
TOTAL	15177	454	2.99

II PRESENTATION AND ANALYSIS OF DATA

I Population Movement

Since the Social and Economic Impact Survey of 1991, populations within the centers of FIII activity have fluctuated up and down. At the peak of the drought and with armed conflict raging accommodation centers burgeoned. Later, following the signing of the Rome Peace Accords and the end of the drought emergency, people have flowed both in and out of accommodation centers as family members seek to reunite.

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1.1 Population Change Over Time

The table below details population by district and center recorded in October 1991 and October 1993, and difference from 1991 to 1993.

	Families 1991	Families 1993	Difference
Dondo			
Macharote	2716	2753	37
Mafarinha	1068	872	-196
Bloco 9	1254	1698	444
Savanne	1600	0	-1600
Sub-total	6638	5323	-1315
Marrromen			
Baliera	640	285	-355
Chueza	670	1071	401
Sacasse	952	566	-386
Rama-Rama	268	296	28
Matilde/Luabo/ 25 de Junho	292	181	-111
Sub-total	2822	2399	-423
Nhamatanda			
Jasse	1076	1766	690
Nharuchonga	220	265	45
Nhampoca	456	1266	810
Ramos	347	3105	2758
Muda	137	1053	916
Sub-total	2236	7455	5219
TOTAL	11696	15177	3481

As seen in the previous table, in cases such as Savanne Accommodation Center the entire population left the center to return to their home of origin. In other cases, such

as Muda Accommodation Center, recent arrivals from Malawi have led to a rapid and recent increase in the population.

1.2 Return to Home of Origin -- by District

The table below displays the percentage of the population by district which may still return to home of origin.

DISTRICT	% of Population Still Expecting to Return to Home of Origin	% of Population Still Unsure to About Return to Home of Origin
Dondo	25.0	18.2
Marroneu	35.0	3.4
Nhamatanda	47.5	24.6

1.3 Return to Home of Origin -- by Center

The table below displays the percentage of the population by center which may still return to home of origin.

Center	% of Population Still Expecting to Return to Home of Origin	% of Population Still Unsure to About Return to Home of Origin
Baliera	57.1	7.1
Bloco 9	18.0	16.0
Chueza	0	0
Jasse	38.0	34.0
Luabo/Matilde/25 Junho	40.0	0
Macharote	45.8	37.5
Mafarinha	12.0	2.0
Muda	28.6	50.0
Nhampoca	64.6	14.6
Nharuchonga	43.8	18.8
Rama Rama	53.3	2.6
Ramos	47.3	20.0
Sacasse	12.7	1.3

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As can be seen in the preceding tables (1.2 and 1.3), 72.1% of the population of Nhamatanda either expect to return to their homes of origin or are yet undecided, while in Dondo and Marromeu the figures are 43.2% and 38.9% respectively. Among centers Macharote has the highest % of households expecting to return home or yet unsure (83.3%), followed by Nhampoca (79.2%), Muda (78.6%) and Jasse 72.0%). On the other end of the scale, the majority of the populations of Chueza, Mafarinha, and Sacasse intend to remain in their present locations. *For planning of on-going extension programming, expected population movements should be carefully considered.*

2 Family Size

2.1 Family Size by Center

Center	n =	Mean	Min.	25%ile	Median	75%ile	Max.
Baliera	14	6.57	3.00	6.00	6.00	8.00	10.00
Bloco 9	51	5.67	1.00	4.00	6.00	7.00	15.00
Chueza	49	6.47	2.00	5.00	6.00	8.00	20.00
Jasse	50	6.10	2.00	4.00	5.00	8.00	12.00
Luabo/oth.	10	6.20	4.00	5.00	7.00	7.00	7.00
Macharote	50	5.90	1.00	4.00	6.00	8.00	11.00
Mafarinha	50	5.72	1.00	4.00	6.00	7.00	12.00
Muda	15	10.0	3.00	6.00	10.00	14.00	21.00
Nhampoca	50	5.34	1.00	3.00	5.00	7.00	12.00
Nharuchonga	16	8.06	2.00	6.00	7.50	9.00	25.00
Rama-Rama	15	6.13	4.00	5.00	6.00	6.00	11.00
Ramos	55	8.11	2.00	5.00	7.00	10.00	20.00
Sacasse	29	5.45	2.00	4.00	5.00	7.00	11.00

The data shows the mean family size for most centers to lie between 5 and 7 family members per household. Notable exceptions are the centers of Muda, Nharuchonga, and Ramos which report significantly larger family sizes per household. We were unable to ascertain exactly why average family sizes in these three centers are larger than in other centers.

2.2 Family Size by District

District	n =	Mean	Min.	25%ile	Median	75%ile	Max.
Dondo	151	5.762	1.0	4.0	6.0	7.0	15.0
Marromeu	117	6.162	1.0	4.0	6.0	7.0	20.0
Nhamatanda	186	6.973	1.0	5.0	6.0	7.0	25.0

The average family size for the 454 families sampled is 6.3 persons, compared with 6.2 persons in the 91BS. District averages compared with district averages during the 1991 study are as follows:

<u>District</u>	<u>1991</u>	<u>1993</u>	<u>Difference</u>
Dondo	6.7	5.8	-0.9
Marromeu	4.5	6.2	+1.7
Nhamatanda	6.7	7.0	+0.3

In the face of conflicting and unclear data trends, it is only possible to speculate as to the reasons for the drop in mean family size in Dondo and the increase in mean family size in Marromeu. It is probable that both the drop in Dondo and the increase in Marromeu are at least in part related to security issues. While people have moved in and out of both districts in large numbers since the signing of the Rome Peace Accords, the trend in Dondo District appears to be for extended families to split apart as some members leave to more remote and now secure areas seeking to reestablish themselves in their homes of origin. In Marromeu District increased security has made it possible for many families from Renamo areas to return to Marromeu and reunite with extended family, thereby increasing family size per household.

34 Average Age Distribution Per Household

The average number of children under age 5 per household has changed significantly since the baseline survey of 1991. However, decreases within this group do not appear to be linked to security issues and infant mortality rates as suggested in the 1991 survey. For instance, the average number of children under age 5 per household in Mafarinha dropped from 1.8 in 1991 to 0.8 in the current survey. Yet Mafarinha has been among the most secure centers and has the second highest socio-economic index of all centers in our current study. Perhaps a more reasonable explanation for these changes resides in normal cyclic variations of birthrates and/or population movements in and out of centers. While it would be interesting find the actual reason(s) for this fluctuation, it is beyond the scope of this survey. The data collected by district and center is presented in the table which follows.

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	Age 0 to 5	6 to 17	18 to 56	57+
Dondo				
Macharote	1.1	2.7	2.0	0.2
Mafarinha	0.8	2.4	2.1	0.2
Bloco 9	1.4	1.9	2.3	0.1
Average	1.1	2.3	2.1	0.2
Marromeu				
Baliera	1.2	3.0	2.1	0.2
Chueza	1.4	2.6	2.1	0.2
Sacasse	1.2	2.0	2.2	0.1
Rama-Rama	1.7	2.2	2.3	0.0
Luabo/Matilde/ 25 de Junho	1.7	2.1	1.7	0.2
Average	1.4	2.4	2.1	0.1
Nhamatanda				
Jasse	1.2	2.6	2.7	0.2
Nharuchonga	2.0	3.3	2.4	0.4
Nhampoca	0.9	2.1	2.4	0.1
Ramos	1.8	3.9	2.3	0.3
Muda	1.7	4.5	3.1	0.6
Average	1.5	3.3	2.6	0.3
TOTAL AVERAGE 1993	1.3	2.7	2.3	0.2
TOTAL AVERAGE 1991	1.4	2.2	2.4	0.2

4.1 Rooms per household by District

District	n =	Mean	Min.	25%ile	Median	75%ile	Max.
Dondo	151	2.57	1.0	2.00	2.00	3.00	9.00
Marromeu	117	2.20	1.0	1.00	2.00	3.00	9.00
Nhamatand	178	2.30	1.0	1.00	2.00	3.00	8.00

Average rooms per household has increased in all districts over the data gathered in the 1991 baseline survey. Specific increases by district are as follows: from 1.8 rooms to 2.6 rooms in Dondo; from 1.4 rooms to 2.2 rooms in Marromeu, and from 2.0 rooms to 2.3 rooms in Nhamatanda. This would appear to be a result of both greater security and greater economic means among the survey population. Greater economic means is impossible to prove by comparing the socio-economic index of the 1991 survey with the current survey because no record was left of how points were given in the 1991 survey. However, increased purchases of expensive items in 1993 such as high protein foods, clothing and cloth, sugar, and other consumables as well as other economic indicators clearly indicate improving economic circumstances. These indicators are discussed in the sections which follow.

3.2 Rooms per household by Center

Center	n =	Mean	Min.	25%ile	Median	75%ile	Max.
Baliera	14	2.36	1.00	2.00	2.00	3.00	3.00
Bloco 9	51	2.57	1.00	2.00	2.00	3.00	9.00
Chueza	49	2.43	1.00	1.00	2.00	3.00	9.00
Jasse	43	2.14	1.00	1.00	2.00	3.00	5.00
Luabo/oth.	10	1.30	1.00	1.00	1.00	1.00	3.00
Macharote	50	2.14	1.00	1.00	2.00	3.00	6.00
Mafarinha	50	3.00	1.00	2.00	3.00	4.00	5.00
Muda	15	3.87	1.00	3.00	4.00	4.00	8.00
Nhamapoca	49	1.94	1.00	1.00	2.00	2.00	6.00
Nharuchonga	16	2.81	1.00	2.00	3.00	3.00	6.00
Rama-Rama	15	2.07	1.00	1.00	2.00	3.00	5.00
Ramos	55	2.16	1.00	1.00	2.00	2.00	7.00
Sacasse	29	2.10	1.00	1.00	2.00	2.00	6.00

In most instances, rooms per household is up from the 1991 survey. The only exceptions are Sacasse where average rooms per household remained the same, and Ramos where average rooms per household decreased from 3.4 in 1991 to 2.16 in the current survey. The probable cause for the decrease in Ramos is an influx of 2758 people into the center since the 1991 survey, largely from the Renamo area of Maringue which was severely impacted by drought and war. Indeed, this is by far the largest influx reported among all centers. It is probable that many of the households which arrived after the 1991 survey have not yet had the same opportunity to establish themselves as have households in other centers.

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3.3 Average Index of Household Possessions by District

Within the survey people were asked the quantities they owned of the following items, radios, tables, chairs, beds, plates, pots, cups, bicycles, and others. Some of these items were given a weighted numerical value to derive an index of household possessions, the ranking system used is detailed in Appendix A. As mentioned previously, the baseline survey report of 1991 did not specify how these items were numerically ranked in that survey, hence no direct comparison can be made between the index of household possessions from that survey, and the data obtained from this survey. The data does however give us a means to superficially compare economic levels between individual districts and centers.

District	n =	Mean	Min.	25%ile	Median	75%ile	Max.
Dondo	151	6.76	0	3	6	10	17
Marromeu	117	2.30	0	1	2	3	14
Nhamatanda	186	4.06	0	2	3	6	15

* Differences between means of all districts are significant at the $p < 0.01$ level. As shown in the table above, Dondo District has the highest number of household possessions, as it did at the time of the 1991 survey. Nhamatanda District falls into second place, and Marromeu District brings up the rear, again as at the time of the 1991 survey. Marromeu has been and remains the most remote of the three districts. Until recently it remained virtually isolated from outside markets as roads were mined and river transport to and from Chinde was irregular at best. The recent opening of the road linking Marromeu to the Beira corridor, new access to markets, and current FHI food for work activities should result increased cash income and a higher index of household possessions in the future.

3.4 Average Index of Household Possessions by Center

Center	n =	Mean	Min.	25%ile	Median	75%ile	Max.
Baliera	14	2.14	0	2	2	2	8
Bloco 9	51	6.31	1	2	6	9	17
Chueza	49	2.80	0	1	2	4	14
Jasse	50	3.68	0	2	2	6	12
Luabo/oth.	10	2.20	1	1	1	3	5
Macharote	50	4.88	0	0	3	7	12
Mafarinha	50	9.10	1	1	5	13	16
Muda	15	6.73	1	1	3	8	15
Nhampoca	50	2.78	0	1	2	3	13
Nharuchonga	16	5.94	1	2.5	5	9	12
Rama-Rama	15	1.67	0	1	1	2	7
Ramos	55	4.29	0	2	4	6	12
Sacasse	29	1.90	0	1	2	2	6

Mafarinha has the highest index of household possessions, followed by Muda and Bloco 9. It is worth noting that the index for Muda is as high as it is due in part to distributions of pans and other household goods to returning refugees from Malawi by one or more international aid organizations. At the bottom of the index list are Rama-Rama and Sacasse centers in Marromeu District. In general, this index closely parallels that of the 1991 survey.

3.5 School Age Children Attending Schools

Within the survey sample of three districts, only 36.75% of school age children currently attend school. The worst situation with regard to education of school age children is in the Luabo/25 de Junho/Matilde area of Marromeu, in which the mean percentage of school age children attending school is only 17.4% and the maximum percentage of school age children attending school within any one family is 50%. Overall the situation is appalling. *With literacy rates as reported in the 1991 survey reporting an overall literacy rate of 27.1% (only 1.3 literate persons per household) and current low percentages of children in schools, it is apparent that extension methodologies should generally avoid wordy printed materials and be geared to highly visual and practical methodologies.*

3.5.1 % School Age Children Attending Schools by District

District	n =	Mean	Min.	25%ile	Median	75%ile	Max.
Dondo	119	37.87	0	0	33	75	100
Marromeu	101	39.12	0	0	33	66	100
Nhamatanda	168	34.53	0	0	21	60	100

Differences between districts are not statistically significant (p-value = 0.618)

3.5.2 % School Age Children Attending Schools by Center

Center	n =	Mean	Min.	25%ile	Median	75%ile	Max.
Baliera	13	39.85	0	0	33	66	100
Bloco 9	46	24.93	0	0	0	50	100
Chueza	40	47.37	0	0	50	83	100
Jasse	47	19.38	0	0	0	50	100
Luabo/oth.	10	17.40	0	0	12.5	33	50
Macharote	40	45.57	0	0	50	80	100
Mafarinha	33	46.54	0	0	50	100	100
Muda	14	39.57	0	0	41.5	66	100
Nhampoca	43	33.07	0	0	0	66	100
Nharuchonga	15	40.07	0	0	33	60	100
Rama-Rama	15	26.60	0	0	0	50	100
Ramos	49	47.20	0	0	50	100	100
Sacasse	23	41.96	0	0	33	100	100

3.6 Sources of Household Cash Income (excluding agricultural field crops)

DISTRICT	% CH	% W	% F	% L	% H	% SL
Dondo	2.6	30.5	10.6	41.7	23.8	25.2
Marromeu	0.9	10.3	29.3	2.6	53.4	31.0
Nhamatanda	35.7	38.7	21.0	6.0	55.4	10.8

CH = making and selling charcoal

W = cutting and selling firewood

F = fishing

L = labor, employment

H = hawking, buying & selling goods

SL = sells "nipa" (home liquor)

In Marromeu, the percentage of households in deriving cash income from labor was 46.6% at the time of the 1991 survey, this number has dropped to only 2.6% in 1993.

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This drop is largely due to the closure of the Sena Sugar Mill in Marromeu. The percentage of households in Nhamatanda district earning cash income from labor also dropped significantly, from 26.2% in 1991 to only 6.0% by October 1993. We have not yet determined the reason for this drop. In contrast, cash income earned through labor in Dondo district has increased from 26.2% in 1991, to 41.7% by October of 1993.

Deforestation related activities continue to provide an important source of cash income for many farm families in Nhamatanda and Dondo districts.

Other income generating activities mentioned include making of baskets and mats, selling services as a "curandiero" or traditional healer, and selling grass for roofing. Three families interviewed reported selling donated goods as a source of income. One person mentioned a unique business to obtain cash income, that of selling wine and rats, a reminder that rats were observed as being an important source of protein for many farm families.

3.7 Cash Income Related to Sales of Field Crops and Small Animals

DISTRICT	% SV	% SP	% SC	% SA
Dondo	23.2	22.5	3.3	2.6
Marromeu	23.3	46.6	22.7	4.6
Nhamatanda	19.3	38.7	3.8	1.6

SV = sells vegetable crops

SP = sells other crops (primarily cereals)

SC = sells chickens

SA = sells animals (other than chickens)

The 1991 survey report failed to mention data related to sales of crops and small animal species, yet in our current survey 11% of respondents reported sales of crops and small animals as their sole source of cash income. Furthermore of the surveyed population 21.5% obtained cash income from the sale of vegetable crops and 35.3% from sale of other crops -- primarily cereals. At the present time the sale of small animal species is relatively unimportant, with the exception of chickens which provided cash income for 22.7% of those surveyed in Marromeu district.

3.8 Most Common Purchases Reported for 1991 and for 1993

A comparison between data from the 1991 survey and the Oct. 1993 survey indicate strengthening economic conditions as the percentage of the population purchasing high protein foods, salt, clothes and cloth, soap, cooking oil, sugar, vegetables, and maize flour increased significantly for each category of goods. Of the three districts, Marromeu appears to have shown the least overall improvement, perhaps due in part to the closure

of Sena Sugar and the isolation of Marromeu which resulted in low availability of goods and high prices.

3.8.1 Tables of Most Common Purchases Reported for 1991 and 1993

District	PROT 91	PROT 93	SALT 91	SALT 93	CLOTH 91	CLOTH 93	SOAP 91	SOAP 93
Dondo	68%	99%	52%	83%	48%	66%	37%	62%
Marromeu	42%	56%	84%	78%	60%	68%	33%	47%
Nhamatanda	82%	96%	46%	75%	37%	69%	25%	61%
TOTAL AVERAGE	43%	84%	61%	79%	48%	68%	32%	57%

District	OIL 91	OIL 93	SUGAR 91	SUGAR 93	VEGES 91	VEGES 93	MEAL Y 91	MEAL Y 93
Dondo	35%	73%	29%	56%	26%	69%	30%	61%
Marromeu	25%	23%	24%	34%	1%	38%	9%	41%
Nhamatanda	25%	50%	18%	47%	40%	51%	5%	39%
TOTAL AVERAGE	28%	49%	24%	46%	22%	53%	6%	47%

PROT = fish, chicken & beans CLOTH = clothing and cloth OIL = cooking oil
VEGES = vegetables MEALY = Maize flour

3.9 Travel -- % of Respondents Who Have Travelled During The Past Year

District	Outside District Only	Inside District Only	Inside & Outside Dist.	Did Not Travel
Dondo	0	0.7	98.7	.6
Marromeu	16.2	27.4	52.1	4.3
Nhamatanda	2.7	1.6	95.7	0

95.2% of respondents reported to have travelled during the past year, compared with 82.3% in the 1991 baseline study. More importantly, 90.8% of all respondents traveled outside of their own district in the current survey, compared with only 60.3% in the 1991 survey. Reasons given for travel include: visits to friends or relatives 91.9%, travel for trade (buying & selling) 41.1%, travel for medical reasons 29.2%, and work 13.5%. Nothing else was reported more than 5% of the time.

4 Agricultural Data

It is important to determine the agricultural resources held by farm families in each geographic area, to investigate agronomic practices which impact yields, and to determine to what extension assistance has been effective in helping farmers improve their agronomic practices and their food supplies. The following data provides some insight into these areas of concern.

4.1 Land Under Cultivation

There has been a significant increase in average land under cultivation by farm families since the baseline study of 1991. This difference is summarized below by district.

	<u>1991</u>	<u>1993</u>
Dondo	0.8	1.5 hectares
Marromeu	0.9	1.7
Nhamatanda	1.0	1.9

Average and median land holdings of farm families surveyed are displayed below in sections 4.2 and 4.3. Differences between means and medians both by district and by center are relatively small. Although the tables show a large disparity between land holdings among a few individual farmers; for example, the minimum land holding in Dondo District of .2 hectares and the maximum land holding in Nhamatanda District of 15 hectares, the interquartile range of the three districts is 1 to 2.5 hectares. Furthermore, 61.7% of all farm families reported land holdings between 1 and 2 hectares.

Centers with the lowest average land holdings are Luabo/Matilde/25 de Junho (1.0 ha), Mafarinha (1.28 ha), and Nhampoca (1.38 ha). Ramos has the highest percentage of farmers with less than one hectare (18.3%), followed by Macharote (15.1%), Mafarinha (14.0%), and Chueza (10.8%). In all other centers over 90% of farmers report land holdings of one hectare or greater.

Asked whether or not they increased their land holdings this past year, 65% said they had. Nhampoca, Bloco 9, Macharote and Mafarinha are the areas in which the least expansion of fields is taking place, yet even in those areas between 40%-50% of families are expanding their fields.

4.2 Land holdings by District (hectares)

District	n =	Mean	Min.	25%ile	Median	75%ile	Max.
Dondo	149	1.5	.2	1.0	1.0	2.0	8.0
Marromeu	114	1.7	.3	1.0	1.5	2.0	9.0
Nhamatanda	165	1.9	.5	1.0	2.0	2.5	15.0

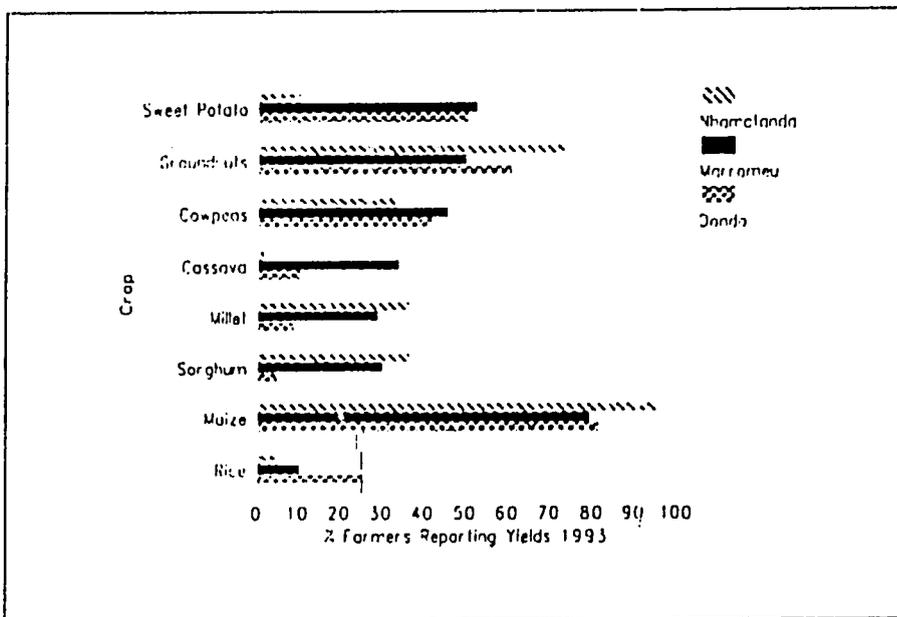
Between districts, only Dondo and Nhamatanda are significantly different at the 0.05% level.

4.3 Land holdings by Center (hectares)

Center	n =	Mean	Min.	25%ile	Median	75%ile	Max.
Baliera	14	2.25	1.0	2.0	2.0	3.0	3.0
Bloco 9	51	1.60	0.2	1.0	1.5	2.0	8.0
Chueza	48	1.98	0.5	1.0	1.0	2.25	9.0
Jasse	46	1.99	0.5	1.5	2.0	2.5	4.2
Luabo/oth.	10	1.00	0.5	1.0	1.0	1.0	1.5
Macharote	48	1.71	0.5	0.75	1.0	2.0	6.0
Mafarinha	50	1.28	0.5	0.5	1.0	1.5	8.0
Muda	15	3.17	0.5	1.0	2.5	4.0	15.0
Nhampoca	48	1.38	0.5	1.0	1.0	1.5	4.0
Nharuchonga	14	2.29	1.0	2.0	2.0	3.0	4.0
Rama-Rama	13	1.77	0.3	1.0	1.5	2.0	7.0
Ramos	42	1.88	0.5	1.0	2.0	2.0	6.0
Sacasse	29	1.35	0.3	0.70	1.5	2.0	3.0

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4.4 Major Food Crops (% of Farm Families Reporting Harvests of each Crop 1993)



In our survey the percent of farm families reporting having harvested each crop during the previous calendar year presented in the table above. Using this information along with reported yields for each crop it is clear that maize is the most important single crop in all three districts. By looking at the percent of farmers producing each crop and the relative yields reported for each crop it is also possible to gain a general ranking of the importance of each crop to farm families in each district.

Dondo: Most important crops: 1) maize, 2) sweet potato, 3) rice
 Most important veg. protein source: groundnuts
 Most important tuber: sweet potato

Marromeu: Most important crops: 1) maize, 2) sweet potato, 3) cassava or rice
 Most important veg. protein source: cowpeas (narrowly over groundnuts)
 Most important tuber: sweet potato

Nhamatanda: Most important crops: 1) maize, 2) groundnuts, 3) sorghum
 Most important veg. protein source: groundnuts
 Most important tuber: sweet potato

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4.5 Vegetable Production

In this sample, 56.8% of all farm families reported producing at least one vegetable crop. Ranking by district is as follows: 1) Marromeu (62.6%), 2) Dondo 59.6%, and 3) Nhamatanda (50.3%). The most frequently produced vegetable is tomato, grown by 87.9% of families reporting to produce vegetables. Following tomato are collard greens (84.6%), onions (83.4%), lettuce (39.3%), and chili peppers (28.7%). Other vegetables listed in order of frequency of times reported are okra, cucumbers, bell peppers, squash, cabbage, egg plant, carrots, garlic, and green beans.

4.6 Vegetable Production and Sales

The table below gives percentages of families reporting to grow vegetables, and the percentage of vegetable producing families which sell vegetables.

Center	% Grows Vegetables	% Sells Vegetables
Baliera	85.7	66.7
Bloco 9	70.6	36.8
Chueza	66.7	37.5
Jasse	34.8	23.5
Luabo/oth.	30.0	66.7
Macharote	60.0	56.7
Mafarinha	48.0	16.7
Muda	93.3	64.3
Nhampoça	55.3	44.4
Nharuchonga	66.7	60.0
Rama-Rama	71.4	20.0
Ramos	40.5	26.3
Sacasse	51.7	20.0

4.7 Crop Yields

As was the case with the 1991 baseline survey, we are certain that crop yields as reported in this survey are so far from reality as to be only marginally useful. Our certainty was confirmed for instance by interviewing farmers in Marromeu whom sold more maize from their fields to FHI this year than they reported having produced in the survey interview.

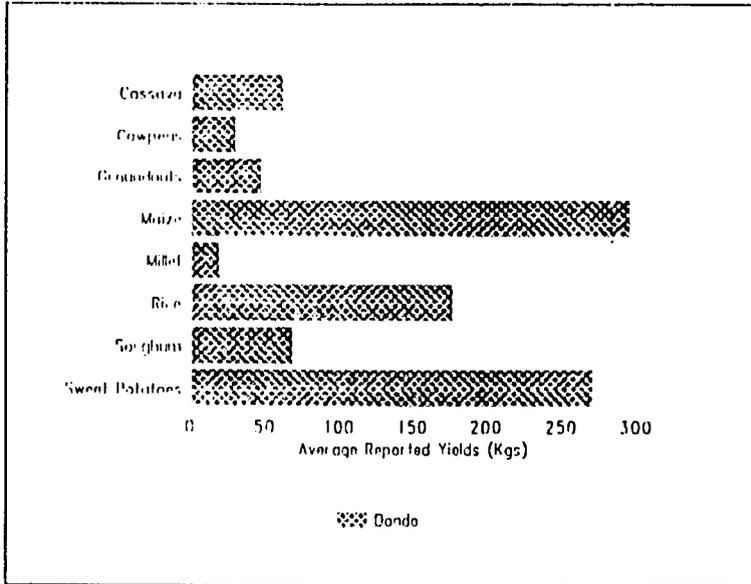
Additionally, in April of 1993 FHI agronomists conducted 144 physical yield samples over randomly sampled 49 sq. meter plots. The report on this study from May 10, 1993 is included in Appendix B. The difference between our physical sample results and the results of this survey are summarized below:

Center	-- Kgs. Maize per Average Farm Family --	
	May Physical Study	November Survey
Mafarinha, Dondo	606	259
Bloco 9, Dondo	375	451
Baliera, Marromeu	3029	250
Nharuchonga, Nham.	1844	1473
Tica/Muda, Nham.	1050	473

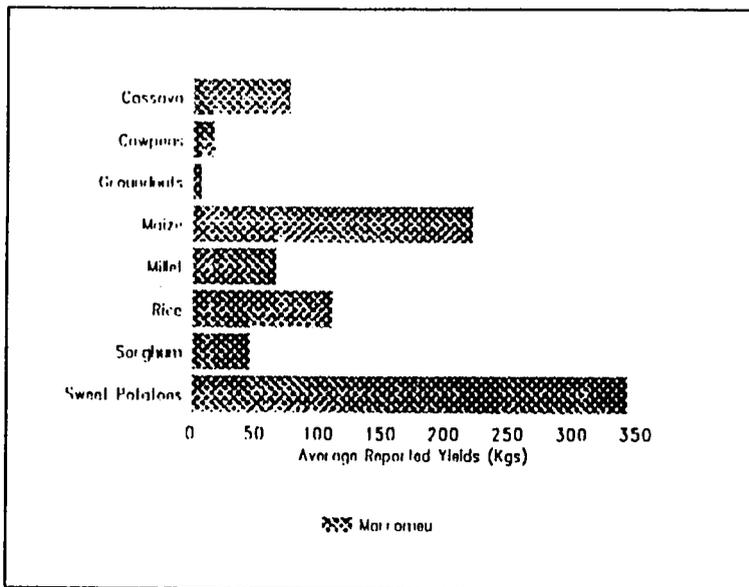
As can be seen above, farmers in Mafarinha reported about only about 43% of their maize production, Baliera 8%, Nharuchonga 80%, and Muda 45%. Only Bloco 9 reported higher yields than observed in our May study, where farmers reported 20% greater production than we observed in our study.

Based on FHI extension staff field observations during 1993 harvests, we are equally convinced that yields for other crops were most often grossly understated. Clearly farmers had a strong incentive to understate their production in hopes of receiving continued free aid in the form of emergency food and seed and tool distributions. Additionally, because of the nature of the harvest and storage operations, many farm families probably do not really know how much of each food type they produced. Having warned readers of our general lack of credibility in the yield data, we present the reported yield data in the figures which follow.

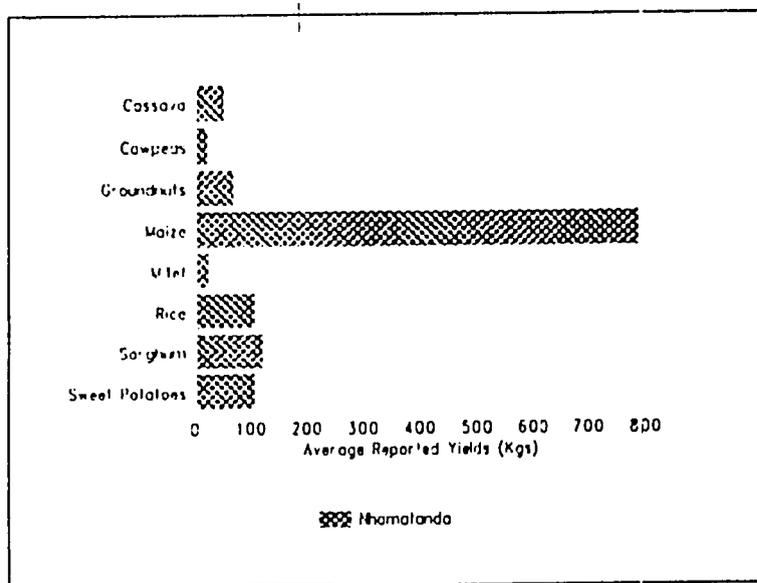
4.7.1 Reported Crop Yields per Farm Family -- Dondo District



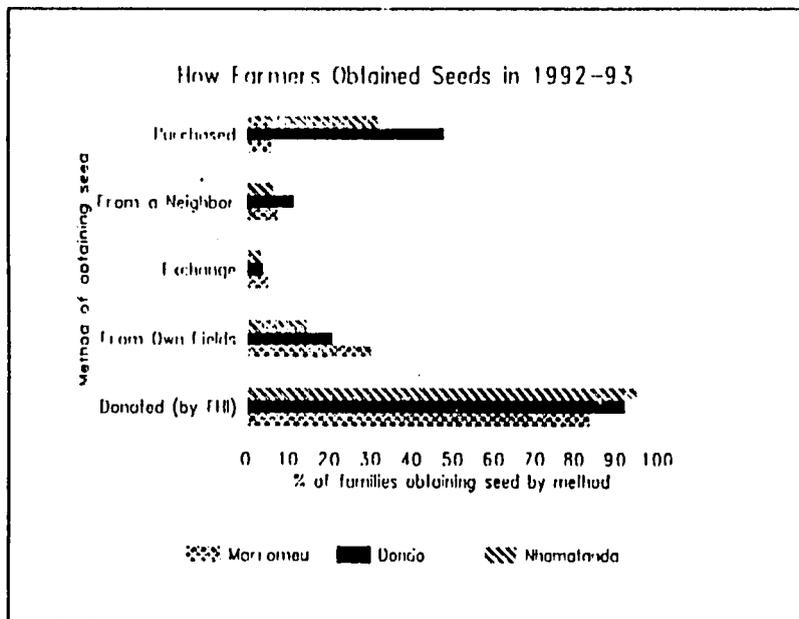
4.7.1.0.1 Reported Crop Yields per Farm Family -- Marroneu District



4.7.2 Reported Crop Yields per Farm Family -- Nhamatanda District



4.8 Seed Source

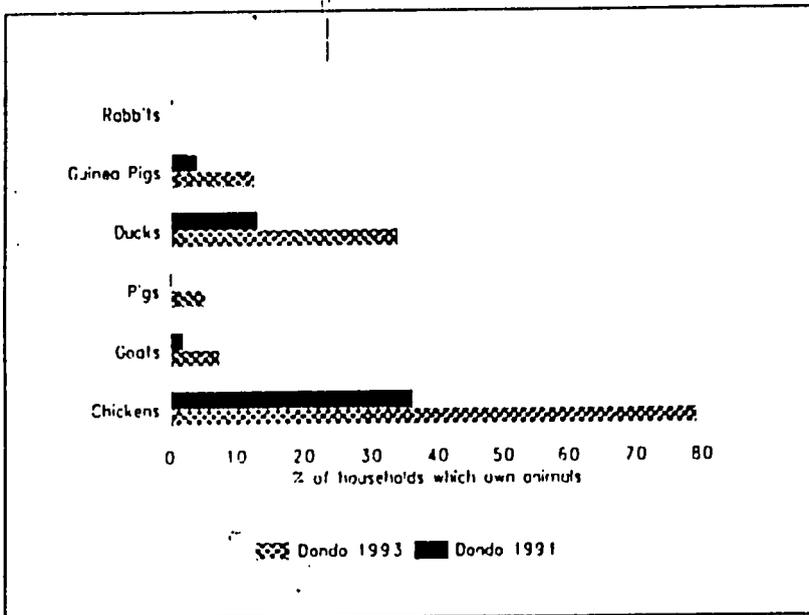


The figure above provides an overview of how farmer families from each district obtained seed for planting from October 1992 through October 1993. In Dondo 34.4% of farmers reported seed donations as their sole source of seed, in Marromeu 46.2%, and in Nhamatanda 53.6%. The highest percentages of those purchasing seeds were in Dondo and Nhamatanda, at 32% and 48% respectively. In Marromeu only 6% of farmers purchased seeds, reflecting perhaps both on purchase power and upon unavailability of seed for sale in the area. When asked whether they purchased seeds three years ago, 42.5% interviewed said yes, compared to an overall 32.4% who purchased seeds in the past year.

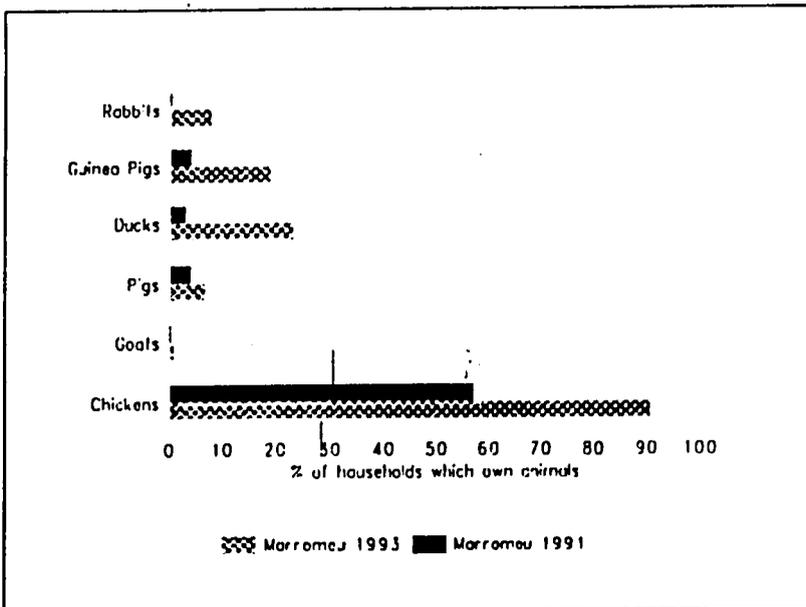
4.9 Small Animal Ownership and Production

Of those interviewed, 66.7% reported to own animals. Of those who own animals, 82.5% own chickens, 5.7% own goats, 8.1% own pigs, 28.8% own ducks, 3.1% own rabbits, and 12.5% own guinea pigs. In addition, 9 families reported to own pigeons.

4.9.1 Average % of Households Which Own Animals -- Dondo District.

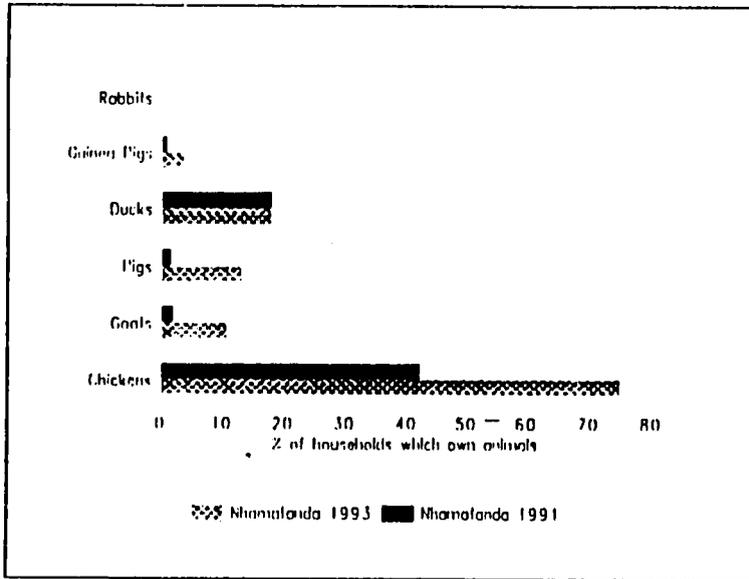


4.9.2 Average % of Households Which Own Animals -- Marromeu Dist.



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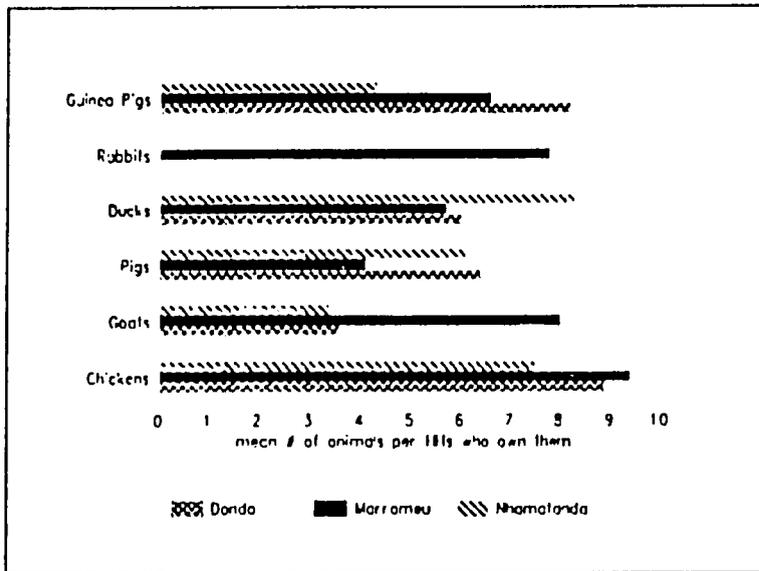
4.9.3 Average % of Households Which Own Animals - Nhamatanda Dist.



As can be seen in the preceding figures, since the 1991 baseline study small animal ownership has increased substantially in each district. Average animal numbers per households who own them are also increasing but are still very low. For instance, the average number of chickens per households who own them is now 8.77, compared with 4.5 in 1991. The maximum number of chickens reported per household was 68 in Nhamatanda District. See table 4.10 which follows.

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4.10 Average Animal Numbers per Households Which Own Them



5 Extension Assistance

Objectives for this section of the survey were to examine the extent to which FHI extension assistance has influenced farmers to adopt improved farming practices, and to evaluate whether or not the adoption of those practices has resulted in increased crop yields, increased food security, increased reliance on own production and markets, and increased number of households with cash income. We were also interested in learning what percentage of the target population has been reached in each district/center, and effectiveness of extensionists in terms of families served per extensionist.

The baseline study of 1991 provides some indicators which are helpful for determining economic changes, but contains little information of value for determining the change in agricultural practices, yields, and food security. Because of a lack of baseline information it was necessary to use a line of questioning which asked farmers to reflect back on three years previously and compare agricultural practices at that time with current agricultural practices. The responses we have received should now serve as baseline information for further studies.

5.1 Population Served

Of the 454 families surveyed, 73.1% stated that they had received extension assistance during the past year, while 29.9% stated they had received no extension assistance. From this data we calculate that of the total 15,117 families in areas served by FHI extensionists in Marrameu, Dondo, and Nhamatanda districts, approximately 10,311 families received extension assistance within the past year.

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5.1.1 Families Receiving FII Extension Assistance

Information given includes total number of families per center in October 1993, the percentage of those families assisted by FII extension staff, the estimated total number of families assisted based on survey results, number of extensionists per center, and the average number of families assisted per extension assistant during the past year.

	Total Families per Center Oct. 1993	% of Families Assisted by FII	Total Families Assisted by FII in 1993	Number of FII Extensionists per Center	Families Assisted per Extensionist
Dondo					
Macharote	2753	70.0%	1927	2	964
Mafarinha	872	86.0%	750	2	375
Bloco 9	1698	56.9%	966	2	483
Sub-total	5323		3643	6	avg. 607
Marromeu					
Baliera	285	100%	285	2	143
Chueza	1071	89.8%	962	2	481
Sacasse	566	89.7%	508	2	254
Rama-Rama	296	100%	296	2	148
Luabo +	181	90%	163	1	163
Sub-total	2399		2213	9	avg. 238
Nhamatanda					
Jasse	1766	56.0%	989	2	494
Nharuchonga	265	87.5%	232	2	116
Nhampoca	1266	74.0%	937	2	468
Ramos	3105	49.1%	1525	2	762
Muda	1053	73.3%	772	1	495
Sub-total	7455		4454	9	avg. 464
TOTAL	15177		10311	24	avg. 464

5.2 Families Served per Extensionist

An average of 464 families were served by each extensionist. The largest ratio of families to extensionist was 964:1 in Macharote while the smallest was 116:1 in Nharuchonga. *This data indicates a possible need to redistribute extension staff members to equalize the load on extensionists and improve outreach; however, factors such as proximity of dwellings and farmers' fields must also be taken into consideration.*

5.3 Number of Extension Visits per Month

Of those families which said they had received extension assistance during the past year 95.6% said they had received a visit at least once during the previous month, while 75.7% reported having received three or more visits during the past month.

5.3.1 Number of Extension Visits per Family per Month by Center

Center	n =	Mean	Min.	25%ile	Median	75%ile	Max.
Baliera	14	5.6	4	4	4	8	10
Bloco 9	26	3.1	0	3	4	4	4
Chueza	44	4.1	0	2	4	4	12
Jasse	25	2.6	0	1	2	4	8
Luabo/oth.	9	5.2	2	3	5	8	10
Macharote	33	5.4	2	4	4	8	12
Mafarinha	40	4.6	0	2.5	4	4	16
Muda	7	6.4	1	4	8	8	12
Nhampxca	37	3.2	0	2	4	4	4
Nharuchonga	14	5.6	1	4	4	8	12
Rama-Rama	15	3.9	1	4	4	4	7
Ramos	27	5.0	0	2	4	8	16
Sacasse	26	3.4	1	2	4	4	7

5.4 Changing Farming Practices

Farmers were asked to compare what they did three years ago against what they do now with regard to 14 specific agricultural practices. Those practices which they performed three years ago would predate any FHI extension assistance. Table 5.41 gives the average percentages of responses obtained to each set of questions, comparing changes made by farmers who received no agricultural assistance with farmers who received extension assistance from FHI. As noted in the table there are few significant differences (@ $p < 0.05$) between practices of farmers three years ago, whether assisted by FHI extensionists or unassisted. In contrast many statistical differences can be seen between assisted and unassisted farmers in 1993. Among important practices, unassisted farmers are significantly less-likely to plant in rows at increased densities, rotate crops, raise vegetables, prepare compost or practice improved organic matter management, prepare and use organic pesticides, or use animal manure. Unassisted farmers are also more likely to burn fields. No statistical difference was found between assisted and unassisted farmers in terms of use of chemical pesticides and chemical fertilizers at the level of $p < 0.10$ (Yates Corrected Chi-Squares).

**5.4.1 Changes in Agricultural Practices -- Assisted vs. Unassisted
Farmers in FHI Assisted Centers**

Farming Practices/Activities	FHI Assisted Farmers	Unassisted Farmers
Burned fields 3 years ago	82.0	78.2
Burn fields now	42.4	58.2**
Planted in lines 3 years ago	27.0	30.9
Plant in lines now (increased plant populations)	90.4	68.2**
Bought seeds 3 years ago	43.0	40.9
Bought seeds this year	30.0	39.1**
Rotated crops 3 years ago	22.4	24.5
Rotate crops now	39.1	23.6**
Intercropped maize/cowpeas 3 years ago	79.3	78.2
Intercrop maize/cowpeas now	59.0	73.6**
Intercropped maize/sorghum 3 years ago	81.4	85.5
Intercrop maize/sorghum now	50.5	74.5**
Intercropped maize/groundnuts 3 years ago	35.6	35.5
Intercrop maize/groundnuts now	23.5	35.5**
Grew vegetables 3 years ago	54.5	53.6
Grow vegetables now	72.8	42.7**
Prepared compost 3 years ago	19.2	20.9
Prepare compost now	50.5	30.9**
Prepared organic pesticides 3 years ago	10.2	19.1
Prepare organic pesticides now	24.8	17.3**
Used chemical pesticides 3 years ago	3.1	1.8
Use chemical pesticides now	7.7	5.5
Used chemical fertilizers 3 years ago	1.2	3.6
Use chemical fertilizers now	5.9	2.7
Used manure as fertilizer 3 years ago	11.1	14.5
Use manure as fertilizer now	19.2	9.1**
Raised animals 3 years ago	80.8	75.5
Raise animals now	65.0	50.9

** Indicates a difference between FHI assisted farmers and unassisted farmers significant at $p < 0.05$.

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5.4.2 Differences Between FHI Assisted Centers & Unassisted Centers

In addition to the 454 farm families surveyed in centers served by FHI, 30 farm families were surveyed in the area of Rua Domingos, Nhamatanda. The purpose of this survey was to compare FHI assisted areas with a control area which received no agricultural extension. Rua Domingos (RDO) was chosen because it was believed to be geographically, economically, and culturally similar to the Nharuchonga (NGA) center served by FHI, yet has received no extension assistance during the past three years. Comparisons between responses from the NGA and RDO surveys confirm that the two areas are indeed similar. There is no statistically significant difference ($p < 0.10$) between average land holdings in NGA and RDO nor between average household indexes. The following table summarizes the differences in agricultural practices found between NGA and RDO.

Farming Practices/Activities	% NGA 1990	% NGA 1993	% RDO 1990	% RDO 1993
Plant in lines/improved plant density	40	100	44.4	51.9*
Burn fields	80	60	85.2	77.8
Buy seeds	46.7	33.0	48.1	74.1*
Rotate crops	46.7	20	11.1	22
Intercropping maize and cowpeas	93	66.7	85.2	85.2
Intercropping maize and sorghum	86.7	53.3	88.9	88.9*
Plant vegetables	66.7	80.0	44.4	22.2*
Make compost/Organic Matter Management	33.3	86.7	18.5	22.2*
Make home organic insecticides/repellents	13.3	46.7	11.1	7.4*
Use chemical pesticides	13.3	13.3	7.4	7.4
Use chemical fertilizers	0.0	26.7	3.7	0.0*
Use of animal manure	6.7	46.7	3.7	3.7*
Sell produce from own fields	n/a	75.0	n/a	20.7*

* Statistically significant at $p < 0.05$ between NGA 93 and RDO 93.

Differences in farming practices between the two areas are often significant. As can be seen in the table above, farmers in the NGA area have made substantially larger improvements in the areas of increased plant density, increased planting of vegetables, better organic matter management, greater use of organic pest control methods, greater use of animal manures, reduced field burning, and a reduction in non-advisable crop rotation practices such as sorghum and maize. Farmers from the NGA area are also 3.6

5.5.1 Ag. Index Table A

The following table gives the average number of improved practices adopted by surveyed farm families, out of seven practices promoted by FHI extensionists.

District	Mean Index With Extension Assistance	Mean Index Without Extension Assistance
Dondo	3.34	1.39
Marroneu	3.22	1.89
Nhamatanda	1.88	0.61
Average Index->	2.79	0.98

5.5.2 Ag. Index Table B

The following table gives the average number of improved practices adopted by farm families receiving FHI extension assistance during the past year.

Center	n =	Median	75 %ile	Max.
Baliera	14	3	3	5
Bloco 9	29	2	3	5
Chucza	44	3	4	6
Jasse	28	1	2	4
Luabo/oth.	9	4	6	7
Macharote	35	4	5	7
Mafarinha	43	4	5	6
Muda	11	4	5	7
Nhampoca	37	1	2	5
Nharuchonga	14	2	3	5
Rama-Rama	15	3	5	6
Ramos	27	2	4	7
Sacasse	26	3.5	5	6

5.5.3 Ag. Index Table C

The table below gives the average number of improved practices adopted by farmer families not receiving FHI extension assistance during the past year.

Center	n =	Median	75 %ile	Max.
Baliera	0	--	--	--
Bloco 9	22	.5	1	4
Chueza	5	1	2	3
Jasse	22	0	0	2
Luabo/oth.	1	3	3	3
Macharote	15	1	3	4
Mafarinha	7	3	4	4
Muda	4	1	1	1
Nhampoca	13	0	1	3
Nharuchonga	2	3	3	3
Rama-Rama	0	--	--	--
Ramos	28	0	1	4
Sacasse	3	3	4	4

5.6 Effect of Extension Assistance on Crop Yields

Of those farm families which receive FHI extension assistance, 93.2% responded that they have obtained improved yields by following the advice of extensionists while 6.8% responded that yields did not improve or they did not know. Of farmers interviewed 61.2% said they found the extension assistance "very useful", and 32% said it was useful. 6.8% of farmers interviewed said they found the extension assistance to be of little use.

Of those who reported increased yields, 264 attributed the increase to improved spacings and increased plant populations. Improved seed selection (including seed germination testes) was mentioned by 27 respondents, followed by improved organic matter and soil fertility management. Pest control, weeding, crop rotation, assistance with storage, and crop rotation were also mentioned but infrequently.

5.7 Common Agricultural Problems

Control of insect pests and plant diseases was by far the most frequently mentioned agricultural problem, with 324 of those interviewed indicating difficulties with these pests. Rodent pests were noted as a problem by 123 respondents, followed by drought, birds, weed control, and lack of labor for land preparation. Other problems mentioned infrequently include poor soil, theft from fields, losses to monkeys and hippos, lack of tools, and a need for sacks to transport produce from fields to homes.

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6 Conclusions and Recommendations

6.1 Population Movements

Populations in most areas served by the SRRP have been in flux since the project began and will continue in flux until political, physical, and economic security improves. With 72.1% of the population of FHI served centers in Nhamatanda either expecting to return to their homes of origin or as of yet undecided about returning, future plans for SRRP assistance must allow flexibility to either shift assistance to areas where people are likely to return, or to other areas of equal need within Sofala Province. This is especially true in working with populations such as those of Macharote, Nhampoca, Muda, and Jasse where 50-80% of the population could move in mass as occurred in Savanne Center in 1993. On the other hand, populations in centers such as Chueza, Mafarinha, and Sacasse appear to be quite stable (less than 15% of the population expected to leave) and hence are better candidates for assistance activities with longer term development objectives.

6.2 Family Size and Average Age Distribution

Within the SRRP area of influence, the median family size is 6 persons per family. For emergency assistance such as food distributions as well as for food for work ration planning, the mean family size is of obvious importance. For extension planning and targeting of extension messages, consideration of age group is important. To date extension messages have been geared largely towards adult members within the family. However with an average of 2.7 school age children in each household, and only 36.75% of these children attending schools, extension education for the school age group may well be an intervention of utmost importance. To be effective, extension planning and extension methodologies should be revised to include this group which represents the future of Mozambique.

6.3 Socio-Economic Conditions

Comparing the data from this survey with that of the 1991 FHI baseline survey the picture is one of generally improving economic circumstances and outlook. Ownership of small animals has greatly increased and livestock numbers are increasing, albeit slowly. Purchases of relative expensive items such as high protein foods, clothing and cloth, sugar, and other consumables have increased in all districts. The average number of rooms per household are up in all districts. Land per farm family under cultivation has nearly doubled since the 1991 survey in all districts. Travel too increased significantly, especially to areas outside of the home districts. In addition to indicating improving economic conditions, the increased travel indicates improved security for travel.

The average index of household possessions (IHP) shows centers within Dondo District to be the best off, followed by Nhamatanda District centers. Marroneu District centers remain at the bottom of the index. This IHP ranking is strongly supported by data relating to purchases, travel, source of cash income, and field observations of the survey team.

Note: The IHP index used for this survey as well as the IHP index used for the 1991 survey should be improved. The IHP in 1993 was established using questions from developed in the FHI 1991 baseline survey, but no direct comparison was possible as no description of the weighting of possessions was detailed in the 1991 survey report. The weighting system used for this survey is included in Appendix A to allow direct comparison in future surveys. Clearly both the IHP of 1991 and that of 1993 allow for a general comparison of socio-economic well-being and the index obtained corresponds roughly with observations and rankings of the interview teams, but both are probably far too simple and could be improved to provide a better picture of socio-economic conditions. Number of rooms per house could be included in the index, but consideration of quality of houses (quality of building materials) and size of the homes in addition to number of rooms would present a more accurate picture. Education levels of parents and number of children in school might be other factors to include in the index. Future surveys would do well to consider these and perhaps additional factors.

6.4 School Age Children Attending School

With only 36.75% of school age children attending schools the educational situation is appalling. Additionally during our survey we observed several school sessions taking place outdoors, particularly in Marromeu District. The worst situation with regard to education is found in the Luabo/25 Junho/Matilde area of Marromeu where only 17.4% of school age children attend school. Nhamatanda District has the worst median number of children in schools at 21%, compared with 33% for Marromeu and Nhamatanda districts. There is however no significant statistical difference (@ $p < 0.05$) between the mean number of school age children in schools for the three districts.

6.5 Sources Of Cash Income

Our survey found that sales of agricultural crops are an important source of cash income to farmers in all of the three districts surveyed. Of those farmers who produce vegetables, 39% reported income from vegetable sales. Staple food crops are also an important source of cash income for farm families. Even though farmers reported relatively small land holdings and reported insufficient production of cereal crops for their own family consumption, 35.3% reported sales of field crops as a source of cash income.

Small animal sales remain of little importance due to the reduction of stock brought about by conflict and drought. An exception is the sales of chickens in centers of Marromeu District where 22.7% of farm families report cash income from their sale.

A high percentage of income generating activity relating to deforestation activities in Nhamatanda and Dondo districts is cause for alarm. Along the Beira Corridor west of Nhamatanda the effects of deforestation are visually very apparent, particularly when fields are newly prepared. In these areas, residents of accommodation centers have few other options for obtaining cash income. With improved security conditions, the movement of large numbers of families from the Beira Corridor may provide a reprieve for the areas forests, however until that time any income generation activities which can

reduce the devastation on the forests should be encouraged, include income generation from agricultural crops in areas where the clearing of new land would not be required. Small animal production, oil seed crops, and vegetable crop production are options currently being explored by FHI which may impact this situation. Reforestation may be another appropriate intervention, but may be more effective after the population pressure on the area is relieved.

6.6 Land Under Cultivation

Average land holdings under cultivation have nearly doubled in each district since the 1991 baseline survey. Of respondents 65% reported increasing land holdings in the past year. The interquartile range for the three districts is 1-2.5 hectares. For extension planning purposes, this information shows the need for extension messages and technologies directed towards small scale intensive farming systems. Farm families with landing holdings of this size are likely to be lacking agricultural machinery, therefore extension messages should carefully consider farming systems and the effect of new practices on the supply and demand for labor. Animal traction could be of great assistance to farmers within this group, both for plowing/cultivation, as well as for transportation of goods from fields to homes or markets. Nhamatanda is the district with the largest average land holdings and hence in greatest need of animal traction assistance. As AFRICARE is already working in animal traction within areas of Nhamatanda District, FHI should explore opportunities to collaborate with AFRICARE in extending this assistance to FHI assisted areas.

6.7 Major Food Crops

Within the three districts included in this study, maize is clearly the most important food crop. Extension efforts to improve maize production are of critical importance. Recommended interventions include identification of best adapted varieties for agro-climatic conditions as well as to traditional farming systems, seed multiplication, improvement in plant populations, and improvement in storage practices. Other cereal crops of importance include sorghum, and in some areas millet and rice. Substantial opportunity exists to improve yields of these crops through varietal improvement and improved cultural practices. FHI should continue work with DPA, INIA and SEMOC in research related to improving production of these crops.

Among legume crops both groundnuts and cowpeas are widely planted. In the case of cowpeas, many varieties both local and imported are currently grown; however, many varieties grown seem poorly adapted to the zone. Research into and distribution of semi-erect, photo-insensitive, determinate varieties should result in higher cowpea yields.

Among tuber crops sweet potato production is of great importance in Dondo and Marroneu districts, while cassava is of most importance in Marroneu and Dondo. Continued research into improved varieties is recommended. With sweet potatoes the emphasis should be on identifying high yielding varieties with qualities desired by local farmers. Given farmer practices of harvesting and consuming the potatoes as they mature, numerous varieties might be identified with differing days to maturation to

provide farm families with a longer continuous supply of this crop. With regard to cassava, research into varieties with improved resistance to virus diseases, high yields, and qualities desired by farm families must be continued.

6.8 Vegetable Production

Among farmers receiving FHI extension assistance, vegetable production is on the increase. Respondents report that three years ago only 54.5% produced vegetables, compared with 72.8% this past year. As noted earlier vegetable crops provide an important source of cash income for many farm families. Among the most important vegetables grown by farm families interviewed are: tomatoes (grown by 87.9% of families producing vegetables), collard greens (84.6%), onions (83.4%), lettuce (39.3%), and chili peppers (28.7%).

6.9 Crop Yields

Crop yields were clearly under reported by most respondents in this survey, as shown by comparisons of physical samples taken using FAO methodology at the time of harvest with responses from survey respondents. For the moment, random physical sampling, although expensive and time consuming, may be the best and most reliable alternative for estimating crop yields.

6.10 Seed Source

During and following the droughts of 1991 and 1992 farmers relied heavily on seed distributions by donors. 83.8% of all respondents reported receiving seeds from FHI during the Oct. 1991 - April 92 cereal season and the April - August 1993 vegetable season.

In Nhamatanda District, 53.6% of respondents reported donations as their sole source of seeds for the same cropping period. Only 30.4% of respondents reported having purchased seed during the same period, 20.8% from their fields, and 12.6% from local sources and exchange with neighbors.

Clearly local seed production should be encouraged, and assuming normal or near-normal precipitation during the present cereals campaign, farm families should be encouraged and able to retain sufficient seeds for the following cereals season. However, there are other important considerations. It must be recognized that with various donors distributing different varieties seed throughout the province during the drought (including hybrid seeds), and many farmers using food grain as seed, many farmers will not have seed for the best adapted varieties for their regions. Additionally, few farmers were able to produce and adequately store vegetable seeds during the previous vegetable crop season. Even assuming good yields this cropping season it would therefore seem advisable to continue limited distributions during the coming year. Recommendations for continued distributions include as a minimum targeting in all centers full distributions of well adapted open pollinated maize varieties, targeting specific farmers to produce seed material of other appropriate crop varieties for resale to neighbors. Partially subsidized sale of vegetable seeds to farmers for one more

vegetable season. These distributions should be accompanied by intensive extension campaigns to promote good seed production, selection, and storage practices. To do less than these recommendations would be to lose the gains made through research and extension activities of the past and current years.

6.11 Small Animal Production

66.7% of respondents own small animals. Chickens are clearly the most important animals at the present time in all districts, produced by 82.5% of those who raise small animals. 28.8% of families who own animals raise ducks while less than 10% of families who own animals currently raise goats, pigs, or rabbits. Average numbers of small animals owned are very low for all animal classes. Repopulation of small animal numbers would appear to be the priority intervention to be recommended at this time.

6.12 Extension Assistance

Our survey shows that the SRRP has reached 73.1% of the total population within its areas of extension assistance in Dondo, Marromeu, and Nhamatanda Districts. In other words, approximately 10,300 families. In terms of effectiveness of extension agents this means that each extension agent has assisted an average of 464 families per year, with an average of 4.47 visits to each family per month. The survey data shows they have been very effective in convincing farmers to adopt improved agricultural practices such as increasing plant populations of maize, reducing field burning, increasing production of vegetable crops, preparing compost and improving use of organic matter, and reducing unfavorable intercropping, practices such as planting closely related crops of maize and sorghum together. They have also made significant gains in convincing farmers to prepare and use organic pesticides and pest repellents and to rotate crops. The survey data shows that FHI assisted farmers adopted an average of 2.79 of seven improved practices, compared to an average of 0.98 improved practices adopted by non-assisted farmers living in the same centers.

But has the adoption of these new practices improved yields and the socio-economic conditions of farmers? Of farm families receiving FHI extension assistance, 93.2% said they have obtained higher yields by following the advice of extensionists, while only 6.8% said their yields did not improve or they did not know. Contrasting the FHI assisted center of Nharuchonga with the non-assisted neighboring center of Rua Domingos, the data shows that 75% of Nharuchonga farmers sold produce from their fields during the past year, compared with only 20.7% of farmers from Rua Domingos.

The greatest perceived problem of farm families interviewed is that of insect pest and rodent pests. Crop rotation, organic pesticides and repellents, traps, physical barriers, and improved varieties are among the practices FHI assistants promote to combat these problems. However 71% of respondents still listed insect pests as a serious problem. At the moment FHI is prohibited from using chemical means of pest control except for research plots by its donor, even when used within a sound IPM framework. To effectively pest problems, FHI needs to be able to include a carefully selected group of pesticides into a full IPM program. Obviously this carries with it a strong responsibility to provide adequate training in IPM and pesticide safety, however that is why qualified

agronomists with IPM training are employed. At present FHI's hands are tied and it is not even able to use those tools available to untrained home gardeners in developed countries. Development agencies and theorists speak of the need for participatory development and addressing "felt needs". Here is a major "felt need", and a real need, begging to be addressed.

A major goal for any agricultural crops extension program is improving the socio-economic conditions for the families it serves, generally through production, improved crop storage, and/or marketing assistance. With two years of severe drought preceding the last harvest, marketing assistance has not been a viable intervention and the SRRP has focused on improving agricultural practices which lead to improved production. As both physical and political security for farm families improves, extension activities will need to focus more on marketing assistance.

Appendix A Household Index

The household index was based on household possessions reported by surveyed families, plus land holdings under cultivation. Points were given as follows:

0 radios	= 0	0 tables	= 0	0 chairs	= 0
1 radio	= 1 (pt)	1 table	= 2	1-3 chairs	= 2
> 1 radio	= 2	> 1 table	= 3	4-6 chairs	= 3
				> 6 chairs	= 4
0 beds	= 0	0 dishes	= 0	0-1 hectares	= 0
1 bed	= 3	1-10 dishes	= 1	1.1-3 hectares	= 1
> 1 bed	= 4	11-20 dishes	= 2	> 3 hectares	= 2
		> 20 dishes	= 3		

Appendix B
Maize Crop Estimate Report
May 10, 1993

Crop: Maize			Province: Sofala		
District	Location	Yield Range Between Samples Taken Within the Area (Kg/Ha)	Avg. Yield (Kg/Ha)	Reported Avg. Maize Prod. Area Per Farm Family (Ha)	Calculated Production Per Farm Family (Kg/Ha)
Buzi	Bandua	316-1131	500	0.9	450
Buzi	Estaquinha	459-2457	1100	1.2	1320
Dondo	Mafarinha	390-1396	757	0.8	606
Dondo	Bloco 9	193-1575	815	0.5	375
Marromeu	Baliera	1135-3898	2423	1.3	3029
Nhamatanda	Nharuchonga	167-2065	1229	1.5	1844
Nhamatanda	Tica	243-3776	1050	1.0	1050

General Comments

The figures presented above are based upon a total of 114 yield samples obtained from Buzi, Dondo, Nhamatanda, and Marromeu Districts of Sofala Province using FAO methodology summarized below:

- 1) To the extent possible general areas were selected which were "typical" for the zone, exceptions to this criteria are noted under discussion relating to specific areas below.
- 2) Farmers fields within each general area were selected randomly.
- 3) Two sample areas were selected randomly from within each field, each sample taken was 49 sq. meters.

Word of Caution

With regard to food security considerations, caution should be exercised in using the yield estimates presented here. Readers are advised to consider that the range of yields per hectare obtained from any given site vary greatly depending on soil conditions, farming methods used, and microclimatic factors.

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Area Specific Comments

Buzi/Estaquinha

Yields sampled in this area varied greatly due to varying soil types and farming practices used. In a small area within Estaquinha Sede, on poor sandy soils and with traditional farming practices, crop yields were very low -- in the 450-500 Kg/Ha range. In the major production area with better soils, farmers using traditional farming practices had quite surprisingly good stands of 1100 Kg/Ha. In the same area, farmers using improved planting practices obtained yields of over 2400 Kg/Ha; however, we were told that many of these farmers were from Buzi Sede and had access to production inputs not available to "average" farmers in Estaquinha. Based on our yield estimate samples, walks through the major production areas, and conversations with local farmers, best estimate of average yields for farmers in this area is 1100 Kg/Ha.

Dondo/Mafarinha

Maize production was very poor here, as it was in the Macharote, Savanne, and Bloco 9 areas of Dondo. In terms of overall food security for this area the effect of poor maize production will have to be viewed in light of rice production in the area; however estimates on rice yields are not yet available.

Dondo/Bloco 9

The situation here is very similar to that of Mafarinha.

Marromeu/Baliera

Maize production in Baliera and the other centers of Marromeu has been outstanding this year. Throughout the areas in Marromeu where FHI distributed seeds and tools, this year's maize harvest should virtually ensure food security throughout an entire year. **HOWEVER, storage of the maize harvest is a major problem in this area and much grain may be lost unless immediate is taken to prevent post-harvest losses.** We are currently discussing options available for providing this assistance. One major problem is a lack of locally available materials suitable for constructing grain storage units.

Nhamatanda/Nharuchonga

The yield data obtained from Nharuchonga this year is generally representative of the general area from Nhamatanda Sede up the corridor to the Manica Province border (Gorongosa Center, Metuchira Center, Jasse). Production was generally quite good throughout the area and should feed most families throughout the year.

Nhamatanda/Tica

The yield data obtained from samples in the Tica (Muda-Mufa) area should be fairly representative of the general area from Nhamatanda Sede along the corridor through Lamego, Muda, and Tica, down to the Pungue River. However, it is the opinion of IHH agronomists that the particular area selected by the LDA for this survey is clearly better than the area as a whole, perhaps by as much as 33%. We have adjusted our estimate for the area accordingly. Additionally, it should be noted that the accommodation center of Ramos is not represented well by either the Tica or Nharuchonga crop estimates, owing to microclimatic and soil conditions which are much more similar to those of Mafarinha in Dondo District than to our sample areas in Nhamatanda District.

Appendix C
The Survey Questionnaire

QUESTIONARIO GERAL DA FHI -- Nov. 1993

1 DADOS DE IDENTIFICAO

- 1.1 Equipe _____
- 1.2 Questionario no. _____
- 1.3 Data _____
- 1.4 Distrito _____ (NA=Nhamatanda, DO=Dondo,
MA=Marromeu, GO=Gorongozza BU=Buzi)
- 1.5 Centro _____ (JAS=Jasse, NGA=Nharachonga, MUD=Muda,
RMS=Ramos, MAC=Macharote, SAV=Savane, NAP=Nhampoca,
MAF=Mafarinha, BL9=Bloco9, BAL=Baliera,
CHU=Chueza, RMA=Rama Rama, LUA=Luabo/
Matilde/25 de Junho, SAC=Sacasse, BUZ=Buzi Sede,
BAN=Bandua, NOS=Nova Sofala, EST=Estaquinha,
MUC=Mucodza, MAP=Mapombwé, NHA=Nhamissongora,
PUN=Pungué)
- 1.6 Pessoa entrevistada _____ (H=Homen, M=Mulher, A=Ambos)
- 1.7 Chefe de familia _____ (H=Homen, M=Mulher)

2 DADOS GERAIS

- 2.1 A quanto tempo reside neste centro? _____
- | | |
|------------------|------|
| Desde nascimento | (N) |
| Menos de 6 meses | (L6) |
| Menos de 1 ano | (L1) |
| 1 ano | (1) |
| 2 anos | (2) |
| 3-5 anos | (5) |
| 6 ou mas anos | (6) |
- 2.2 Qual é o tamanho da vossa casa? (quartos) # _____
- 2.3 Quantas pessoas vivem na vossa casa? # _____
- | | |
|--------------|---------|
| Idades 0-5 | # _____ |
| Idades 6-12 | # _____ |
| Idades 13-17 | # _____ |
| Idades 18-56 | # _____ |
| Idades 57+ | # _____ |
- 2.3.6 Quantos vao a escola? # _____

2.4 O que tem dentro da vossa casa? Quantos? / _____

Radio / _____
Mesa / _____
Cadeira / _____
Cama(s) / _____
Pratos / _____
Panelas / _____
Copos / _____
Bicicleta / _____
Outros _____

2.5 Pensa em voltar para sua terra? _____
(Y=sim, N=nao, DK=nao sabe)

3 DADOS SOBRE AGRICULTURA

3.1 Tem mais de 1 ano aqui? (oneyear) Y N

3.2 Quanto produziram entre Sept. 1992 e Agosto 1993?
(Qual a colheita que puneram nos celeiros?)

Chegou para quanto tempo? (Indique qual menes)

Que Quantos kilos

arroz / _____
milho / _____
mapira / _____
moxoeira / _____
mandioca / _____
frejao nemba / _____
amendoim / _____
batata doce / _____
outros _____

*(1 sacco = 90 kg, 1 lata = 15 kg, 1 galao = 10 kg)

3.3 Qual foi a quantidade que venderam?

Cultura _____ Kilos _____
Cultura _____ Kilos _____
Cultura _____ Kilos _____

3.4 Onde apanharam as sementes no ano pasado?

doadas	Y	N
machamba	Y	N
troca	Y	N
obtencao local	Y	N
comprada	Y	N
outro	_____	

3.5 Este ano produziram legumes? Y N

couve	Y	N
cebola	Y	N
tomate	Y	N
alface	Y	N
piri-piri	Y	N
outros	< _____ >	

3.6 Venderam legumes? Y N Quais? < _____ >

3.7 Qual e o tamanho da sua machamba em ha.? ##.# _____

3.8 Aumentou o tamanho da sua machamba este ano? Y N

3.9 Cria animais de pequena especie? Y N

Que tipo?	Quantidade?
Galinhas	# _____
Capritos	# _____
Porcos	# _____
Patos	# _____
Coelhos	# _____
Porquinhos da India	# _____
Outros	< _____ >

3.10 Compare aquilo que se fez durante 3 anos atras e aquilo que esta a fazer agora.

Três anos atras fez....
Agora faz...

Prática	-3 anos	Agora
Queimar terras antes de semear	Y N	Y N
Semear milho em linhas	Y N	Y N
Comprar sementes	Y N	Y N
Prática de rotaçao de culturas	Y N	Y N
Consociação de milho e nhemba.	Y N	Y N
Consociação de milho e mapira	Y N	Y N
Consociação de milho e amendoim	Y N	Y N
Cultiva vegetais	Y N	Y N
Prepara composto orgânico	Y N	Y N
Prepara remédio caseiro para combate insectos	Y N	Y N
Usa pesticidas químicas	Y N	Y N
Usa adubo químico	Y N	Y N
Usa estrume dos animais	Y N	Y N
Cria animais	Y N	Y N

4 Comercio/Transporte

4.1 Ten feito compras no mercado/lojas? Y N

O que compra?

Caril, peixe, galinha, frejao	Y	N
Vegetais, coco	Y	N
Roupa, capulana	Y	N
Sabao	Y	N
Açúcar	Y	N
Sal	Y	N
Oléo	Y	N
Petróleo	Y	N
Pao	Y	N
Farinha	Y	N
Outro < _____ >		

4.2 Como obtem dinheiro?

Forno de carvao	Y	N
Venda peixe	Y	N
Venda lenha	Y	N
Ganho-ganho	Y	N
Venda nipa, cachaso	Y	N
Venda produtos da machamba	Y	N
Vende galinhas	Y	N
Vende animais	Y	N
Emprego	Y	N
Outro < _____ >		

4.3 O que mais importante gostaria de comprar?

Roupa, capulana	Y	N
Utensilos, domesticos	Y	N
Acucar, óleo, sabão	Y	N
Cobertor, manta	Y	N
Comida fundamental (farinha, peixe seco, camarao, arroz, frejao, etc.)	Y	N
Sapatos	Y	N
Radio	Y	N
Outra compra < _____ >		

4.4 Tem deslocado para fora da comunidade/aldeia? Y N

Para onde normalmente? < _____ >

Dentro do distrito (I)
Fora do distrito (E)

4.4.2 Se desloca para fazer o que? < _____ >

Visita (V)
Comercio (C)
Tratamento medico (M)
Ganho-ganho, emprego, trabalho (T)
Outra (OT)

5 Assistencia por Extensao

5.1 Recebeu ajuda do extensionista neste ano? Y N

5.2 Quantos vezes foi visitado pelo extensionista durante o ultimo mês? # _____

5.3 Qual foi o valor da assistência que teve? # _____

Muito útil (4)
útil (3)
Pouco útil (2)
Não foi útil (1)

5.4 Através do conselho do extensionista aumentou o seu rendimento? Y N

Aumentou como? < _____ >

5.5 Desde que começou a trabalhar com extensionista terá:

Reduzido espaços entre linhas de milho? Y N
Reduzido espaço entre plantas de milho? Y N
Mudado a maneira de seleccionar a semente? Y N
Reduzido número das sementes por cova? Y N

5.6 Desde que começou a trabalhar com extensionista terá mudado algumas práticas? Y N

Quais práticas? < _____ >

5.7 Quais são os mais importantes problemas relacionadas com as culturas que necessita ajuda para resolver?

Não tem problemas Y N
Control de insectos na machamba Y N
Control de gorgulhos no celeiro Y N
Control de ratos Y N
Control das cheias Y N
Preparação da terra Y N
Ajuda na sacha Y N
Transporte da machamba para a casa Y N
Outra problema < _____ >

Códigos:

DK = Não Sabe
NR = Não respondeu
NA = Não é aplicável
Y = Sim
N = Não