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**REPORT ON THE FATE OF SEED/PLANTING MATERIAL OF FARMER SELECTED VARIETIES
DISTRIBUTED THROUGH WORLD VISION'S EXTENSION PROGRAM**

Please find attached the Report of the Fate of Seed/Planting Material of Farmer Selected Varieties Distributed Through World Vision's Extension Program. I hope you find it interesting. Please feel free to contact me if you have any queries. Thank you.

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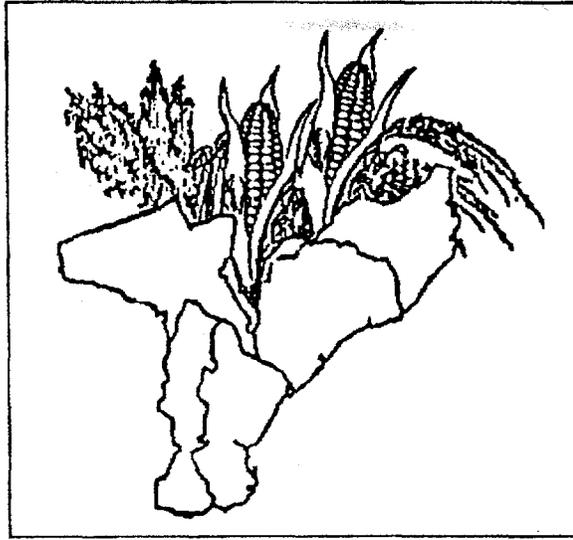
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WORLD VISION INTERNATIONAL - MOZAMBIQUE
AGRICULTURAL RECOVERY AND DEVELOPMENT PROGRAMME



FATE OF SEED/PLANTING MATERIAL OF
FARMER SELECTED VARIETIES DISTRIBUTED
THROUGH WORLD VISION'S EXTENSION PROGRAM

FEBRUARY 1996

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EXECUTIVE SUMMARY

One of the objectives of World Vision International - Mozambique's Agricultural Recovery Program (ARP) is to identify varieties of a range of crops grown by the family sector farmer, which combine a higher yield than the farmers variety, with acceptability in other characteristics such as maturity, pest and disease resistance and taste. The INIA/World Vision multi-location trials programme has successfully identified a number of varieties through a series of on-station and on-farm trials and these Farmer Selected Varieties (FSV's) (which may be either improved varieties or particularly promising regional varieties) are being multiplied and disseminated through the ARP's "Farm Family First" Extension Network and through the Emergency Seed Distribution Program. Two surveys have been implemented between 1994 and 1995 to monitor the fate of the FSV's disseminated in selected districts where the ARP is operating and over 1,200 responses have been obtained. The surveys were mainly conducted in the districts of Gurúè and Nicoadala in Zambézia Province. The second survey included a more complete set of questions designed to elicit more complete opinions from the farmers concerning the acceptability of each variety.

The respondents of these two surveys had received seed/planting material of 14 different crops mostly as a free distribution from ARP extension technicians. Eight of these crops represented the more traditional crops, namely maize, rice, sweet potato, cowpea, cassava, millet, sorghum and groundnut. The largest number of responses were received for maize, rice, sweet potato and cowpea.

In addition, responses were obtained concerning six "new crops", namely sunflower, mungbean, bambara groundnut, lablab bean, footlong bean and finger millet. These represent crops of which the beneficiary farmers have had no or limited experience, or traditional crops which have been almost lost during the war. These "new crops" are being distributed by the "Farm Family First" extension network with the objective of diversifying the range of crops which farmers grow.

Analysis of these surveys demonstrates that the ARP is indeed having a large impact on the availability and use of improved varieties. The proportion of respondents keeping seed for resowing exceeds the ARP's target of 50%, with 83% of the beneficiaries questioned in Survey 1 and 58% of the beneficiaries questioned in Survey 2 saving seed of the FSV's and "new crops" obtained through the extension activities. The lower proportion of beneficiaries saving seed in the second survey is a consequence of the fact that many beneficiaries failed to harvest, for reasons such as pest attacks (34% of all crop failures), drought (21.2%) or excess water (16.3%). In fact, only 65% of the beneficiaries interviewed in the Survey 2 were able to harvest their crop, of whom 58% saved seed. It would appear that, given a good cropping season, the higher figure of 83% of the beneficiaries saving seed of FSV's is more representative of the level of interest among farmers in these newly introduced varieties and crops. Crops which were particularly successful in terms of the proportion of beneficiaries saving seed were finger millet (100% of the beneficiaries saved seed for resowing in both surveys), sweet potato (an average of 81.1% of the beneficiaries surveyed in Surveys 1 and 2 saved vines for replanting), rice (69.2% of the beneficiaries saved seed for replanting), mung bean (66.7%), maize (66.4%), sunflower (61.5%) and cowpea (58.6%). Another important factor to consider is the area of land planted to these FSV's, reflecting the level of commitment of the beneficiaries to the varieties received. Unfortunately this information was not yet available.

The results of these surveys demonstrate that the majority of the farmers benefitting from the distribution of FSV's or "new crops" are satisfied with the variety/crop received. Most of the varieties disseminated through the ARP's extension network appear to combine high yield with earliness and an acceptable taste, suggesting that the process of on-station followed by on-farm evaluation through a series of technician-controlled and farmer-controlled on-farm trials is successful.

b

The crops that were less successful were sorghum (32.3% of farmers keeping seed for resowing averaged over the two surveys), millet (48.4%) and groundnut (28.6%). Sorghum and millet are not widely planted by farmers in the districts of Gurúe and Nicoadala and therefore the results of these surveys do not give an accurate indication of the performance and acceptability of the FSV's of sorghum and millet currently being distributed through the "Farm Family First" extension network. A more accurate impression of the acceptability of these varieties would be obtained from surveys carried out with beneficiary farmers in the provinces of Sofala and Tete. These surveys are currently underway. The number of farmers growing FSV's of groundnut was very low in these surveys, as groundnut varieties have not been widely distributed by the ARP. Further evaluation, dissemination and surveying is necessary to obtain information concerning the acceptability of FSV's of groundnut.

Sunflower, finger millet and mungbean were the most successful "new crops" in terms of the proportion of farmers maintaining seed for resowing. Recipients of bambara groundnut experienced problems with harvesting and the success of lablab bean and footlong bean was limited by poor germination.

The proportion of initial beneficiaries who are redistributing seed/planting material to family, friends and neighbours appears to be encouraging, representing 53.3% of the respondents in Survey 1 and 20.7% of the respondents in Survey 2. Those farmers who decide to give seed/planting material away usually give to more than one person (an average of 1.9 and 1.8 person in Surveys 1 and 2, respectively). Hence the number of secondary beneficiaries represents a significant proportion of initial beneficiaries (99% and 36% across all crops for Surveys 1 and 2, respectively). Beneficiary farmers redistribute seed/planting material principally to family members (representing 59.1% of all secondary beneficiaries), neighbours (27.6%) and friends (13.0%), mainly for free (in 74.4% of the cases) but also in exchange for different seed/planting material (23.6%).

During the 1993/94 and 1994/95 seasons, the ARP's "Farm Family First" Extension Network made seed or planting material of FSV's and "new crops" available to approximately 26,000 recipients, estimated to represent 17,000 farming families as a family may receive seed of more than one different farmer selected variety or "new crop" (see Appendices IA, IB and IC). The number of families now having seed/planting material for resowing is estimated to be 19,000. This estimate is based on an assumption that data obtained in these surveys for the proportion of farmers keeping seed for resowing and for the number of secondary beneficiaries is representative of all farmers receiving seed/planting material of FSV's or "new crops" and that there are no post-harvest losses in seed viability. The latter assumption may not be valid as it is known that post-harvest losses can be a problem, either due to rats, weevils or losses of viability under more humid conditions. Seed of Matuba maize has been made available prior to the 1992/93, 1993/94 and 1994/95 rainy season to approximately 361,000 farming families in the provinces of Tete, Sofala, Manica, and Zambézia through the ARP's Emergency Seed Distribution Program. Using the data collected in these surveys, it is estimated that 490,000 families now have seed of Matuba maize for resowing during the 1995/96 agricultural campaign. This number represents direct beneficiaries of the Emergency Seed Distribution Program who have saved seed, plus families who have received seed from the direct beneficiaries of the Emergency Seed Distribution Program. A similar level of dissemination can be seed for the improved varieties of sorghum, SV-2 and groundnut, Natal Common.

The ARP's strategy of introducing seed of farmer selected varieties into the family sector through emergency seed distributions and parallel extension activities appears to be highly effective. Farmer-to-farmer exchange also has an important impact on the dissemination of farmer selected varieties.

1. INTRODUCTION

A major limitation to crop productivity by small scale farmers in Mozambique is the acute shortage of seed and planting material of good varieties of the principle food crops. One of the objectives of World Vision International - Mozambique's Agricultural Recovery Program (ARP) is to identify and disseminate seed/planting material of Farmer Selected Varieties (FSV's), which may include improved varieties, genetically improved regional varieties or regional varieties selected for particularly good performance and acceptability. Varieties that are both high yielding and acceptable to farmers are initially identified through a series of multi-location trials both on-station and on-farm, and are tested by farmers in terms of palatability. These varieties are referred to as FSV's. Seed or planting material of these FSV's is then multiplied and subsequently distributed to farmers through the Emergency Seed Distribution Program operating in Central and Northern Mozambique or through the "Farm Family First" Extension Network. During the 1993/94 and 1994/95 seasons, over 26,000 recipients (estimated to represent 17,000 farming families) received seed or planting material of a range of FSV's through the ARP's extension activities and approximately 361,000 families received seed of Matuba maize through the Emergency Seeds and Tools Distribution Programs across the provinces of Tete, Manica, Zambézia, and Sofala (Appendices IA, IB and IC). Farmer selected varieties of other crops have also been incorporated into the Ag-paks distributed as part of the Emergency Seed Distribution Program, such as SV-2 sorghum, Natal Common groundnut, ITA 312/Chibiça/Mamima rice and IT 18 cowpea.

In addition to the introduction of FSV's into farming systems in districts where World Vision is working, the ARP aims to diversify the range of crops which farmers grow, as a means of increasing household income. With this in mind they have distributed a range of "new crops" including bambara groundnut, sunflower, mungbean, and sesame.

World Vision is attempting to monitor the extent of the dissemination of FSV's and "new crops" made available through the extension program with a series of surveys to determine the number of farmers who save seed for replanting. The ARP hopes that at least 50% of the farmers who receive seed of FSV's or "new crops" maintain those varieties/crops by saving seed. It also hopes that these beneficiaries will also give seed to family, friends and neighbours, thereby ensuring the natural dissemination of these varieties and crops. This report describes the results of two surveys implemented in selected districts in Zambézia and Sofala Provinces to determine the extent to which beneficiaries of the ARP's FSV and "new crop" dissemination activities maintain seed/planting material and to what extent these varieties are spreading through seed redistribution and exchange activities.

2. METHODOLOGY

Two surveys were implemented by World Vision International - Mozambique's Agricultural Recovery Program (ARP) to determine the fate of germplasm of Farmer Selected Varieties (FSV's) and "new crops" distributed through "Farm Family First" Extension Network. The first survey was conducted between January and June 1994 in the districts of Nicoadala, Gurúè, Mocuba and Chinde, Zambézia Province. The second survey was conducted between August 1994 and December 1995 in the districts of Nicoadala, Gurúè and Mocuba in Zambézia Province and in Caia District, Sofala Province. The two surveys are shown in Appendices II and III, respectively. The two surveys were

slightly different in format, the second survey providing an opportunity for beneficiaries to describe their reasons for saving or not saving seed/planting material of the FSV or crop received from World Vision. A wide variety of questions were included to determine how the farmer obtained the seeds/planting material concerned, if the farmer successfully harvested the variety (and if not why not), if the farmer saved seed (and if not why not), whether the farmer was going to resow (or had indeed resown), whether he/she redistributed seed/planting material to anyone and if so, to how many people.

The interviews took five minutes to complete and were conducted by ARP extensionists. A total of 240 responses were obtained in Survey 1. In Survey 2, 699 farmers were interviewed. However, many interviewees received seed of more than one FSV, giving a total of 1,055 responses. Traditional crops included in the responses were cassava, sweet potato, maize, millet, sorghum, cowpea, rice and groundnut. The ARP is also attempting to reintroduce crops which have been almost lost during the war or crops of high nutritional or market value. A number of "new crops" had been distributed to respondents of these surveys, such as bambara ground nut, sunflower, finger millet, lablab bean, footlong bean and mungbean.

3. RESULTS

3.1 Proportions of Responses by District and by Crop

Surveys were conducted across four districts in Zambézia Province and in Caia District in Sofala Province (Table 1). A total of 240 and 1,055 responses were collected in the first and second survey, respectively. In the first survey, responses were mainly from Gurúè, Nicoadala and Mocuba districts with a small number of responses from Chinde District. In the second survey, responses were mainly from Nicoadala and Gurúè districts, with a smaller proportion from the districts of Mocuba and Caia.

TABLE 1: NUMBER OF RESPONDENTS SURVEYED BY DISTRICT IN SURVEYS 1 AND 2.

DISTRICT	SURVEY 1: NUMBER OF RESPONDENTS (%)	SURVEY 2: NUMBER OF RESPONDENTS (%)
CAIA	0 (0.0)	16 (1.5)
GURÚÈ	120 (49.8)	293 (27.8)
MOCUBA	42 (17.4)	64 (6.1)
NICOADALA	74 (30.7)	682 (64.6)
CHINDE	4 (2.1)	0 (0.0)
TOTAL	240	1,055

The acceptability of FSV's of a total of eight crops and of six "new crops" was evaluated across the two surveys (Table 2). In the first survey the majority of responses were for various maize (30% of respondents) and sweet potato (32.8% of respondents) varieties, with over 10% of the responses concerning rice varieties. In the second survey the majority of the responses were for maize (33.8% of respondents) and rice (21.2% of respondents). At least 20 respondents had received seed or planting material of cowpea, cassava, sorghum, sweet potato, bambara groundnut and millet. There were only a small proportion responses from farmers who had received groundnut, sunflower, finger millet, lablab bean, footlong bean and mungbean and many were only sampled in one of the two surveys.

TABLE 2: CROPS RECEIVED BY RESPONDENTS.

CROP	SURVEY 1:		SURVEY 2:	
	NUMBER OF RESPONDENTS (%)		NUMBER OF RESPONDENTS (%)	
MAIZE	72	(30.0)	357	(33.8)
RICE	26	(10.8)	224	(21.2)
COWPEA	18	(7.5)	122	(11.6)
CASSAVA	0	(0.0)	90	(8.5)
SORGHUM	7	(2.9)	89	(8.4)
SWEET POTATO	79	(32.8)	59	(5.6)
BAMBARA GROUNDNUT	18	(7.5)	54	(5.1)
MILLET	4	(1.7)	27	(2.6)
SUNFLOWER	7	(2.9)	19	(1.8)
GROUNDNUT	0	(0.0)	7	(0.7)
FINGER MILLET	3	(1.3)	5	(0.5)
FOOTLONG BEAN	0	(0.0)	1	(0.1)
LABLAB BEAN	0	(0.0)	1	(0.1)
MUNGBEAN	6	(2.5)	0	(0.0)

3.2 Fate of Seed for all Crops

(i) Survey 1

In Table 3 the proportion of total beneficiaries who received seed/vines of FSVs of each crop and saved them for resowing is shown, along with the proportion of initial beneficiaries redistributing seeds/vines and the mean number of people to whom they redistributed.

TABLE 3: FATE OF SEED/PLANTING MATERIAL FOR EACH CROP (SURVEY 1).

VARIETY	% OF BENEFICIARIES WHO SAVED SEED AND REPLANTED EACH CROP	% OF BENEFICIARIES WHO REDISTRIBUTED SEED OF EACH CROP	MEAN NUMBER OF SECONDARY BENEFICIARIES OF EACH CROP
MAIZE	91.7	59.7	1.7
RICE	88.5	50.0	2.1
COWPEA	72.2	44.4	1.4
SORGHUM	42.8	14.3	3.0
SWEET POTATO	87.3	50.6	1.9
BAMBARA GROUNDNUT	83.3	61.1	1.9
MILLET	100.0	100.0	2.8
SUNFLOWER	85.7	28.6	2.5
FINGER MILLET	100.0	100.0	3.0
MUNGBEAN	66.7	50.0	1.0
AVERAGE	83.3	53.3	1.9 (243*)

* Total number of secondary beneficiaries

In this survey 83.3% of the 240 initial beneficiaries saved seed/planting material for resowing across all crops. The only crop for which less than 50% of the beneficiary farmers saved seed and resowed was sorghum. The most successful crops were millet (100% of the beneficiaries saved seed to replant), finger millet (100%) and maize (91.7%). In most crops, over 50% of the beneficiaries also

redistributed seed/planting material to other farmers, with the exception of sorghum and sunflower, where only 14.3% and 28.6% of the initial beneficiaries redistributed seed. The average number of secondary beneficiaries was 1.9 across all crops and was highest for sorghum (3.0), finger millet (3.0) and millet (2.8). In Survey 1, there were a total of 243 secondary beneficiaries of seed/planting material of FSV's. Hence there were almost the same number of new recipients of seed as there were initial beneficiaries; the number of secondary beneficiaries represented 99% of the number of initial beneficiaries.

(ii) Survey 2

From Survey 2, it was clear that seed or planting material for each crop was generally obtained free from the extensionist (Table 4). However, a small proportion of beneficiaries had received the seed/planting material for maize, rice, cowpea, sorghum and cassava stakes from other farmers. The highest farmer-to-farmer exchange occurred for cassava. In the case of rice, maize and cowpea, a small proportion of beneficiaries had purchased their seed from the ARP.

TABLE 4: METHOD OF OBTAINING SEED/PLANTING MATERIAL FOR EACH CROP AND FROM WHOM IT WAS OBTAINED (SURVEY 2).

CROP	METHOD OF OBTAINING SEED/PLANTING MATERIAL		SEED/PLANTING MATERIAL OBTAINED FROM WHOM*	
	Free %	Purchased % (number)	Extensionist %	Farmers % (number)
MAIZE	99.7	0.3 (1)	96.1	3.9 (14)
RICE	95.1	4.9 (11)	92.9	7.1 (16)
COWPEA	99.2	0.8 (1)	94.3	5.7 (7)
CASSAVA	100.0	0.0 (0)	84.4	15.6 (14)
SORGHUM	100.0	0.0 (0)	97.8	2.2 (2)
SWEET POTATO	100.0	0.0 (0)	100.0	0.0 (0)
BAMBARA GROUNDNUT	100.0	0.0 (0)	100.0	0.0 (0)
MILLET	100.0	0.0 (0)	100.0	0.0 (0)
SUNFLOWER	100.0	0.0 (0)	100.0	0.0 (0)
GROUNDNUT	100.0	0.0 (0)	100.0	0.0 (0)
FINGER MILLET	100.0	0.0 (0)	100.0	0.0 (0)
FOOTLONG BEAN	100.0	0.0 (0)	100.0	0.0 (0)
LABLAB BEAN	100.0	0.0 (0)	100.0	0.0 (0)

* Expressed as percentage of those obtained free

Column two, Table 5 shows, for each crop, the proportion of initial beneficiaries of seed/planting material who saved seed/planting material for resowing. The third column shows the proportion of the initial beneficiaries that were able to harvest seed of the FSV or "new crop" they had received; many people lost their crops due to pest attacks, drought or excess water. The fourth column shows the proportion of those beneficiaries who were able to harvest that saved seed for resowing. Column five gives the proportion of the initial beneficiaries who redistributed seed/planting material to other farmers. Cassava is not included in this table because, at the time of the survey approximately 25% of the farmers had not yet harvested.

In Survey 2, when averaged across all crops, 58.4% of beneficiaries saved seed/planting material for resowing (column 2). The crops where greater than 50% of the beneficiaries saved and replanted were finger millet (100%), sweet potato (72.9%), rice (67.0%), maize (61.3%), cowpea (56.6%) and

sunflower (52.6%). Crops where less than 50% of the beneficiaries saved and replanted included millet (40.7%), bambara groundnut (37.0%), sorghum (31.5%), groundnut (28.6%), footlong bean and lablab bean (0%).

TABLE 5: FATE OF SEED/PLANTING MATERIAL FOR EACH CROP (SURVEY 2).

CROPS	% OF BENEFICIARIES WHO SAVED SEED AND REPLANTED	% OF BENEFICIARIES WHO HARVESTED	% OF BENEFICIARIES WHO SAVED SEED (AS % OF THOSE WHO HARVESTED)	% OF BENEFICIARIES WHO REDISTRIBUTED SEED
MAIZE	61.3	69.5	87.9	18.3
RICE	67.0	76.8	89.0	30.1
COWPEA	56.6	63.1	85.7	15.6
SORGHUM	31.5	38.2	79.4	5.7
SWEET POTATO	72.9	88.1	82.7	42.4
BAMBARA GROUNDNUT	37.0	49.1	76.9	13.2
MILLET	40.7	44.4	83.3	14.8
SUNFLOWER	52.6	63.2	83.3	26.3
GROUNDNUT	28.6	85.7	42.9	14.3
FINGER MILLET	100.0	100.0	100.0	100.0
FOOTLONG BEAN	0.0	0.0	--	--
LABLAB BEAN	0.0	0.0	--	--
AVERAGE	58.4	64.7	86.2	20.7

If seed was harvested, the majority of farmers retained seed for resowing (column 3). However, a large proportion of farmers were not able to harvest seed. The proportion of farmers failing to harvest was particularly high for millet (55.6%), sorghum (61.8%), and bambara groundnut (50.9%). The crops with the highest harvesting success were sweet potato (88.1%), groundnut (85.7%), rice (76.8%) and finger millet (100%).

Figure 1 shows the main reasons for crop failure across all crops, given as a percentage of the total number who failed to harvest. The three main reasons for crop failure were pest attack (resulting in 34.5% of crop failures), drought (21.2%) or excess water (16.3%).

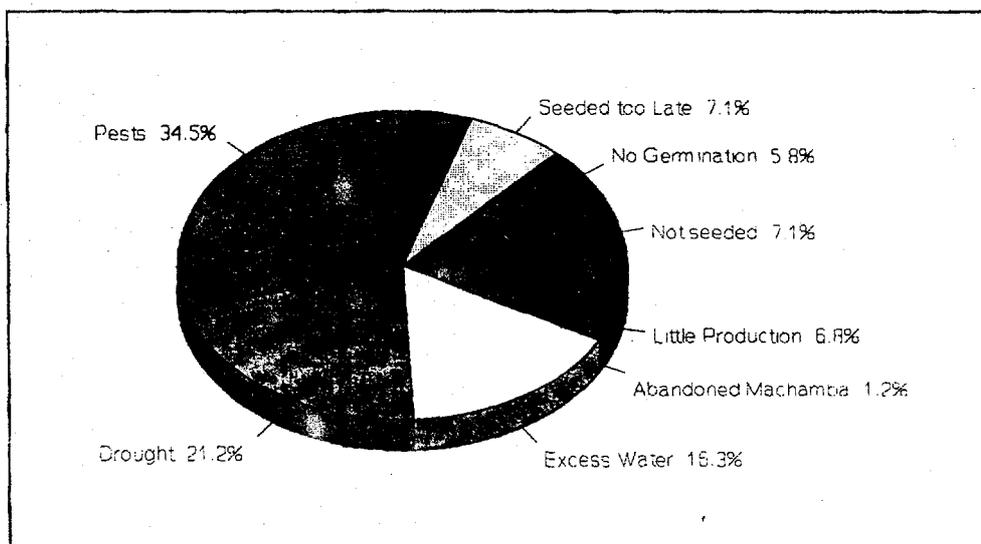


Figure 1: Reasons given for failure to harvest; expressed as a percentage of farmers surveyed.

Losses due to pest attack were mainly caused by rats and birds.

Similarly the principle reasons given for a failure to retain seeds for resowing were post-harvest losses due to pests (23.8% of total responses for not keeping seed) or low yields, suggesting that these beneficiaries were not happy with the variety.

Table 6 shows the number of secondary beneficiaries who received redistributed seed from the initial beneficiaries. In Survey 2, approximately one fifth of the initial beneficiaries redistributed seed. Farmers distributed to between one and six other people, with an average of 1.8 other people. In Survey 2, a total of 378 people were registered to have received seed/planting material from the initial beneficiaries. This number of secondary beneficiaries represents approximately 36% of the beneficiaries who initially received seed (excluding farmers who had failed to harvest cassava at the time of the survey). The crops with the greatest redistribution of seed or planting material were sweet potato, finger millet, rice and sunflower. Overall, sorghum and maize were redistributed to the most number of people and groundnut and bambara groundnut was redistributed to the least number of people.

TABLE 6: EXTENT OF THE REDISTRIBUTION OF SEED/PLANTING MATERIAL TO SECONDARY BENEFICIARIES, BY CROP (SURVEY 2).

VARIETY	NUMBER OF INITIAL BENEFICIARIES REDISTRIBUTING TO ONE TO SIX SECONDARY BENEFICIARIES						MEAN NUMBER OF SECONDARY BENEFICIARIES RECEIVING FROM EACH INITIAL BENEFICIARY	TOTAL NUMBER OF SECONDARY BENEFICIARIES FOR EACH CROP	SECONDARY BENEFICIARIES (AS A % OF INITIAL BENEFICIARIES)
	1	2	3	4	5	6			
MAIZE	28	25	4	0	1	6	2.1	131	36.3
RICE	28	33	3	0	2	0	1.7	113	53.4
COWPEA	13	4	1	0	1	0	1.5	29	23.4
CASSAVA	5	3	2	0	0	0	1.7	17	-
SORGHUM	0	4	1	0	0	0	2.2	11	12.0
SWEET POTATO	14	6	2	2	1	0	1.8	45	76.0
BAMBARA GROUNDNUT	5	2	0	0	0	0	1.3	19	35.0
MILLET	2	2	0	0	0	0	1.5	6	21.0
SUNFLOWER	1	3	1	0	0	0	2.0	10	52.6
GROUNDNUT	1	0	0	0	0	0	1.0	1	13.0
FINGER MILLET	2	2	0	0	0	0	1.5	6	120.0
TOTAL NUMBER OF INITIAL BENEFICIARIES WHO GAVE TO OTHERS	99	84	14	2	5	6	1.8	378*	36.4*

* Total number and percentage of secondary beneficiaries

Most initial beneficiaries who redistributed seed or planting material gave the seed away free of charge (in 74.4% of the cases). However, a few initial beneficiaries of maize, rice, cowpea, cassava and millet exchanged seed for other seed (Table 7). Two initial beneficiaries sold seed of rice FSV's to other people. In most cases, the initial beneficiaries gave seed/planting material away at the request of the secondary beneficiaries (59% of the cases). However in 41% of the cases the initial beneficiary offered seed/planting material to others. Seed/planting material was generally redistributed to family members (in 59.1% of the cases) while in a smaller proportion of cases the new recipients were neighbours (27.6%), friends (13.0%) or colleagues (0.3%).

TABLE 7: PROPORTION OF INITIAL BENEFICIARIES WHO GAVE SEED/PLANTING MATERIAL AWAY FREE, EXCHANGED IT FOR OTHER SEED/PLANTING MATERIAL OR SOLD IT (SURVEY 2).

VARIETY	MEANS OF EXCHANGE*		
	FOR FREE % OF INITIAL BENEFICIARIES (NUMBER)	EXCHANGED FOR OTHER SEEDS % OF INITIAL BENEFICIARIES (NUMBER)	SOLD % OF INITIAL BENEFICIARIES (NUMBER)
MAIZE	68.8 (44)	28.1 (18)	0.0 (0)
RICE	66.7 (44)	34.8 (23)	3.0 (2)
COWPEA	84.2 (16)	21.1 (4)	0.0 (0)
CASSAVA	70.0 (7)	20.0 (2)	0.0 (0)
SORGHUM	80.0 (4)	0.0 (0)	0.0 (0)
SWEET POTATO	96.0 (24)	0.0 (0)	0.0 (0)
BAMBARA GROUNDNUT	50.0 (6)	8.3 (1)	0.0 (0)
MILLET	50.0 (2)	50.0 (2)	0.0 (0)
SUNFLOWER	100.0 (5)	0.0 (0)	0.0 (0)
GROUNDNUT	100.0 (1)	0.0 (0)	0.0 (0)
FINGER MILLET	100.0 (4)	0.0 (0)	0.0 (0)
TOTAL (ALL CROPS)	74.4 (157)	23.6 (50)	0.9 (2)

* For some crops there was no response to this question so the percentages do not sum to 100.

3.3 Farmer Selected Varieties of Traditional Crops

In this section the characteristics and the fate of seed/planting material for FSV's of maize, rice, cowpea, sorghum, sweet potato and millet are described. As many farmers had not yet harvested cassava at the time of the survey only the characteristics of the varieties are described. Groundnut is not included in this section as the number of survey responses was very low. The results of the two surveys in terms of the fate of seed/planting material are shown separately in tabular form. The responses of the two surveys in terms of the proportion of beneficiaries commenting on characteristics of the FSVs, such as earliness, yield or taste have been combined and are generally presented graphically.

(i) Maize

A total of ten different maize varieties had been received by the respondents of the two surveys, although responses concerning SEMOC 1, Matuba and EV 8430SR were most numerous in Survey 1 and SEMOC 1 and Matuba in Survey 2 (Table 8). Matuba is an early flowering, open-pollinated variety which is very popular among farmers in Mozambique. Seeds of Matuba maize have been widely distributed through the ARP's Emergency Seed Distribution Program and through the "Farm Family First" Extension Network (see Appendix 1). The variety SEMOC 1 is a selection of Matuba with slightly more resistance to Maize Streak Virus. SEMOC 1 is often slightly higher yielding than Matuba, as a consequence of its slightly later maturity; SEMOC 1 flowers approximately five days later than Matuba. SEMOC 1 has performed well in the INIA/World Vision fully-replicated trials and is considered a promising variety. The variety EV 8430SR is a very early maturing white, flint selection from CIMMYT. It is lower yielding than other maize varieties because it is very early maturing. However, it is very popular as it can be harvested as green ears or dry grain much earlier than other varieties, providing food during the traditionally hungry months prior to harvest. The varieties Umbeluzi and Manica are open-pollinated, with a longer maturity. They are highly adapted to environments where the growing season is longer. Manica SR is a selection from Manica and NTS

88 is said to have a similar genetic background to Manica. R 201 is a hybrid variety and therefore is of limited use to farmers in Mozambique who cannot afford to purchase seeds every year.

The proportion of beneficiaries retaining seed for resowing was in excess of 50% for all varieties in both Survey 1 and 2. There was a higher proportion of seed kept for resowing in Survey 1 (Table 8, column 4) compared to Survey 2 (column 5), apparently because many farmers interviewed in Survey 2 had experienced crop failure (column 6). The difference between the percentage of variety beneficiaries who harvested seed (column 6) and the percentage of variety beneficiaries who saved seed and replanted (column 5) represents the percentage of beneficiaries who harvested the variety but did not replant, an average of 6% of the beneficiaries across all varieties. The variety with the highest proportion of redistribution in Survey 2 was Manica being given to an average of 2.3 people (columns 8 and 9).

TABLE 8: FATE OF THE SEED OF TEN MAIZE VARIETIES DISTRIBUTED TO BENEFICIARIES.

VARIETY	% OF MAIZE BENEFICIARIES WHO RECEIVED SEED OF EACH VARIETY (NUMBER)		% OF VARIETY BENEFICIARIES WHO SAVED SEED AND REPLANTED		% OF VARIETY BENEFICIARIES WHO HARVESTED SURVEY 2	% OF VARIETY BENEFICIARIES WHO SAVED SEED (AS % OF THOSE WHO HARVESTED) SURVEY 2	SEED REDISTRIBUTION	
	SURVEY 1	SURVEY 2	SURVEY 1	SURVEY 2			% OF VARIETY BENEFICIARIES WHO REDISTRIBUTED SURVEY 2	MEAN NO. OF SECONDARY BENEFICIARIES SURVEY 2
SEMOC 1	22.2 (16)	51.3 (183)	93.8	53.0	65.2	82.2	13.8	1.6
MATUBA	37.5 (27)	44.0 (140)	92.6	68.6	73.0	93.0	23.3	2.0
MANICA	8.3 (6)	4.8 (10)	66.7	90.0	90.0	100.0	40.0	2.3
R 201	0.0 (0)	2.5 (9)	--	67.0	67.0	100.0	11.0	1.0
MANICA SR	0.0 (0)	2.0 (7)	--	71.0	71.0	100.0	14.0	1.0
UMBELUZI	2.8 (2)	1.7 (6)	100.0	66.7	83.0	80.0	17.0	1.0
NTS 88	0.0 (0)	0.6 (2)	--	100.0	100.0	100.0	50.0	1.0
EV 8430SR	25.0 (18)	0.0 (0)	94.4	--	--	--	--	--
MMV 600	1.4 (1)	0.0 (0)	100.0	--	--	--	--	--
OBREGON	2.8 (2)	0.0 (0)	100.0	--	--	--	--	--

In Figure 2 the popular characteristics of SEMOC 1 and Matuba are shown as the proportion of seed savers making comments on each characteristic.

SEMOC 1 was particularly valued for its earliness, high yield, and taste. Farmers also commented on its ease of pounding and white flour. In addition the cobs were large. Matuba was particularly popular because of its earliness, flowering five days earlier than SEMOC 1, but was also found to

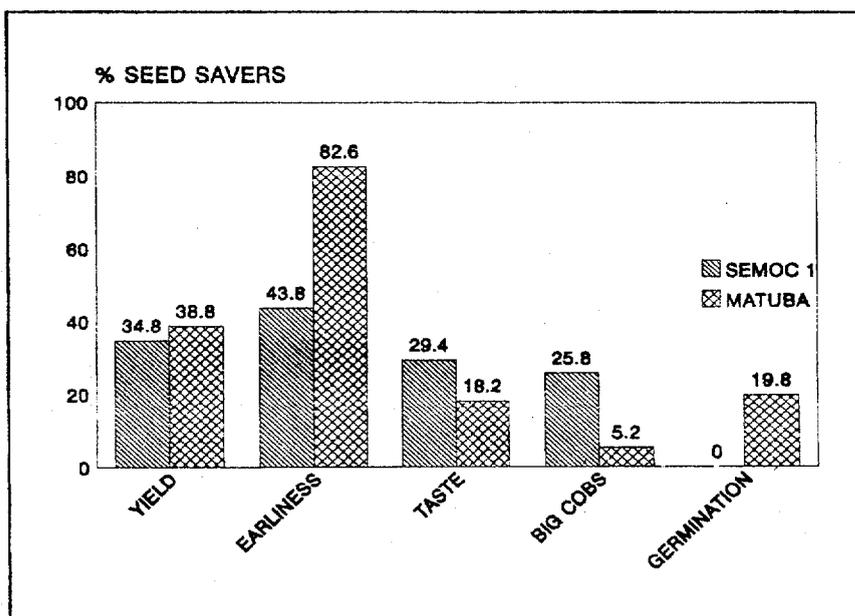


Figure 2: Characteristics identified by farmers who saved seed of the maize varieties, SEMOC 1 and Matuba.

15

yield and germinate well. The taste of Matuba was acceptable, with 18.2% of seed savers commenting on this characteristic.

Close to half of the farmers failed to harvest SEMOC 1 due to pest attack (rats, weevils or birds), drought or excess water. Some farmers lost their Matuba crops for similar reasons.

The main feature of EV 8430SR which seed savers liked was its earliness (88% of the respondents), flowering approximately six days earlier than Matuba. Surprisingly a little over half of farmers commented on its yield (EV 8430SR does not have a high yield potential because of its earliness) whereas only about 10% commented on its taste.

Farmers growing Manica found it to be productive and easy to pound, producing large quantities of flour. Umbeluzi had a good taste. Obregon was liked for its earliness in addition to its high yields and MMV 600 for its yield.

(ii) Rice

Seeds of eight rice varieties had been distributed to the respondents of these surveys, with ITA 312, Cabo Delgado and Chibiça being the most widely distributed (Table 9). ITA 312 is an improved variety of short stature which has a high yield potential under good growing conditions. Cabo Delgado is a taller regional variety considered to be more drought tolerant and resistant to the effects of flooding. Both these varieties have been widely distributed in Nicoadala District, Zambézia Province (Appendix 1). The varieties Chibiça, Oitava, Mamima, Algulha and Eunuca are all promising local varieties.

Seed of all eight varieties was retained for resowing by more than 60% of the initial beneficiaries, with the exception of PR 106. The variety PR 106 does not appear to be acceptable to farmers as it is very short and consequently suffers from flooding, competition from weeds and also drought. Averaged across all varieties, approximately 7% of the beneficiaries who harvested seed did not replant, the majority of whom had received ITA 312. It is possible that these farmers had farms which were subject to flooding and ITA 312 was considered to be less appropriate than a taller regional variety.

TABLE 9: FATE OF THE SEED OF EIGHT RICE VARIETIES DISTRIBUTED TO BENEFICIARIES.

VARIETY	% OF RICE BENEFICIARIES WHO RECEIVED SEED OF EACH VARIETY (NUMBER)		% OF VARIETY BENEFICIARIES WHO SAVED SEED AND REPLANTED		% OF VARIETY BENEFICIARIES WHO HARVESTED SURVEY 2	% OF VARIETY BENEFICIARIES WHO SAVED SEED (AS % OF THOSE WHO HARVESTED) SURVEY 2	SEED REDISTRIBUTION	
	SURVEY 1	SURVEY 2	SURVEY 1	SURVEY 2			% OF VARIETY BENEFICIARIES WHO REDISTRIBUTED SURVEY 2	MEAN NO. OF SECONDARY BENEFICIARIES SURVEY 2
ITA 312	26.9 (7)	37.9 (85)	85.7	64.7	80.0	84.0	31.3	1.6
CABO DELGADO	11.5 (3)	24.6 (55)	100.0	67.3	74.5	90.2	32.7	1.8
CHIBIÇA	34.6 (9)	16.1 (36)	100.0	69.4	75.0	96.3	27.8	1.3
OITAVA	11.5 (3)	9.4 (21)	100.0	61.9	76.0	81.3	28.6	1.7
MAMIMA	0.0 (0)	8.9 (20)	--	75.0	75.0	100.0	30.0	2.3
AGULHA	7.7 (2)	2.7 (6)	100.0	66.7	66.7	100.0	0.0	0.0
EUNUCA	0.0 (0)	0.4 (1)	--	100.0	100.0	100.0	0.0	2.0
PR 106	7.7 (2)	--	0.0	--	--	--	--	--

Seed of all varieties, with the exception of Agulha, Eunuca and PR 106, was redistributed by approximately 30% of the initial beneficiaries to between one and two people. In Survey 2, it was shown that farmers receiving Mamima redistributed seed to on average the greatest number of people (2.3).

Characteristics of the varieties ITA 312 and Cabo Delgado appreciated by seed savers are shown in Figure 3.

For ITA 312, earliness, high yields, big panicles and taste were particularly appreciated. It was also noted for its tillering ability. Cabo Delgado was appreciated for its yield, taste and particularly the size of its panicles/grains. In addition, a higher proportion of seed savers liked Cabo Delgado (16.2% of the respondents) relative to ITA 312 (8% of the respondents) because it was more drought resistant. The taller plant stature of Cabo Delgado made it easier to harvest (18.9% of the respondents) and more resistant to flooding.

The main reason for the failure of crops of ITA 312 was drought or sensitivity to flooding in the field or seedling nursery. For Cabo Delgado, crop failure occurred because of flooding in the seedling nursery or field, or due to pest attacks.

Popular characteristics of the other varieties were similar to those identified for ITA 312 and Cabo Delgado. Oitava and Chibiça were noted for their earliness and Eunuca was noted for its ease of pounding. Flooding was commonly cited as the main reason for not harvesting.

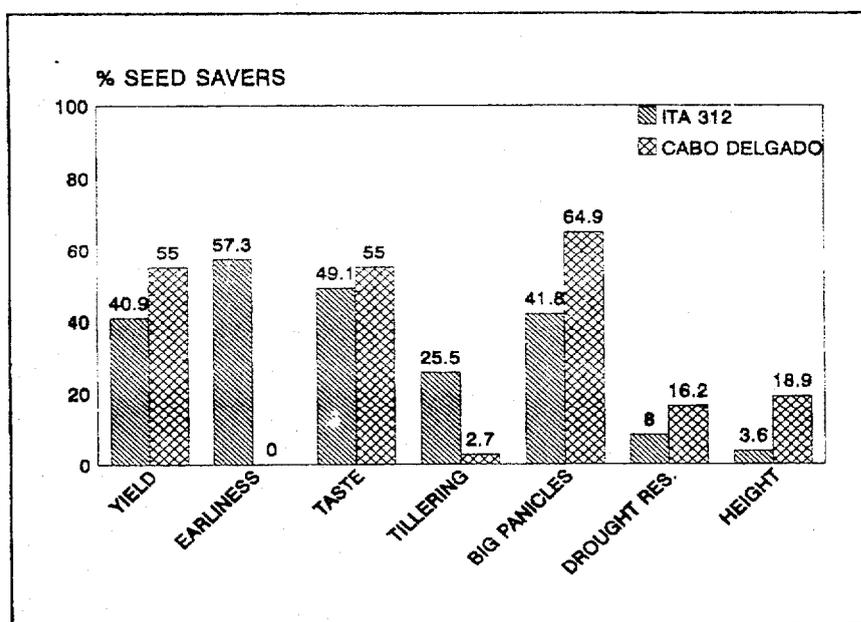


Figure 3: Characteristics identified by farmers who saved seed of the rice varieties, ITA 312 and Cabo Delgado.

(iii) Cowpea

Seeds of four cowpea varieties had been distributed to respondents (Table 10), although most survey responses were for the variety Namuesse. Namuesse is a regional variety from Zambézia Province which was originally a composite of determinate, indeterminate and prostrate plant types, as well as being mixed with the regional variety Mugoro. The ARP has purified this variety by selecting on the basis of a determinate plant type. The resulting selection of Namuesse has been shown to be higher yielding and has been multiplied by SEMOC and widely distributed through the "Farm Family First" Extension Network (Appendix 1). This variety has recently been included on INIA's list of

recognised varieties. IT18 is a commercially available cowpea variety and Brahman is a new variety shown by the INIA/World Vision trials program to be highly adapted to Mozambican conditions.

Seed of Namuesse and Brahman were retained for reseeded by over 50% of farmers in Surveys 1 and 2. The proportion of seed saved was higher in Survey 1 compared with Survey 2, largely because a number of farmers interviewed in the second survey failed to harvest seed. Only 7% of the recipients interviewed in Survey 2 harvested but did not save seed. Approximately 15% of the initial beneficiaries of these two varieties had distributed seed to an average of 1.6 and 1.0 people, for Namuesse and Brahman respectively. IT18 had a very high crop failure rate and thus seed saved and retained was low (33.3% in Survey 2).

TABLE 10: FATE OF THE SEED OF THREE COWPEA VARIETIES DISTRIBUTED TO BENEFICIARIES.

VARIETY	% OF COWPEA BENEFICIARIES WHO RECEIVED SEED OF EACH VARIETY (NUMBER)		% OF VARIETY BENEFICIARIES WHO SAVED SEED AND REPLANTED		% OF VARIETY BENEFICIARIES WHO HARVESTED SURVEY 2	% OF VARIETY BENEFICIARIES WHO SAVED SEED (AS % OF THOSE WHO HARVESTED) SURVEY 2	SEED REDISTRIBUTION	
	SURVEY 1	SURVEY 2	SURVEY 1	SURVEY 2			% OF VARIETY BENEFICIARIES WHO REDISTRIBUTED SURVEY 2	MEAN NO. OF SECONDARY BENEFICIARIES SURVEY 2
NAMUESSE	100.0 (18)	90.2 (110)	72.2	57.3	64.5	85.0	14.5	1.6
BRAHMAN	0.0 (0)	4.9 (6)	—	66.7	66.7	100.0	16.7	1.0
IT18	0.0 (0)	4.9 (6)	—	33.3	33.3	100.0	16.7	1.5

The characteristics of Namuesse that were popular with seed savers are shown in Figure 4, together with the proportion of seed savers who made comments on each characteristic.

Namuesse was generally appreciated for its earliness and productivity. Approximately one quarter of the seed savers also liked its taste and smell (22.4%) and a smaller proportion commented that the grain cooks quickly (7.9%). IT18 and Brahman were found to be productive with big seed. The main reason given for not harvesting attack by aphids and domestic birds.

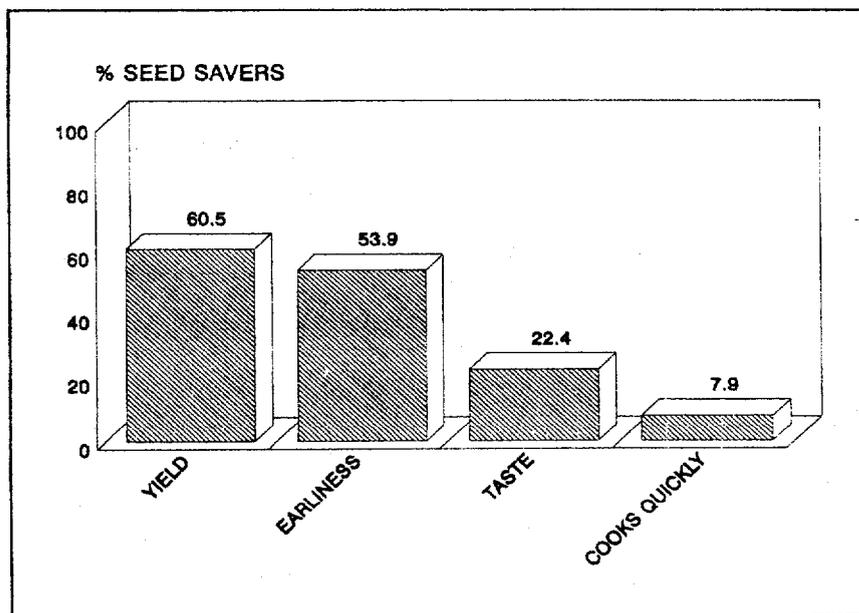


Figure 4: Characteristics identified by farmers who saved seed of the cowpea variety, Namuesse.

(iv) Cassava

Stakes of three varieties of cassava had been received by beneficiaries in Survey 2, namely Mucudo Muevia, Sergio and Mulaleia. Most responses were collected for Mucudo Muevia (82.2%), a smaller number for Sergio (14.4%) and only three for Mulaleia (3.3%). These are regional varieties which have been selected for their reliable performance, apparent tolerance to African Mosaic Virus and Green Spider Mite and relatively sweet taste (low cyanide content). Statistics on the fate of these varieties are not available as a large proportion of the farmers were interviewed when the cassava had not yet been harvested. These beneficiaries will be surveyed at a later date to determine the frequency of replanting.

Mucudo Muevia was known by the beneficiaries to be sweet due to its low cyanide content, productive, easy to sell, and quick to cook. Some farmers also described the roots as floury, a popular characteristic. In contrast to Mucudo Muevia, Sergio had a slightly more bitter taste due to a higher cyanide content. Mulaleia was not harvested by two of the three farmers because it had rotted in the ground or had been attacked by pests. One farmer was going to replant Mulaleia because he liked the taste of the roots.

(v) Sorghum

Four varieties of sorghum had been received by respondents of Survey 2 (Table 11). The majority of the respondents had received Chokwé (74.2%) and SDSL 89566 (22.5%), while a few farmers had received SV-2 (2.2%) and Macia (1.1%). In Survey 1, respondents had received Chokwé and SDSL 89566. The INIA/World Vision multi-location trials program has shown the variety Chokwé to be high yielding across many environments and palatability tests have shown it to have a highly acceptable taste. The variety SDSL 89566 has been found to have a reasonable yield potential and to be tolerant to poor soil conditions. On the basis of these observations, these varieties were distributed widely through the "Farm Family First" Extension Network (Appendix 1).

In Survey 1, the proportion of beneficiaries saving seed was high for Chokwé (75% of the initial beneficiaries) but no-one saved seed of SDSL 89566. In Survey 2, the percentage of beneficiaries saving seed of both Chokwé and SDSL 89566 was well under 50%, largely due to the lack of seeds as a result of crop failure. Only 60% of the farmers who harvested SDSL 89566 actually saved seeds. Discussions with farmers has revealed that this variety is susceptible to stem borer and has since been eliminated from the ARP multiplication and dissemination programme.

TABLE 11: FATE OF THE SEED OF FOUR SORGHUM VARIETIES DISTRIBUTED TO BENEFICIARIES.

VARIETY	% OF SORGHUM BENEFICIARIES WHO RECEIVED SEED OF EACH VARIETY (NUMBER)		% OF VARIETY BENEFICIARIES WHO SAVED SEED AND REPLANTED		% OF VARIETY BENEFICIARIES WHO HARVESTED SURVEY 2	% OF VARIETY BENEFICIARIES WHO SAVED SEED (AS % OF THOSE WHO HARVESTED) SURVEY 2	SEED REDISTRIBUTION	
	SURVEY 1	SURVEY 2	SURVEY 1	SURVEY 2			% OF VARIETY BENEFICIARIES WHO REDISTRIBUTED SURVEY 2	MEAN NO. OF SECONDARY BENEFICIARIES SURVEY 2
CHOKWÉ	57.1 (4)	74.2 (66)	75.0	33.8	39.4	80.8	6.2	2.3
SDSL 89566	42.9 (3)	22.5 (20)	0.0	15.0	25.0	60.0	0.0	0.0
SV-2	0.0 (0)	2.2 (2)	--	100.0	100.0	100.0	50.0	2.0
MACIA	0.0 (0)	1.1 (1)	--	100.0	100.0	100.0	0.0	0.0

Chokwé was not harvested on a large proportion of farms because of attack by birds, rats and on a few farms by stem borer. Because of its earliness, Chokwé is often maturing when regional sorghum varieties are flowering and therefore this variety becomes a target for bird attack, as would any other early maturing variety. Chokwé was mostly appreciated for its yield (68.1% of the seed savers) and earliness (48%). A smaller proportion of farmers commented on its taste (16%), reduced height which makes it easy to harvest in comparison to the taller regional varieties (18.2%) and the large size of its seeds or panicles (31.8%). SDSL 89566 was not harvested by many farmers due to attacks by birds. Those farmers that kept seed did so because they considered this variety to be drought resistant with good growth and big panicles. Popular characteristics of SV-2 and Macia were their earliness and short height, making them easy to harvest.

(vi) Sweet Potato

The acceptability of four varieties of sweet potato, 15 Dias, TIS 2534, INIA 18 and Cana Sumana was determined by the two surveys (Table 12). The varieties 15 Dias and TIS 2534 have performed consistently well in on-station and on-farm trials, but 15 Dias appears to establish better under water-stressed conditions. 15 Dias, TIS 2534 and Cana Sumana are all early maturing varieties yielding well after three to four months. In comparison, INIA 18 is slightly later maturing, producing high yields six months after planting. Although Cana Sumana has consistently performed well in both on station and on-farm trials, it is more susceptible to virus and has been eliminated from the dissemination programme.

The FSV's of sweet potato were the most successful of all FSV's evaluated in these surveys, with well over 60% of farmers harvesting and retaining vines. The proportion of beneficiaries redistributing vines of these FSV's was also high, ranging from 37.5% for 15 Dias to 75% for INIA 18. In the case of 15 Dias, the initial beneficiaries redistributed vines to an average of 2.2 people.

TABLE 12: FATE OF VINES OF FOUR SWEET POTATO VARIETIES DISTRIBUTED TO BENEFICIARIES.

VARIETY	% OF SWEET POTATO BENEFICIARIES WHO RECEIVED VINES OF EACH VARIETY (NUMBER)		% OF VARIETY BENEFICIARIES WHO SAVED VINES AND REPLANTED		% OF VARIETY BENEFICIARIES WHO HARVESTED SURVEY 2	% OF VARIETY BENEFICIARIES WHO SAVED VINES (AS % OF THOSE WHO HARVESTED) SURVEY 2	VINE REDISTRIBUTION	
	SURVEY 1	SURVEY 2	SURVEY 1	SURVEY 2			% OF VARIETY BENEFICIARIES WHO REDISTRIBUTED SURVEY 2	MEAN NO. OF SECONDARY BENEFICIARIES SURVEY 2
15 DIAS	32.9 (26)	67.8 (40)	88.5	67.5	82.5	81.8	37.5	2.2
TIS 2534	29.1 (23)	25.4 (15)	91.3	86.7	100.0	86.7	46.7	1.1
INIA 18	26.6 (21)	6.8 (4)	81.0	75.0	100.0	75.0	75.0	1.1
CANA SUMANA	11.4 (9)	0.0 (0)	88.9	--	--	--	--	--

In Figure 5 the characteristics of the popular variety 15 Dias are shown together with the proportion of vine savers commenting on each characteristic.

Earliness and yield were important characteristics being cited by 70% and 50% of the beneficiaries respectively. Taste and ease of replanting were also cited by beneficiaries. The tubers were described as sweet and pleasant smelling.

Earliness and yield were also features of Cana Sumana and TIS 2534. TIS 2534 was also described as having sweet tasting tubers.

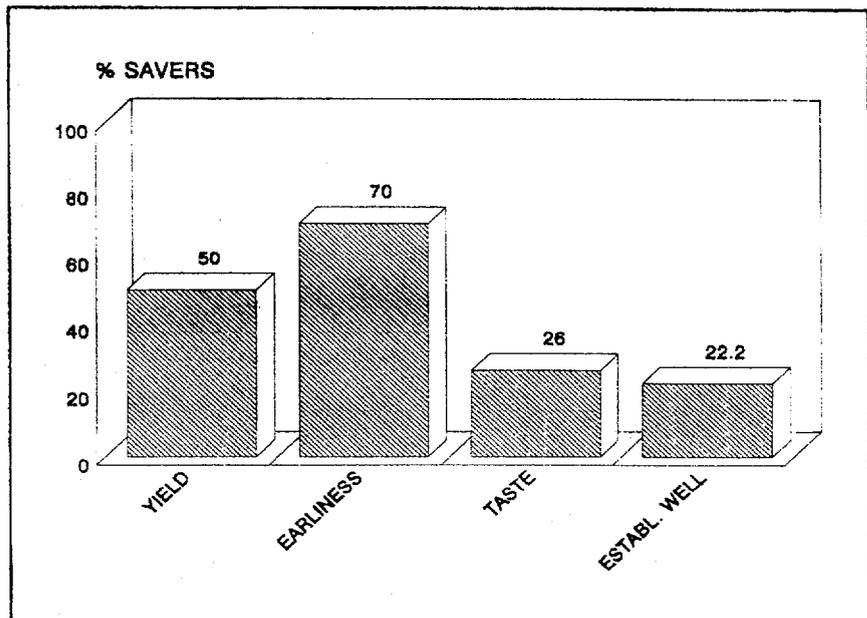


Figure 5: Characteristics identified by farmers who saved vines of the sweet potato variety, 15 Dias.

Surprisingly, INIA 18 was also noted as being early maturing by farmers in Gurúè District. This observation probably reflects the fact that the two regional varieties in Gurúè are very late maturing and therefore INIA 18 is also relatively early maturing. INIA 18 was also cited as having a good yield and sweet tubers that were also a good colour. One farmer noted it was drought resistant.

(vii) Millet

The principle millet variety distributed through the extension network was SDMV 89005, having been planted by 92.6% of the beneficiaries of FSV's of millet. Two other FSV's of millet, SDMV 90031 and SDMV 91018 were being grown by one farmer as part of an on-farm trial (Table 13). Similarly in Survey 1 the four responses concerning millet were from one farmer who received four varieties, the commercial variety RMP 1 and three FSV's SDMV 89005, SDMV 91018 and SDMV 90031 as part of an on-farm trial. The variety SDMV 89005 has been identified as high yielding in both on-station and on-farm trials and it is also popular as it is earlier maturing than the regional variety. For these reasons, this variety has been included in distribution programme carried out within the "Farm Family First" Extension Network (Appendix 1). SDMV 91018 and 90031 are also considered promising, high yielding varieties and are undergoing multiplication.

In Survey 1, seed of all four varieties was kept for resowing. In Survey 2, the proportion of seed retained and resown was only 32% for SDMV 89005, reflecting the high frequency of crop failure (60%), principally due to pest attacks (rats and birds).

TABLE 13: FATE OF THE SEED OF THREE MILLET VARIETIES DISTRIBUTED TO BENEFICIARIES (SURVEY 2).

VARIETY	% OF MILLET BENEFICIARIES WHO RECEIVED SEED OF EACH VARIETY (NUMBER)	% OF VARIETY BENEFICIARIES WHO SAVED SEED AND REPLANTED	% OF VARIETY BENEFICIARIES WHO HARVESTED	% OF VARIETY BENEFICIARIES WHO SAVED SEED (AS % OF THOSE WHO HARVESTED)	SEED REDISTRIBUTION	
					% OF VARIETY BENEFICIARIES WHO REDISTRIBUTED	MEAN NO. OF SECONDARY BENEFICIARIES
SDMV 89005	92.6 (25)	32.0	40.0	80.0	16.0	2.0
SDMV 90031	3.7 (1)	100.0	100.0	100.0	0.0	0.0
SDMV 91018	3.7 (1)	100.0	100.0	100.0	0.0	0.0

Yield and earliness were the most popular characteristics of SDMV 89005, each being mentioned by 36.3% of the respondents. Taste was also an important characteristic cited by 18.2% of the respondents, as well as its ease of pounding (22.2%). The other varieties, SDMV 90031 and SDMV 91018 were also appreciated because of their productivity, drought resistance, ease of pounding and taste.

3.4 "New Crops"

In Survey 1, the "new crops" which had been made available through the extension activities, namely sunflower, bambara groundnut, finger millet and mungbean, were saved and replanted by over 50% of the beneficiaries (see Table 3). Fifty percent or more of the initial beneficiaries also gave the seed to other people, with the exception of sunflower where only 28.6% of initial beneficiaries gave seed away. In this case, farmers often commented that they had little seed and wanted to multiply the seed first before giving seed away.

In Survey 2, sunflower appeared to be one of the most successful, as 52.6% of the initial beneficiaries saved seed and replanted this crop and 26.3% also redistributed seed to friends and neighbours (see Table 5). Finger millet was also very successful, as all beneficiaries retained seed for resowing and also distributed seed to friends and neighbours. Finger millet was liked for its earliness, tillering ability and productivity. Bambara groundnut was not as successful, as many farmers failed to harvest their crop, mainly due to drought or excess water. However seed was kept if harvested because farmers liked the taste and smell and the fact that it flowered early.

3.5 Estimation of Impact of World Vision's Programs on the Availability of Seed/Planting Material of Improved Varieties.

It is estimated that 19,000 families have seed/planting material of a range of FSV's and "new crops" available for sowing in the 1995/96 season as a result of activities in the "Farm Family First" Extension Network during the 1993/94 and 1994/95 seasons. This estimate takes into consideration the fact that: the ARP has provided seed/planting material of FSV's and "new crops" to 26,000 recipients (approximately 17,000 families) during the 1993/94 and 1994/95 seasons in the provinces of Tete, Zambézia, Sofala and Nampula (see Appendix I); that each family received seeds of approximately 1.5 different crops (note: 699 families were interviewed in Survey 2 and they gave a total of 1,055 responses); that 61.4% of the beneficiary families are saving seed/planting material and are resowing (calculated as an average of the two surveys for all crops); and that the proportion of

secondary beneficiaries receiving seed/planting material from the initial beneficiaries represent 47.9% of the initial beneficiaries who received seed/planting material (calculated as an average of the two surveys for all crops). This represents an overall increase of 10% in the number of people growing FSV's and "new crops" over the initial distribution. In a good year where constraints such as pest attacks, drought and excess water do not affect production, these percentages of people saving seed can be considered conservative (as many beneficiaries in the larger Survey 2 failed to harvest) and the frequencies indicated in the Survey 1 would be more appropriate.

It is also estimated that nearly 490,000 families have seed of Matuba as a result of the Emergency Seed Distribution Program which was made by World Vision prior to the 1992/93, 1993/94 and 1994/95 agricultural seasons. This calculation uses the number of families to whom seed of Matuba maize was distributed each season (see Appendix I for details) and assumes that 72.4% of families kept seed for resowing and obtain a viable crop each season (calculated as an average of the two surveys for Matuba maize) and that secondary beneficiaries of seed as the result of farmer to farmer exchange represent 60.5% of the initial beneficiaries each season (calculated as an average of the two surveys for Matuba maize). This represents an overall increase of 18% in the number of people growing Matuba over the initial distribution. An additional 126,000 families received Matuba maize prior to the 1995/96 agricultural campaign, suggesting that the number of farming families planting Matuba maize in the 1995/96 rainy season has reached 616,000.

4. DISCUSSION

World Vision International - Mozambique has distributed seed of farmer selected varieties and "new crops" to approximately 400,000 recipients across Tete, Zambezia, Sofala and Nampula Provinces in the 1993/94 and the 1994/95 seasons as part of the Agricultural Recovery Program's Farm Family First Extension Network and the Emergency Seeds and Tools Distribution Program (see Appendix I). This report describes the results of two surveys designed to monitor the fate of the FSV's and "new crops" distributed through the extension activities. These surveys were mainly conducted in the districts of Nicoadala and Gurùè with an intermediate number in Mocuba District and only a small number in Chinde and Caia districts. Further surveys are being conducted in other Provinces to more adequately sample the other major centres of World Vision distribution activities.

The ARP has achieved its target of at least 50% of beneficiaries retaining seed and resowing as there are 74% of beneficiaries saving seed across all crops in the first survey and 58% in the second survey. Apparent success was lower in the second survey as a relatively large number of beneficiaries failed to harvest because of pest attack, drought or excess water. In the traditional crops, FSV's of maize (saved and resown by 66.4% of the interviewees, calculated across two surveys), rice (69.2%), cowpea (58.6%), and sweet potato (81.1%) have been particularly successful surpassing the target of 50% of beneficiaries saving and retaining seeds. Farmer selected varieties of sorghum (32.3%), millet (48.4%) and groundnut (28.6%) have not been so successful according to these surveys. Sorghum and millet are not widely grown in Nicoadala and Gurùè Districts as they are not particularly adapted to the environmental conditions in these districts, thereby explaining their apparent lack of success. World Vision has distributed a higher proportion of these two crops in the drier provinces of Tete and Sofala to which these crops are more adapted (Appendix I) and surveys are underway to determine the success of the sorghum and millet FSV's under these more appropriate agro-climatic conditions. Groundnut has not as yet been widely distributed by World Vision and the respondents who were growing groundnut in Survey 2 were participating in on-farm trials. Thus the number of responses received was quite small and does not adequately sample farmers' opinion of these varieties.

The "new crops" sunflower, finger millet and mungbean were very successful with 61.5%, 100% and 66.7% of the beneficiaries saving seed for resowing, respectively. However there were some problems with bambara groundnut, footlong and lablab beans due to crop failure and poor germination. Therefore little can be said, as yet, about the adaptability and acceptability of these crops to the surveyed area.

The principal limitations to crop production were pest attack in the field or after harvesting (34.5% of all responses given for not harvesting, Figure 1), drought (21.2%) and excess water (16.3%). Pest attack was mainly by rats and birds and these problems are difficult to avoid through genetic improvement. Post-harvest storage losses can be avoided through the use of improved methods of storage and World Vision has initiated a program to demonstrate improved storage techniques and estimate storage losses. The effects of drought and of excess water can be avoided to some extent through selecting varieties which are able to escape these stresses through phenology, for example early maturity. There is a need to quantify the frequency of occurrence of these two types of stress across years to select varieties with more appropriate phenology or other tolerance/avoidance mechanisms. In addition, new management skills will help to reduce losses due to stress, such as the use of bunding in rice fields to prevent drought or better drainage to prevent flooding.

The ARP's dissemination program has resulted in a large number of farmers retaining seed of FSV's for resowing and has also stimulated some informal seed redistribution. Finger millet was particularly successful with the number of secondary beneficiaries outnumbering the initial beneficiaries by approximately 1.9 fold across the two surveys. Finger millet and sunflower produce a large quantity of very small seed, making it easy for a farmer to give a small quantity of seed away to friends and neighbours. Other successful crops where secondary beneficiaries reached 50% or more of the initial beneficiaries were sweet potato (89.5% averaged across the two surveys), millet (67.7%), sunflower (57.6%), bambara groundnut (55.5%), rice (54.4%) and maize (50.3%). For sweet potato, the crop is replanted using the vines, rather than the edible portion (the tuber) and therefore there is no conflict between a families food needs and the requirement to save planting material. Vines are also produced in quantities often in excess of the farmers requirements and therefore the farmer is more likely to give vines to others. Farmers are often aware of varietal differences in the case of crops such as maize and rice, and consequently seed exchange is more likely. Crops where there were a lower number of secondary beneficiaries in relation to the number of initial beneficiaries were cowpea (28.6%), mungbean (16.7%), sorghum (14.6%) and groundnut (14.3%). In the case of sorghum and groundnut, seeds are considered to be valuable and yields can be low, suggesting that farmers may be reluctant to give seed away from their first harvest of a new variety. In the case of cowpea, farmers show very little varietal recognition and yields are low. As a consequence, there may be less interest in seed redistribution or exchange.

The ARP appears to be having a considerable impact on the availability of improved varieties in Northern and Central Mozambique. It is estimated that approximately 19,000 families have viable seed/planting material for sowing in the 1995/96 rainy season as a consequence of activities carried out by World Vision's "Farm Family First" extension program between the 1993/94 and 1994/95 seasons. This estimation assumes that 17,000 families have received seed, that the results gained from the surveys reported here are representative of beneficiaries' seed saving and redistribution activities, and that there are no post-harvest losses. It is also estimated that almost 490,000 families have seed of Matuba maize as a result of the seed distributions made through the Emergency Seed Distribution Program prior to the 1992/93, 1993/94 and 1994/95 seasons, including initial, secondary and tertiary beneficiaries (see Section 3.5 for details).

The ARP subjects varieties to an extensive selection program before including them in on-farm trials

or releasing them into the seed distribution/dissemination programs. Interesting varieties are initially evaluated in a series of multi-location fully-replicated trials for at least two years to determine their regional adaptability. During this evaluation process, farmer field days are held at the trials sites to obtain information from participating farmers concerning the acceptability of these varieties in terms of plant type, grain type and other characters important to farmers. At the same time the ARP conducts palatability tests to determine the acceptability of the variety in terms of taste and smell. Selected varieties are then tested in a series of on-farm trials implemented by a network of farmers, in close collaboration with ARP technicians. Further feedback is gathered at this stage. Hence the ARP is usually very satisfied with the performance of a variety before it is released for wider testing. The sorghum variety SDSL 89566 is an example of a variety which looked very promising in on-station trials in terms of adaptability. However, when placed in on-farm trials, this variety proved to be susceptible to stem borer and has consequently been eliminated from the ongoing variety multiplication and dissemination program.

Due to this extensive selection process, most FSV's distributed by World Vision were very popular with farmers because they are early, high yielding and palatable. Earliness is a particularly important feature. In drought-prone conditions such as those in the Zambezi Valley, earliness is a drought avoidance strategy and early crops are able to avoid the inevitable drought which affects later maturing crops at the end of the rainy season. Early varieties are also important as they represent a source of food at a time when food stocks are low and the later maturing regional varieties are far from mature, and can be replanted in the dry season to obtain two or more crops per year. Farmer selected varieties with a high degree of acceptance as demonstrated by this survey are: the maize varieties Matuba, SEMOC 1, Manica, and EV 8430SR (information concerning the remaining maize varieties was limited as the number of respondents was low); the rice varieties ITA 312, Cabo Delgado, Chibiça, Oitava, and Mamima; the cowpea varieties Namuesse and Brahman; the sweet potato varieties 15 Dias, TIS 2534 and INIA 18; and possibly the millet variety SDMV 89005 (when evaluated under appropriate agro-climatic conditions).

5. CONCLUSIONS

This survey has shown that World Vision International - Mozambique's Agricultural Recovery Program has surpassed its target of 50% of farmers retaining and resowing seed/planting material of farmer selected varieties and "new crops" made available through the "Farm Family First" Extension Network. Farmer selected varieties that proved particularly popular in terms of seed saving and redistribution by initial beneficiaries were: the maize varieties Matuba, SEMOC 1, Manica, and EV 8430SR; the rice varieties ITA 312, Cabo Delgado, Chibiça, Oitava, and Mamima; the cowpea varieties Namuesse and Brahman; and the sweet potato varieties 15 Dias, TIS 2534 and INIA 18. The distribution of sorghum and millet FSV's in Nicoadala and Gurúè districts has not been successful, as these crops are not really appropriate for the agro-climatic conditions of these districts. Although farmers in Gurúè do grow long-season sorghum, it is clear that the FSV's identified through the ARP trial program are not well adapted to conditions in Gurúè.

The major limitations to farmers in terms of seed production were pest attack, drought and excess water. A problem such as excess water could be controlled by adequate water management. Likewise, management practices may be able to alleviate some of the water shortage problems. Problems such as attack by birds and rats are difficult to avoid. Alternative drought avoidance strategies can be adopted such as the use of early maturing varieties which mature before the late-season drought-prone periods. Varieties with tolerance to drought and excess water could also be identified if the timing and the extent of the problem were better defined. Problems related to post-

harvest storage need to be quantified. However, the use of improved storage techniques can make a significant contribution to the reduction of post-harvest losses.

World Vision is successfully making available seed of improved varieties and "new crops" through its "Farm Family First" Extension Network. This activity is in turn stimulating the redistribution of this germplasm among farmers in the areas where the ARP is operating. These surveys looked at the seed saving practices of 939 families and detected a total of 621 new recipients of seed/planting material. It has been estimated that approximately 19,000 families had FSV's and "new crops" for regrowing in the 1995/96 season as a result of these extension activities, assuming that these surveys give a typical representation of the fate of harvested seed and planting material and assuming no post-harvest losses. By a similar calculation it is estimated that 490,000 families have Matuba seed for growing in the 1995/96 season as a result of distribution activities carried out in the Emergency Seed Distribution Program prior to the 1992/93, 1993/94 and 1994/95 seasons to 361,000 families.

Further surveys are currently being conducted to more adequately sample the fate of FSV's made available through the ARP's extension networks in Sofala and Tete Provinces.

APPENDIX IA

PROPORTION OF CROPS DISTRIBUTED BY PROVINCE THROUGH THE "FARM FAMILY FIRST" EXTENSION NETWORK PRIOR TO THE 1993/94 AND 1994/95 SEASONS

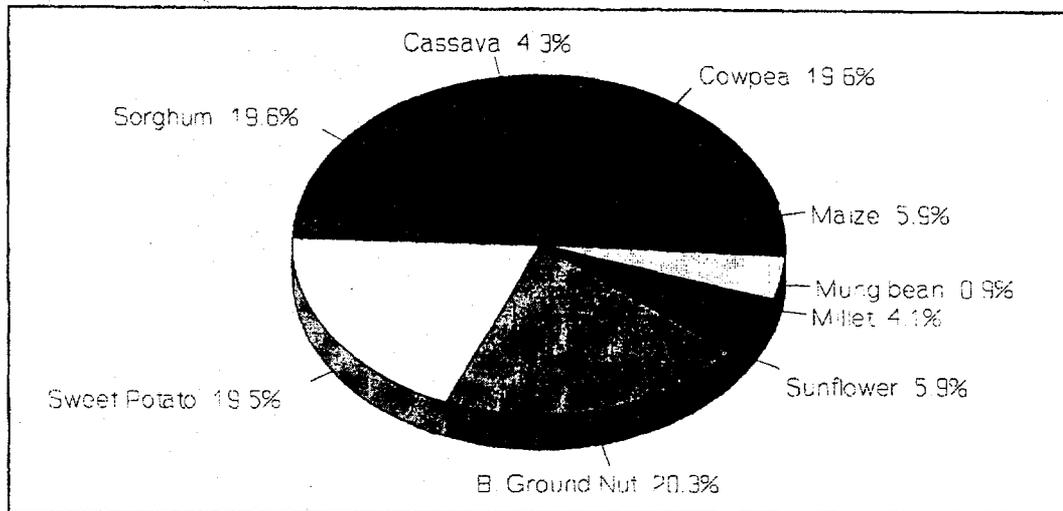


Figure A1: Proportion of different crops distributed in Tete Province as part of the "Farm Family First" Extension Network.

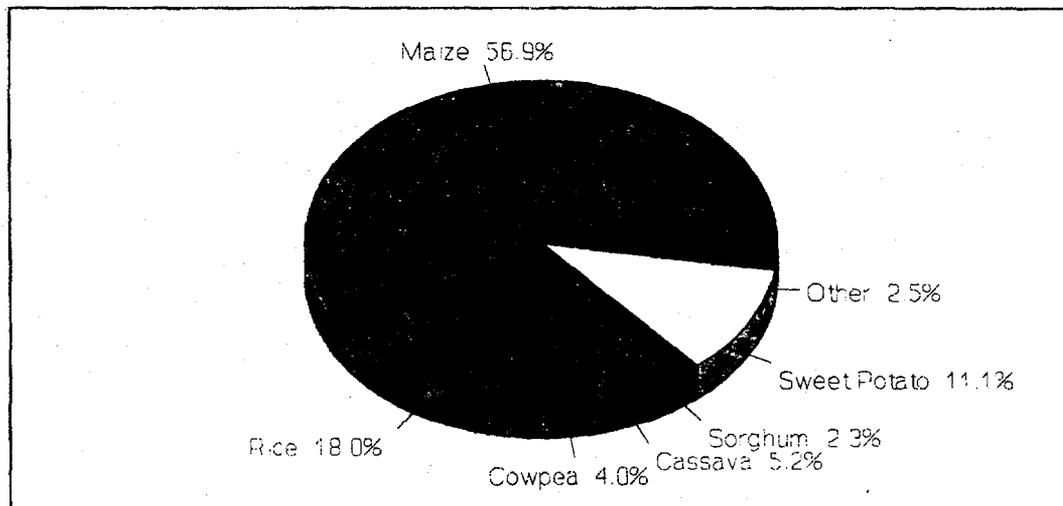


Figure A2: Proportion of crops distributed in Zambézia Province as part of the "Farm Family First" Extension Network. The other crops include sunflower (1.2%), bambara groundnut (0.6%), millet (0.5%) and mungbean (0.1%).

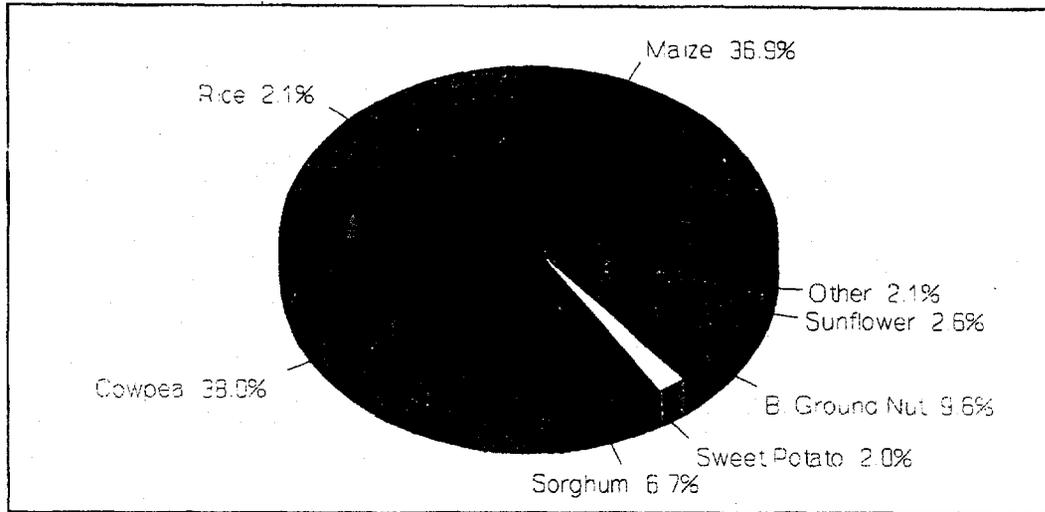


Figure A3: Proportion of crops distributed in Sofala Province as part of the "Farm Family First" Extension Network. The other crops include millet (1.3%), mungbean (0.6%) and cassava (0.1%).

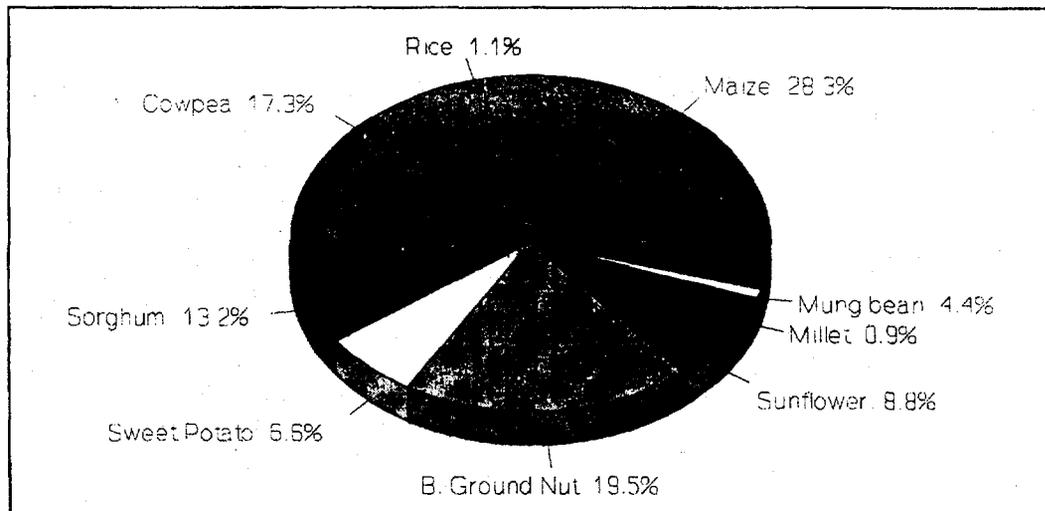


Figure A4: Proportion of crops distributed in Nampula Province as part of the "Farm Family First" Extension Network.

WORLD VISION INTERNATIONAL – MOZAMBIQUE'S AGRICULTURAL RECOVERY PROGRAM

NUMBER OF FAMILIES RECEIVING SEEDS OF IMPROVED MAIZE VARIETIES IN CENTRAL AND NORTHERN MOZAMBIQUE THROUGH THE EMERGENCY SEEDS AND TOOLS DISTRIBUTION PROGRAM, 1992/93 TO 1994/95 SEASONS

PROVINCE/ DISTRICT	1992/93 MATUBA	1993/94 MATUBA	1994/95 MATUBA	1995/96 MATUBA	TOTAL 1994/95 MATUBA	TOTAL 1994/95 UMBELUZI	TOTAL 1994/95 UMBELUZI	TOTAL 1994/95 MANICA	TOTAL MANICA
TETE PROVINCE									
ANGONIA	0	0	0	0	0	21918	21918	0	0
TSANGANO	0	0	0	0	0	10524	10524	0	0
CABORA BASSA	0	2486	10857	6380	19723	0	0	0	0
CHANGARA	0	2914	13424	10564	26902	0	0	0	0
CHIUTA	0	1403	10665	3525	15593	0	0	0	0
MOATIZE	0	10706	22438	8941	42085	0	0	0	0
MAGOE	0	3926	4026	5750	13702	0	0	0	0
CHIFUNDE	0	1100	3930	4690	9720	3124	3124	140	140
MUTARARA	740	12720	31120	25000	69580	0	0	0	0
MARAVIA	0	0	4887	6000	10887	0	0	3189	3189
MACANGA	0	928	0	1000	1928	7714	7714	0	0
ZUMBO	0	0	415	3000	3415	0	0	1147	1147
TOTAL TETE	740	36183	101762	74850	213535	43280	43280	4476	4476
MANICA PROVINCE									
GURO	0	0	1587	0	1587	0	0	7475	7475
TAMBARA	0	4033	5326	0	9359	0	0	925	925
TOTAL MANICA	0	4033	6913	0	10946	0	0	8400	8400
SOFALA PROVINCE									
CAJA	6477	10600	14051	9395	40523	0	0	0	0
MARINGUE	0	0	0	3000	3000	0	0	0	0
CHEMBA	0	11400	10665	12807	34872	0	0	0	0
TOTAL SOFALA	6477	22000	24716	25202	78395	0	0	0	0
ZAMBEZIA PROVINCE									
MOPEIA	1110	2250	2646	1498	7504	0	0	0	0
CHINDE	2000	6000	1241	0	9241	0	0	0	0
MORRUMBALA	0	7750	263	18064	26077	0	0	0	0
MILANGE	0	0	0	6000	6000	0	0	0	0
NICOADALA	1500	719	259	0	2478	0	0	0	0
MORRUA	1000	0	0	0	1000	0	0	0	0
MULEVALA	3400	0	0	0	3400	0	0	0	0
LUGELA	0	0	536	0	536	0	0	0	0
GURUE	200	1168	0	0	1368	0	0	0	0
MOCUBA	0	400	0	0	400	0	0	0	0
TOTAL ZAMBEZIA	9210	18287	4945	25562	58004	0	0	0	0
OVERALL TOTAL	16427	80503	138336	125614	360880	43280	43280	12876	12876

APPENDIX I B

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WORLD VISION INTERNATIONAL - MOZAMBIQUE'S AGRICULTURAL RECOVERY PROGRAM

NUMBER OF FAMILIES RECEIVING FARMER SELECTED VARIETIES AND NEW CROPS IN CENTRAL AND NORTHERN MOZAMBIQUE THROUGH THE 'FARM FAMILY FIRST' EXTENSION NETWORK, 1993/94 AND 1994/95 SEASONS

PROVINCE/ DISTRICT	MATUBA MAIZE	UMBELLIZI MAIZE	SEMOC 1 MAIZE	EV8430 MAIZE	MANICA MAIZE	CHUPA/ ITA 312 RICE	CHOKWE SORGHUM	SDSL 89566 SORGHUM	SDMV 89005 MILLET	NAMUESSE COWPEA	FSV'S SWEET POTATO	FSV'S CASSAVA	BAMBARA GROUNDNUT	SESAME	MUNGBEAN	SUNFLOWER	FRUIT CROPS
TETE PROVINCE																	
CHANGARA	0	0	0	10	0	0	110	80	30	45	281	0	110	0	0	0	0
CHIUTA	0	0	10	0	0	0	50	0	30	30	20	0	80	20	0	20	0
MACANGA	0	20	20	0	0	0	50	0	0	70	132	0	110	0	20	50	0
ANGONIA	0	10	10	25	0	0	0	0	0	30	0	96	50	0	0	20	0
MUTARARA	0	0	0	25	0	0	105	80	30	50	0	0	100	100	0	40	0
TOTAL TETE	0	30	40	60	0	0	315	120	90	225	433	96	450	120	20	130	0
ZAMBEZIA PROVINCE																	
CHINDE	0	0	0	0	0	0	0	0	0	0	0	0	10	20	0	40	112
NICOADALA	5391	10	282	98	0	3647	139	0	113	238	137	349	20	10	10	40	1276
MOCUBA	243	10	57	0	0	45	55	0	0	5	14	0	20	10	10	40	320
MORRUMBALA	636	0	0	525	0	0	0	0	0	497	0	0	0	0	0	0	0
MORRUA	20	5	20	25	20	0	50	20	0	60	40	0	70	10	10	40	120
GURUE	4103	20	256	50	0	17	210	0	0	35	2093	735	10	0	0	80	1204
TOTAL ZAMBEZIA	10393	45	595	698	20	3709	454	20	113	835	2284	1064	130	50	30	240	3032
SOFALA PROVINCE																	
CAIA	33	0	40	1074	0	85	110	100	40	1184	61	5	300	200	20	80	100
TOTAL SOFALA	33	0	40	1074	0	85	110	100	40	1184	61	5	300	200	20	80	100
NAMPULA PROVINCE																	
MORRUPULA	25	5	10	25	0	5	30	0	2	40	20	0	45	10	10	20	100
NAMAPA	25	5	9	25	0	0	30	0	2	39	10	0	44	10	10	20	0
TOTAL NAMPULA	50	10	19	50	0	5	60	0	4	79	30	0	89	20	20	40	100
OVERALL TOTAL	10476	85	694	1882	20	3779	939	240	247	2323	2808	1185	969	390	90	490	3232

APPENDIX IC

APPENDIX II

FICHA DE INQUÉRITO SOBRE DISSEMINAÇÃO DE VARIEDADES CULTURAIS NO CAMPO¹

Província: _____ Distrito: _____ Localidade: _____ Bairro: _____

Data de Inquérito: Mes _____ Dia _____ Ano _____ Proprietário: _____

DADOS SOBRE CULTURA (1)

Cultura: _____ Variedade: _____ Quando Recebeu ? Mes _____ Dia _____ Ano _____

Semente de Quem ? _____

Para que Objectivo ? () Ensaio () Distribuição () Multiplicação () Experiência

Guardou Sementes ? () Sim () Não Plantou de Novo ? () Sim () Não

Porquê (1a. Razão) ? () Precoce () Rendimento () Segurança () Incerteza () Outro

Porquê (2a. Razão) ? () Precoce () Rendimento () Segurança () Incerteza () Sabor

Iniciativa na Disseminação () Demo/Dist () Pedido () Outro

Como Distribuiu ? () Grátis () Troca () Venda () Outro A Quantas Pessoas _____

Quem são e como se Relaciona ?

Nome	Relação	Morada
_____	_____	_____
_____	_____	_____
_____	_____	_____

DADOS SOBRE CULTURA (2)

Cultura: _____ Variedade: _____ Quando Recebeu ? Mes _____ Dia _____ Ano _____

Semente de Quem ? _____

Para que Objectivo ? () Ensaio () Distribuição () Multiplicação () Experiência

Guardou Sementes ? () Sim () Não Plantou de Novo ? () Sim () Não

Porquê (1a. Razão) ? () Precoce () Rendimento () Segurança () Incerteza () Outro

Porquê (2a. Razão) ? () Precoce () Rendimento () Segurança () Incerteza () Sabor

Iniciativa na Disseminação () Demo/Dist () Pedido () Outro

Como Distribuiu ? () Grátis () Troca () Venda () Outro A Quantas Pessoas _____

Quem são e como se Relaciona ?

Nome	Relação	Morada
_____	_____	_____
_____	_____	_____
_____	_____	_____

¹ World Vision International - Divisão de Agricultura

FICHA DE INQUÉRITO SOBRE DISSEMINAÇÃO DE VARIEDADES MELHORADAS/SELECIONADAS

Nome do entrevistador: _____
 Província: _____ Distrito: _____ Localidade: _____ Bairro: _____
 Data do Inquérito: Dia _____ Mês _____ Ano _____ Nome do Dono da Machamba _____

Cultura: _____ Variedade: _____ Quando recebeu: Mes _____ Ano _____ Época _____
 Recebeu Semente de Quem (Nome do Extensionista/Camponês): _____ Comprou?: () Sim () Não
 Para que Objectivo? () Ensaio na machamba () Distribuição () Experiência () Multiplicação
 Colheu? () Sim () Não Se não colheu, porque? _____
 Se colheu, guardou semente para resemear? () Sim () Não Se não guardou semente, porque?

1. _____ 2. _____

Se guardou semente para resemear, explica as características que gostou deste semente:

1. _____
2. _____
3. _____
4. _____

Vai semear as sementes de novo? () Sim () Não Já semeu as sementes de novo? () Sim () Não
 Distribuiu sementes a outras pessoas? () Sim () Não A Quantas Pessoas: _____
 Se sim, porque? () Ofereceu () Pediram Outro _____
 Como distribuiu? () Gratis () Troca () Venda Outra _____

Nome do Beneficiário	Relação	Morada
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Nome do entrevistador: _____
 Província: _____ Distrito: _____ Localidade: _____ Bairro: _____
 Data do Inquérito: Dia _____ Mês _____ Ano _____ Nome do Dono da Machamba _____

Cultura: _____ Variedade: _____ Quando recebeu: Mes _____ Ano _____ Época _____
 Recebeu Semente de Quem (Nome do Extensionista/Camponês): _____ Comprou?: () Sim () Não
 Para que Objectivo? () Ensaio na machamba () Distribuição () Experiência
 Colheu? () Sim () Não Se não colheu, porque? _____
 Se colheu, guardou semente para resemear? () Sim () Não Se não guardou semente, porque?

1. _____ 2. _____

Se guardou semente para resemear, explica as características que gostou deste semente:

1. _____
2. _____
3. _____
4. _____

Vai semear as sementes de novo? () Sim () Não Já semeu as sementes de novo? () Sim () Não
 Distribuiu sementes a outras pessoas? () Sim () Não A Quantas Pessoas: _____
 Se sim, porque? () Ofereceu () Pediram Outro _____
 Como distribuiu? () Gratis () Troca () Venda Outra _____

Nome do Beneficiário	Relação	Morada
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____