FOOD FOR THE HUNGRY INTERNATIONAL MOZAMBIQUE

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FISCAL YEAR 2001 RESULTS REPORT
FISCAL YEAR 2003/2004 RESOURCE REQUEST (CSR4)

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I. RESULTS REPORT

A. ANNUAL RESULTS

Food for the Hungry / Mozambique (FHI/M) focuses on improving household food security and maternal and child health care for almost 47,000 households. During the final program evaluation 51%, 29%, and 45% of the households in Marromeu, Nhamatanda, and Gorongosa respectively, said they had received assistance at some time from FHI/M agricultural extensionists or leader-farmers. The nutrition/health program, which focused specifically on mothers with children under 2 years of age, reached nearly 38,000 mothers directly with health/nutrition messages. The end-of-project evaluation of the overall performance of both programs, as measured by Life of Activity (LOA) targets, revealed that the agriculture and health components met or exceeded almost 65% of targets (using standard questioning on the health survey). Improvements over the baseline conditions occurred, even in the case of unmet targets, in virtually all measured indicators. Furthermore, differences between households participating in FHI/M programs (assisted households) and non-participants (un-assisted households) as revealed by target indictors were frequently dramatic. In terms of the overarching goal of improving the economic base of the communities in which FHI/M worked, the Michigan State University income proxy model (Incprox) indicated a significant rise in incomes of participating households, increased participation in agricultural marketing, and a broader base of crop production. In regard to food security, farmer-reported harvests indicate that the number of months' supply of food staples increased in every district by one to ten months indicating much greater resilience to a failed harvest in a country that has recently been impacted by both drought and floods.

One measure of the impact of the combined nutrition/agriculture program can be found in the percent of the children that are underweight or exhibit stunting. At the end of the project stunting had decreased on average 21% among children under 2 years of age. Thus the messages which encourage better disease prevention practices combined with improved nutritional practices appear to have had a rather dramatic impact on the future of the children living in the communities in which FHI/M works.

ONE STORY - ONE HOUSEHOLD

Two years ago members of the community of Nhataca, in the district of Gorongosa came to FHI/M and requested that an agricultural extensionist be sent to work with them. Their interest in FHI/M resulted from one man's success at convincing his neighbors of the benefits of participation in the collective marketing groups promoted by FHI/M extensionists. Much has happened since the time when the man, Pascal Afice, convinced his neighbors of the benefits of the DAP-funded program. Pascal is now the secretary of his own marketing association as well as for other groups in the marketing zone. He explained that in the first year he received instruction on basic techniques to increase production. This year the focus was on marketing his surplus along with other members of his association. "The great quantity of products that we are able to put together as a group makes it easier to find a buyer at a good price," he commented.

As secretary for the zone Pascal keeps busy. "[The zone officers] get together and compare data. Then they try to distribute this information outside of the district to find a buyer." He went on to explain that his job is to work on issues of importance to the groups. The people trust and listen to him. Pascal proudly states, "We want to be known as a group that's working together and accomplishing something." Right now the group is working on widening the dirt path that leads to the main road. Their work will not only make the farmers more accessible to buyers, it will also enable the local ambulance to reach the area. Next year there are plans afoot for a group farm of sesame, because the price is good and together they can cultivate a larger field.

Pascal Afice is not the only one in his family benefiting from FHI/M programs. His wife, Polena João, also participates in the extensionists training and in FHI's nutrition/health program as well. She is very satisfied with both trainings she receives. She has already noticed a difference in her agricultural production. At the time of the interview she had sacks of maize en route to be sold. Both Pascal and his wife are thankful for the extra income. Last year the extra money helped to buy a bicycle. This year Pascal hopes to buy tin roofing for his house. Polena plans to spend the money she earns on soap, schoolbooks, and clothes for the children.

A.1 AGRICULTURE PROGRAM

Overall Goal

The overall goal of the agriculture program was to increase the percentage of farmers selling their produce and increase household incomes through improvement of production and marketing development**.** Detailed progress towards achieving these objectives is provided in the performance-tracking table.

Marketing And Farmer Group Development

During the year 2001, marketing promotion and farmer group formation and development was a main focus. The main thrust of the agriculture program is to increase sustainable agricultural output of target farmers in the project area through improved productivity and training and linkage to market outlets. FHI's approach has been to focus on a few key crops with high commercial potential and low production risk to the farmer, namely maize, rice, pigeon peas, birds eye chili peppers, sesame seed, vegetables and honey. FHI continued to foster the development of farmer groups and associations that are able to make the market linkages to sell their produce jointly for the best possible prices.

FHI conducted a final survey of the project in October 2001 and the results did indicate significant improvement in marketing as compared to the baseline. Assisted farmers also showed a marked difference in quantities of produce they sold during the year (See Annex 3). Household maize production increased from US $ 373 to US $ 473 by the close of the project. In terms of assisted versus non assisted farmers the former sold comparatively more crops as depicted in the figure 1. The figure also compares assisted and non-assisted farmers. In all cases, the assisted farmers performed better. In Nhamatanda for example, the number of crops produced for sale increased from a baseline figure of 1.4 to 2.5. The same trend was observed in all the other districts.

FHI played the role of a facilitator rather than direct negotiator. Although FHI did some limited negotiation with commodity buyers on farmer's behalf, farmers continued as in the previous year to transport their produce to central district buying points. Now that increased quality and quantity of

agricultural produce offered for sale has reached acceptable levels, commodity buyers are more readily investing in district level marketing. This includes warehousing, transport to collect the product from communities and bring it to their central warehouses; and seasonal purchasing staff who pay farmer marketing groups directly.

Maize topped the scale in sales with majority of farmers during the year 2001. **Table 1** below, from the September survey, compares percentage households indicating sales of crops produced for both food and sale.

As reported last year, FHI has continued to be successful with introduced cash crops. Maize clearly stands out as the key crop most farmers produced and sold. The other crops promoted included pigeon peas and sesame. Markets for these are also expanding significantly.

During the year V&M took over as the main buyer from Mozambique Industrial. The table above indicates that there has been a marked increase in number of crops being offered for sale when baseline position is compared with end of the project in September 2001. Gorongosa communities appear to be selling less of all crop types. The reasons for this are not clear, but it may be due to increased storage. Training on storage has also been very rigorous in this district.

Promotion of apiculture continued to receive focus from FHI. The available market outlet required high quality honey that has not been possible using traditional hives. The use of Kenya Top Bar (KTB) hives has been emphasized. FHI arranged for construction of 60 modern hives to be used for demonstration purposes. These will be ready for use by the beginning of the DAP II. The hives are being assembled locally by an FHI trained carpenter based in Lamego.

Table 1: Percentage of total households that sold major crops:

	Percentage of total households that sold major food, oilseed and commercial crops (among total households)					
CROP PRODUCTION INDICATORS	**Marromeu**		**Nhamatanda**		**Gorongosa**	
	Baseline N=300	**End-of-Project N=550**	**Baseline N=300**	**End-of-Project N=550**	**Baseline N=300**	**End-of-Project N=550**
	1996/97 season	**1999/00 season**	**1996/97 season**	**2000/01 season**	**1997/98 season**	**2000/01 season**
% total households that sold each crop						
Maize	24	43	22	23	69	26
Rice	3	11	0	3	1	0
Cassava [1]	0	21	1	3	8	0
Pigeon pea [1]	0	15	0	4	2	1
Sorghum	2	5	1	1	14	2
Cowpea	0	10	3	5	3	2
Millet	1	3	0	0	0	0
Groundnut	0	2	1	1	3	2
Common bean	0	4	0	1	11	7

[1] At the time of the survey, the majority of the pigeon pea, cassava and sweet potato crops were still in the field.

& Statistically significant differences between years are presented by shading.

Production Extension

FHI continued to provide training to 2,328 farmers during the year -short of the target established at 6,640. Despite that the cumulative number of farmers trained was 24,659 against the target of 25,210. Out of this total figure, the leader farmers trained 2,046 during the year and 10,230 by the closure of DAP 1.

The results of the training provided by the project extension team and the leader farmers was a clear increase in output from maize which was one of the key crops promoted during the year. Farmers were able to sell part of the produce and have enough to eat. Table 2 below provides a comparison between the baseline and end-of-project position. Over 80% increase was achieved against 40% target set at the beginning of the project life.

Table 2: Average production (kilograms) of maize produced during the rainy season, per households that grew the crop:

Maize	Baseline/FY 1997	FY 1997 Achieved	FY 2001 Target	FY 201 Achieved	LOA Target	LOA achieved
Yield in Kgs/hh	373	373	522	473	610	473

The above results could have been better had production not been affected by the heavy flooding at the beginning of the fiscal year. Improved spacing practiced by majority of the assisted farmers had a big impact on increased productivity. Adoption of 0.6 –0.9 m spacing lead to the achievement of optimum plant population.

Rural Enterprise Development

This component focused mainly on input supply. Lack of strong local business men/women interested in stocking farm inputs remained a problem as reported in the last CSR 4. FHI however continued to promote the development of local input supply systems. One major step was to stimulate the interest of a major input supplier for the region to support small scale input networks. As a result SEMOC is now in the process of opening up stores in major centers. Efforts will be made to keep this interest alive. So far the 15 local suppliers reported last year still exist and will continue to be supported with relevant input marketing information. They have also committed to work with selected farmers in production of seed at local level. The first multiplication centers will be established during the November December rains of 2001 as part of the new DAP activities.

Adaptive Research

The FY 2001 marked the end of reasearch at the Lamego station. Useful data was collected while some information was shared in the process of experimantation, use of the station by farmers and staff was not as intensive as the previous year mainly due to reduced program activities. Focus was put on documenting the data collected for wider dissemination. Some 40 trials were conducted at the station.

The targets set for the research activities were however attained. 44 trials were conducted as planned indicating 100% achievement of LOA target. Field days were regularly conducted in the station and a total of 349 extensionists attended the different sessions out of a target of 210. Visits to the plot was also one way of training farmers and arrangements were made for some 1,256 farmers to benefit

from the results. This was short of the 1,900 target. The reason for the short fall was mainly because of the distances from the various districts.

The final report of all activities and results for the Lamago Station were recently completed and will be available under a separate cover.

A.2 Nutrition / Health

Overall Goal

Ultimately the nutrition component seeks to complement food security by minimizing disease and behavior that leads to malnourishment. One of the most direct measurements of malnourishment comes from anthropometric measurements of children. However, this is a long-term problem so dramatic results can not be expected. In light of this, other indicators have been developed which measure factors which contribute to malnourishment. As would be expected, performance on these intermediary indicators shows more dramatic improvement than the indicators of malnourishment (see performance tracking tables). However, it is gratifying to note that the anthropometric targets directly measuring malnourishment were met, with children in assisted households performing much better than unassisted households.

Growth Monitoring

Growth monitoring enables prediction of a child's risk of future morbidity and mortality, and to detect growth faltering earlier, so that appropriate measures can be taken in a timely manner. It also assists health workers to diagnose children who are suffering from, or are in danger of suffering from malnutrition. Children that are seriously malnourished and who may need counseling, referral or food supplements can also be identified through regular growth monitoring. Although comparisons could not be made with baseline findings, the final survey measured additional growth monitoring indicators, which revealed that 82.7% of the children had growth monitoring cards, 68.3% of the children were weighed at birth and 88.1% of them weighed at any time after birth.

Anthropometric nutritional status was determined using the indicator for stunting or chronic malnutrition (Height-for-age). Accordingly, about 51% of the children in the age group 0-23 months were reported to have stunting (H/A <-2.0 SD) in the baseline survey. The corresponding level at final evaluation in the three districts was determined to be 30.0%, which is lower by 21.0%. The level of severe stunting has also shown remarkable decline. However, the use of stunting indicator (based on height-for-age) is not recommended for monitoring and evaluation purpose, as stunting does not respond to interventions in the short-term. Instead, underweight (weight-for-age) which is a composite measure of both acute (wasting) and chronic (stunting) malnutrition is suggested as the indicator of choice to assess changes in the magnitude of malnutrition over time. Accordingly, the final evaluation has measured the prevalence of underweight in the three districts to be 30.3%.

Table 7. Nutritional Indicators. Sofala province, July 2001.

NUTRITION					
Indicator	Target	Final Evaluation Results			
		All districts	Gorongosa	Marromeu	Nhamatanda
Exclusive breast feeding (0-4 moths) [Simple questioning]	65%	60.9%	74.5%	31.7%	55.1%
Continued breastfeeding (20-23 months)	65%	65.3%		53.1%	77.0%
Children getting at least three meals a day (6-10 months)	70%	57.6%	61.6%	50.0%	62.1%
Children With oil added to their weaning food in the last seven days (6-10 months)	70%	72.8%	77.4%	65.7%	76.6%
Children consumed at least one vitamin A rich food rich food the previous day	80%	93.6%	95.2%	91.6%	94.1%
Stunting (HAZ<-2)	<32%	30.3%	30.4%	30.2%	30.3%

Program Constraints

The year 2001 was significantly impacted by flooding in February. The entire FHI staff took part in one way or another on relief efforts which disrupted normal activities well into the year. In Marromeu for example, it was not possible to record any agricultural production during the harvest season as a good part of most productive areas was under water.

AGRICULTURE PERFORMANCE TRACKING TABLES

Indicator	District	Baseline	FY 1997 Target	FY 1997 Achieved	FY 1998 Target	FY 1998 Achieved	Achieved vs. Target	FY 1999 Target	FY 1999 Achieved	Achieved vs. Target	FY 2000 Target	FY 2000 Achieved	Achieved vs. Target	FY 2001 Target	FY 2001 Achieved	LOA Target	LOA Achieved
Rural household income increased in targeted areas																	
1. Total household income increased by 10%[1]	Nham	$253		$253				$266	$398	150%				$278	$476	$278	$476
	Marr , Gor	$239		$239				$251	$314	125%				$263	$687	$263	$687
Increased sustainable agricultural output of target area households																	
2. The total production of maize per household increase by 40% measured in Kgs	Nham & Marr	373		373				448	360	80%				522	473	610	473
Target area households increased their potential for grain self-provisioning																	
3.A four month increase in the number of months a household is able to subsist from the last harvest[2]	Nham& Marr	*8.1*		8.1				10.1	13.1	130%				12.1	12.25	12.1	12.25
Increased productivity of staple food crops by target area households																	
4. Maize yield increase (Kgs/ha) by 20%	All	1,300	1,300	1,295	1,398	1,227	88%	1,495	2,001	134%	1,528	2,050	134%	1,560		1,560	

[1] Measured at baseline, Midterm (except for Gorongoza) and INCPROX calculation used in final

[2] Average for grains used to calculate end of project result as per final survey report.

Indicator	District	Baseline	FY 1997 Target	FY 1997 Achieved	FY 1998 Target	FY 1998 Achieved	Achieved vs. Target	FY 1999 Target	FY 1999 Achieved	Achieved vs. Target	FY 2000 Target	FY 2000 Achieved	Achieved vs. Target	FY 2001 Target	FY 2001 Achieved	LOA Target	LOA Achieved
Target area households decreased proportion of harvest crop lost to pest damage or environment																	
5. Percentage of harvested maize lost in storage decreased by 35%	Marr	6.80%		6.80%				5.78%	8.23%	70%				4.42%	N/A	4.42%	N/A
Target area households increased income from the sale of agricultural produce																	
6. Percentage of households selling produce from their farms increase to 55% in Marromeu and 50% in Nhamatanda[3]	Nham	34%		34%				45%	46%	102%				55%	41%	55%	41%
	Marr	30%		30%				40%	26%	65%				50%	62%	50%	62%
7. Household income from maize sales increased by 40%	Nham & Marr	$10.23		$10.23				$11.76	$15.83	135%				$14.32	$19.5	$14.3	90%
8. 35% increase in the percentage of households who sold more than three crops / vegetables/ fruits / forest products	Gor	27%							27%					36.5%	47%	36.5%	47%
Increased availability of agricultural inputs in target area																	
9. Number of agents and stores selling agricultural inputs increased from 3 to 15*	Nham& Marr	3		3	5*	16	320%	9*	24	267%	12*	12	100%	15*	15	15	15
10. Total income of owners and employees of agricultural input suppliers increased by 40%[4]	Nham & Marr	$2,808				$2,808		$3,299	$7,070	214%	$3,791	$1,891	50%	$3,931		$3,931	

[3] FY 2001 achieved is considered as LOA achieved too

[4] Information on this indicator was not collected in FY 2001 due to difficulty in obtaining reliable information

Indicator	District	Baseline	FY 1997 Target	FY 1997 Achieved	FY 1998 Target	FY 1998 Achieved	Achieved vs Target	FY 1999 Target	FY 1999 Achieved	FY 1999 Achieved vs Target	FY 2000 Target	FY 2000 Achieved	FY 2000 Achieved vs Target	FY 2001 Target	FY 2001 Achieved	LOA Target	LOA Achieved
Increased number of target area households who have improved their agricultural knowl., attitudes & practices																	
11. Increase in percentage of farmers that have adopted at least 8 project recommended practices [5]	Nham& Marr	17.5%		27%				30%	27.5%	92%				41%*	25%	41%*	41%
13. 50% increase in the percentage of project area individuals who can identify three possible sustainable land management techniques.	Gor	14%				14%								21%	25%	21%	25%
. 75% increase in percentage of ditional leaders that understand e threat imposed by unsuitable ming practices. [6]	Gor	0				0								0	0	0	0
15. 35% increase in the implementation/adoption of more sustainable land management techniques in the project area [7]	Gor	32.00%				32%								43.40%	50%	43.40%	50%
16. 50% decrease in the percentage of farmers burning their fields in the project area. [8]	Gor	81.00%				81%								40.50%	22%	40.50%	22%
17. Percentage of households that have implemented improved crop storage technology increased by 50% [9]		Husks		Husks				Husks	Husks	Husks				Husks		Husks	
		38%		38%				45.60%	65%	143%				57%	71%	57%	71%
		Smoke		Smoke				Smoke	Smoke	Smoke				Smoke		Smoke	
	Marr	26%		26%				31%	30%	96%				39%		39%	

[5] The final adoption rate is taken as the highest achieved during the project life not one year result

[6] This indicator is answered in 12 and 13 above. It is interpreted to mean adoption of improved technologies.

[7] Use of plant spacing of 0.6-0.9 m being one of the main messages passed to assisted farmers. among others

[8] Results for assisted farmers is presented for the final evaluation/FY 2001 achievement and LOA

[9] 71% for FY 2001 and LOA refers to roofed storage used by FHI assisted farmers. The evaluation question was altered to cover overall storage.

Indicator	District	Baseline	FY 1997 Target	FY 1997 Achieved	FY 1998 Target	FY 1998 Achieved	FY 1998 Achieved vs. Target	FY 1999 Target	FY 1999 Achieved	FY 1999 Achieved vs. Target	FY 2000 Target	FY 2000 Achieved	FY 2000 Achieved vs. Target	FY 2001 Target	FY 2001 Achieved	LOA Target	LOA Achieved
Increased number of target area households who have improved their agricultural knowledge, attitudes and practices																	
18. Percentage of farmers that receive systematically collected price information increased to 50%[10]	Nham & Marr	0%	0%	0%				25%	10%	40%				50%	74%	50%	74%
19. 25,210 farmers regularly assisted by FHI/M agricultural extensionists	Nhama & Marr	0	3,360	9,216	3,360	2,854	85%	3,360	2,629	78%							
	Gor	0	N/a	N/a	1,440*	1,424	99%	1,440*	1,382	96%							
	All	0	3,360	9,216	4,800*	4,278	89%	4,800*	4,011	84%	6,640*	4,826	73%	6,640*	2,328	25,210*	24,659
20. 10,230 farmers regularly assisted for one year by FHI/M trained leader farmers	All	0	2,400	240	2,400*	1,274	53%	2,400*	2,226	93%	4,185*	4,444	106%	4,185*	2,046	10,230*	8,184
21. 210 Sofala Province extensionists have participated in field days at Lamego Research Station*[11]	All	0	60	41	60	77	128%	60	76	127%	30*	155	370%	0*	0	210*	349
22. 1,900 farmers have visited the Lamego Research Station*	All	0	400	535	600	347	58%	600	208	35%	300*	166	55%	0*	0	1,900	1,256
23. 25 Sofala organizations received FHI/M research results each year[12]	All	0	25	16	25	25	100%	25	20	80%	20	25	125%	0*	0	95	86
Increased knowledge of business practices																	
24. 250 individuals have participated in a business training program	Nham& Marr	0	50	54	50	601	1202%	50	508	1016%	50	0	0%	50	96	250	1,259

[10] FHI extensionists as a source of information is applied here for the FY 2001 and LOA figures

[11] Lamego activities were in the process of being closed. No systematic visits were therefore organized.

[12] Research newsletters were distributed to collaborators as the final research report was under preparation.

Indicator	District	Baseline	FY 1997 Target	FY 1997 Achieved	FY 1998 Target	FY 1998 Achieved	FY 1998 Achieved vs. Target	FY 1999 Target	FY 1999 Achieved	FY 1999 Achieved vs. Target	FY 2000 Target	FY 2000 Achieved	FY 2000 Achieved vs. Target	FY 2001 Target	FY 2001 Achieved	LOA Target	LOA Achieved
Increased agricultural infrastructure functioning in target area																	
25. 350 improved storage facilities constructed	Marr	0	50	0	100*	66	66%	100*	73	73%	100	310	310%	100	100	350	410
26. 22 community price information boards showing the current prices of cereal crops	Nhama& Marr	0	0	0	12	11	92%	22	24	109%	22	24	109%	22	35	22	35
27. 600 ag commodity price bulletins distributed per year	All	0	0	0	250	230	92%	600	225	38%	600	0	0%	600	600	2,050	1,055
28. 582 on-farm demonstration plots established	Nham& Marr	0	64	144	64	96	150%	64	107	167%							
	Gor	0			24*	21	88%	32*	31	97%							
	All	0	64	144	88*	117	75%	96*	138	144%	141*	137	97%	162*	232	582*	768
29. 406 community vegetable gardens established*	Nham& Marr	0	64	0	64	124	194%	64	95	148%	100*	159	159%	114*	187	406*	565
30. 22 on-farm research trials conducted*[13]		0	4	11	6	11	183%	6	6	100%	6	5	83%	0*	45	22*	45
31. 40 trials conducted at Lamego research station*		0	10	21	10	27	270%	10	18	180%	10	5	50%	0*	40	40	40
32. 25 technologies developed and disseminated[14]*		0	5	6	7	10	143%	7	5	71%	4*	2	50%	2*	40	25*	40
Increased number of associations and members in target area																	
33. Number of Associations increased from 23 to 55	Marr	1	4	6	4	13	325%	7	13	186%	11*	13	118%	15*	13	15*	13
	Nham	21	16	21	19	25	132%	25	24	96%	25*	24	96%	30*	24	30*	24
	Gor	1						1*	1		4*	2	100%	7*	2	7*	2

[13] Trials continued in the same plot for the LOA hence the FY LOA figure is not cumulative

[14] Results of the activities will be finalized during the next DAP

Indicator	District	Baseline	FY 1997 Target	FY 1997 Achieved	FY 1998 Target	FY 1998 Achieved	FY 1998 Achieved vs. Target	FY 1999 Target	FY 1999 Achieved	FY 1999 Achieved vs. Target	FY 2000 Target	FY 2000 Achieved	FY 2000 Achieved vs. Target	FY 2001 Target	FY 2001 Achieved	LOA Target	LOA Achieved
34. Number of association members increased in each district*[15]	Marr	200		370	250	392	157%	300	274	91%	350	274	78%	400	274	400	274
	Nham	525		525	578	502	87%	630	502	80%	709	502	71%	787	502	787	502
	Gor							35			40	35	88%	44	35	44	35
Increased employment opportunities in the target area																	
35. 200 small micro-enterprises established.[16]	Nham& Marr	0	0	6	20	22	110%	50	60								
	Gor	0				5			5								
	All	0	0	6	20	27	135%	50	65	130%	120	139	116%	200	139	200	139
Improve land tenure security																	
36. 75% increase in the percentage of individuals aware of their legal title/rights to land[17]	Gor	11.00%				11.00%								19.30%	N/A	19.30%	0

[15] Due to management problems, the District umbrella Associations started collapsing during the year. Membership drive therefore did not take place, as this was the responsibility of the Union members. FHI will work towards reviving these associations during the next DAP.

[16] LOA result remained the same as FY 2001

[17] FHI had some link with ORAM the ONG dealing with the land issues directly. This indicator has since been dropped.

NUTRITION INDICATOR PERFORMANCE TRACKING TABLE

'Children' refers to children between 0 and 23 months of age unless otherwise specified

Indicator	District	Baseline	FY 1997 Achieved	FY 1998 Target	FY 1998 Achieved	FY 1998 Achieved vs. Target	FY 1999 Target	FY 1999 Achieved	FY 1999 Achieved vs. Target	FY 2000 Target	FY2000 Achieved	FY2000 Achieved Vs Target	FY 2001 Target	Achieved	LOA target	LOA Achieved
Adequate nutritional status 1. Percentage of children in target area below -2 SD median height for age .		50.4%	50.4%												<32 %	30.3%
Improve breast feeding practices 2. Percentage of participating children < 4 months being exclusively breast fed. ***(SO3)***	Nhamatanda Marromeu Nhamatanda & Marromeu Gorongosa	---[18] 54% --- 39% --- 46%	---[19] 54% --- 39% --- 46%	51%	68% --- 82% --- 75% ---	147 %	85%*	91% 90% 77% 64% 85% 79%	81%	87% *	78 % 89 % 83 % 34 %	95 %	90% *	81% 79% 34%	65%	43.2%
3. Percentage of participating children 20-23 months with continued breast feeding[21].	Nhamatanda Marromeu Nhamatanda& Marromeu Gorongosa	62% 52% 58% 96%	62% 52% 58% 96%	60%	58% 34% 45%	75%	62%	63% 48% 57%	94%	64%	74 % 53 % 65 % 96 %	102 %	65%	65% 96%	65%	65.3%

[18] Answers differ depending on how the question is asked. Please see narrative of FHI R2 of FY99 for details.
[19] Answers differ depending on how the question is asked. Please see narrative of FHI R2 of FY99 for details.
[20] If mothers of children 20-23 months who are pregnant are excluded, continued breast feeding rates are approximately 6% higher.

Improve complementary feeding practices 4. Percentage of participating children 6-10 months receiving at least three meals a day.	Nhamatanda Marromeu Nhamatanda & Marromeu Gorongosa	24% 14%	24% 14%	37%	58% 78% 68%	184 %	70%*	80% 68% 74%	106%	75% *	93 % 90 % 92 % 14 %	122 %	80% *	92% 14%	70%	57.6%
5. Percentage of participating children 6-10 months with oil added to their weaning food.	Nhamatanda Marromeu Nhamatanda & Marromeu Gorongosa	29% 6%	29% 6%	40%	45% 23% 34%	85%	80%*	92% 87% 90%	112%	85% *	86 % 90 % 88 % 6%	103 %	90% *	88% 6%	70%	72.8%
Increase consumption of vitamin A 6. Percentage of participating children 6-23 months who consumed at least one vitamin A rich food the previous day.	Nhamatanda Marromeu Nhamatanda & Marromeu Gorongosa	59% 12%	59% 12%	65%	66% 56% 61%	94%	90%*	95% 92% 94%	103%	90% *	84 % 83 % 84 % 12 %	93 %	90% *	84% 12%	80%	93.6%
7. Percentage of mothers in target area who know at least one category of vitamin A rich foods.	Nhamatand Marromeu Nhamatand & Marromeu Gorongosa	4%	4%				60%*	98% 88% 93%	155%				90% *	93%	60%	86.5%
8. Percentage of children 12-23 months in target area who have received one vitamin A capsule in the last six months.	Nhamatanda Marromeu Nhamatanda & Marromeu Gorongosa	1% Not measured	1%	25%	9% 4% 6%	24%	80%*	97% 93% 95%	119%	85% *	97 % 98 % 97 % 60 %	115 %	90% *	97% 60%	70%	82.6%

9. Number of children from 6 months to under 5 years given vitamin A capsules every 6 months.[22]		0	0	0	0	n.a.	40,000*	42,106	105%	45,000*	38,410	85%	50,000*	122,621		
Increase deworming of children 10. Percentage of children 12-23 months who received a de-worming medication in the last six months.	Nhamatanda Marromeu Nhamatanda & Marromeu Gorongosa	15% 0%	15%	30%	13% 4% 8%	27%	80%*	89% 87% 88%	110%	85%*	97% 98% 98% 0%	115%	90%*	98% 0%	70%	72.0%
11. Number of children from 6 months to under 5 years given mebendazole every 6 months.[23]	Nhamatanda & Marromeu Gorongosa	0 0	0 0	24,000	34,940	146%	40,000*	39,605	99%	45,000*	50,514 0	112%	50,000*	164,6650		
Improve immunization coverage 12. Percentage of children 12-23 months in target area with DPT3. **(SO3)**	Nhamatanda & Marromeu Gorongosa	49% 34%	49%	53%	59%	111%	65%*	40-77%[24]	62-118%	75%*	73% 34%	97%	80%*	73% 34%	62%	73.9%
13. Percentage of mothers in target area who know when a child should receive the measles vaccine.	Nhamatanda Marromeu Nhamatanda & Marromeu	7%	7%				70%*	88% 63% 77%	110%				85%*	77%	60%	28.7%
14. Percentage of mothers in target area with two or more doses of TT. **(SO3)**	Nhamatanda & Marromeu	25%	25%				50%	41-90%[25]	82-180%				75%	41-90%	75%	53.2%

[22] Figure is an average for the biannual distribution

[23] Figure is an average for the biannual distribution

[24] 77% (247/319) of children 12-23 months with health cards are vaccinated, 40% (247/613) of all children 12-23 months are vaccinated. Number of cards lost unknown (believed to be a large number.)

[25] 90% (555/617) of mothers with health cards are vaccinated, 41% (555/1342) of all mothers (with or without cards) are vaccinated. Number of cards lost unknown. The truth is somewhere between these figures.

Improve control of diarrheal diseases 15. Percentage of participating children with diarrhea in the last 2 weeks.	Nhamatanda Marromeu Nhamatanda & Marromeu Gorongosa	37% 52% 44% 48%	37% 52% 44%	42%	41% 47% 44%	95%	40%	16% 35% 25%	160%[26]	37%	33% 23% 28% 48%	130%	35%	28% 48%	35	28.9
16. Percentage of participating children with diarrhea receiving the same amount or more food. **(IR 3.2.1)**	Nhamatanda Marromeu Nhamatanda & Marromeu Gorongosa	28% 17% 22% 31%	28% 17% 22%	28%	62% 93% 79%	282%	90%*	73% 75% 74%	82%	90%*	88% 95% 91% 31%	101%	90%*	91% 31%	45	48.5
17. Percentage of participating children with diarrhea receiving the same amount or more breast milk. **(IR 3.2.1)**	Nhamatanda Marromeu Nhamatanda & Marromeu Gorongosa	41% 37% 39% 81%	41% 37% 39%	42%	77% 84% 82%	195%	85%*	85% 81% 84%	99%	87%*	93% 93% 93% 81%	107%	90%*	93% 81%	55	65.3
18. Percentage of participating children with diarrhea receiving an increased amount of liquids. **(IR 3.2.1)**	Nhamatanda Marromeu Nhamatanda & Marromeu Gorongosa	55% 44% 49% 79%	55% 44% 49%	55%	87% 85% 86%	156%	90%*	85% 89% 87%	97%	90%*	96% 98% 97% 79%	107%	90%*	97% 79%	72%	55.8%
19. Percentage of participating children with diarrhea being given appropriate oral re-hydration liquids. **(SO3)**	Nhamatanda Marromeu Nhamatanda & Marromeu Gorongosa	28% 23% 26% 69%	28% 23% 26%	34%	86% 82% 84%	247%	90%*	100% 99% 99%	110%	90%*	94% 96% 95%	105%	90%*	105% 69%	90%	68.6%

[26] Measured as target divided by achieved because, in this indicator only, target percent is supposed to be diminishing.

											69 %					
20. No. of ORS Packets distributed yearly.		0	0	75,000	25,000	34%	50,000 *	38,000	76%	50,000*			60,000*	63,000		
21. Percentage of the mothers in target area who know at least 2 signs of dehydration.	Nhamatanda Marromeu Nhamatanda & Marromeu Gorongosa	26% 14% 20% 51%	26% 14% 20%	30%	73% 72% 73%	243 %	80%*	96% 81% 89%	111%	85% *	96 % 96 % 96 % 51 %	113 %	90 %*	96% 51%	70%	24%
Improved knowledge of malaria prevention and treatment 22. Percentage of mothers in target area who know either how to prevent malaria (impregnated bed nets) or how to decrease deaths from malaria (treat within 24 hrs.)	Nhamatanda Marromeu Nhamatanda & Marromeu	1%	1%				--	5% 24% 15%					80%*	15%	60%	17.3%
23. Percentage of children in target area with symptoms of malaria in the last two weeks who were treated within 24 hrs. of the onset of symptoms.	Nhamatanda Marromeu Nhamatanda & Marromeu Gorongosa	Not Measured 40%	Not Measured				--	35% 12% 23%			42% 32% 38% 40%		70%*	76% 40%	50%	23.0%
Process Indicators 24. No. of health promoters functioning.	Nhamatanda Marromeu Nhamatanda & Marromeu Gorongosa	0 0 0 0	0 0 0	20	15 14 29	145%	27*	18 16 34	126 %	40*	18 16 34 11	85 %	40*	34 11	40	55
25. No. of training sessions for health promoters per year.	Nhamatanda & Marromeu Gorongosa	0 0	0 0	5	6	120%	5	5	100 %	5	4 3	80 %	5	15 3	5	2 3

Food for the Hungry International / Mozambique

Outcome Indicators 26. No. of group meetings per month to train volunteer health leaders.	Nhamatanda Marromeu Nhamatanda & Marromeu Gorongosa	0 0 0 0	0 0 0	280	240 224 464	166%	500*	288 256 544	109 %	550*	336 277 613 76	111 %	600*	613 76	600	544 176
27. No. of volunteer health leaders trained twice monthly.	Nhamatanda Marromeu Nhamatanda & Marromeu Gorongosa	0 0 0 0	0 0 0	1,200	2,400	200%	2,500*	1,610 1,438 3,048	122 %	2,750*	1,875 1,795 2,670 815	97 %	3,000*	3,048 815	3000	3537 880
28. No. of house visits occurring in a two week period.	Nhamatanda Marromeu Nhamatanda & Marromeu Gorongosa	0 0 0 0	0 0 0	12,000	21,339	178%	22,000 *	11,972 13,922 25,894	118 %	23,000 *	17,262 24,773 42,035 7,224	183 %	24,000 *	42,035 7,224	24,000	45,432

B. MONITORING AND EVALUATION, AUDITS AND STUDIES

Update of Monitoring and Evaluation System

The monitoring and evaluation system set up at the start of the program continued throughout FY2001 but was impacted somewhat by the flooding and resultant relief efforts mentioned earlier in this document. Generally, indicators are measured by relevant project staff on a weekly, monthly or annual census basis. These include data collection on association and micro-enterprise earnings, and annual crop cuts (maize), for agriculture and output data for health. Collection of this data is supervised by the monitoring and evaluation manager, program managers, and field supervisors. Data collection protocols are in place to ensure uniformity of measurement and periodic training of staff in data collection is undertaken as required.

Monitoring of daily educational group lessons is accomplished with the help of quality control checklists designed to help the health promoters and agricultural extensionists monitor their presentations and provide a quantitative performance score to assist and facilitate supervisory feedback.

Statistical surveys were undertaken for all districts as part of the end-of-project analysis and reports were written by external consultants. This incorporated the MSU INCPROX methodology for measuring household income. The health component in addition carried out a semi-annual monitoring of the majority of it's indicators. Collection has not changed from that described in section 3.2 of the revised health DAP, 'Program Monitoring.'

FHI does use a number of common indicators to other USAID implementing partners and also uses the same income measurement formula. Annual results are presented and shared with other agencies at an annual meeting organized by the mission. Further collaboration is planned for the new DAPs but has been limited to sending other cooperating sponsors copies of relevant reports. Information is shared with the relevant government agencies at all levels and also with all other NGOs undertaking related projects in the province.

Key Findings of Evaluations, Audits or Studies Conducted in FY2001 And How They Are Addressed

Three separate studies were conducted by external consultants as part of the end-of-project evaluation (See Annex 1). The Lamego station research results summary are also annexed. Issues raised in these studies are being addressed by revised plans presented in the new DAP document and by renewed efforts on the part of all CS organizations to coordinate definitions and data collection techniques. Three areas of specific concern that are being addressed by modified programming in the new DAP are the need to better integrate health and agriculture, the need to formalize communication with government counterparts, and the need to reduce the number of messages transmitted through extensionists. Efforts to improve consistency of data collection are also taking place via revised monitoring and evaluation systems and upgraded reporting and training requirements of monitoring and evaluation personnel.

Ernst & Young audited Food for the Hungry International for the fiscal year ending December 31, 2000. A copy of the A-133 audit information was submitted to USAID with the FY2001 Close-out Plan. The audit found "no reportable conditions…" related to FHI operations.

C. EXPENDITURE REPORT

The following narrative refers to the DAP I comprehensive expense report by expense line items found in Appendix A. The attached financial tables shown in Appendices A1 to A4 contain actual and budgeted expenses of each financial year (FY) classified by fund type and expense category for the five-year grant period.

A total of $7,964,257 has been spent from the federal funds during the five-year DAP period, FY 1997 – FY 2001, which is composed of three funding sources, Monetization, Section 202(e), and PVOII (DA) funds. These funds represent 69%, 8%, and 23% of the federal funds, respectively. FHI has spent $594,540 non-federal funds to fulfil its cost sharing requirement for the PVOII funding, which is nearly 25% of total expenses (total of PVOII funds and FHI's contribution).

Of the total expenditures stated above, about 74% of the federal funds have been used for agriculture while the remaining 26% was used for nutrition activities.

About 38% of the total grant was used to cover salaries and benefits of all national and expatriate staff who works 100% of their time in Mozambique. 22% of the grant was spent on Allocated Direct Program Costs, 11% on travel and transportation. Other Direct costs which include consultancy, evaluation, professional fees and utilities represent 6% of the total cost. The remaining 10% and 4% were used for supplies & equipment line items, respectively. The NICRA was 9.5%.

The total of $13,461,539 was approved for the DAP period. 63% of the total approved budget has actually been used during the DAP period.

202(e) Funds

This fund was budgeted and used for nutrition and HIV AIDS prevention training program to cover costs that not met by monetization funds, in foreign currency. 57% of S202 (e) grant were used to cover personnel expenses for fulltime expatriate staff salaries and benefits. The remaining funds was spent to cover for: - travel (4%), other direct costs – consultants, evaluations, professional fees, utilities … (7%), supplies & equipment (1%), allocated direct costs (22%), and for NICRA (9%).

The amount under travel line item was mainly used to cover air travel and per diem costs for the program manager and district coordinators to attend various workshops and training it also include expatriate staff end of contract air travel costs.

The cost under Other Direct Cost line item represents various professional costs, such as consultants, evaluation, auditors… rent and utilities. Allocated direct cost represent general – direct field operating costs that are difficult to directly allocate to an individual project or program as all projects derive benefit and support from field office operation. FHI has applied a cost allocation system – to allocated theses costs to every project, which has been approved by USAID.

PVO II (Mission) Funds

All of PVO II funds were used for agricultural activities. A total of $1,789,800 PVO II funds was used for agricultural development activities. This fund covered expatriate staff salaries and benefits, travel expenses, professional fees, supplied and equipment, other direct costs and the NICRA. FHI has spent or contributed $594,540 of non- - Federal fund to match PVOII funding. The match fund contribution was made in the form of cash, third party in kind commodities, and volunteer services.
(See following page for table)

D. MONETIZATION SALES

Analysis of Monetization Transactions

Impacts from the falling value of the Mozambican currency against the American dollar as well as a collapsing economy in Zimbabwe have hurt the mills that purchase monetized wheat. This has been further aggravated by a failure of one mill to pay for Title I commodities thereby dropping them from the list of potential customers. In spite of these problems monetization has continued to serve as an adequate means of receiving Title II support. Details of monetization activities and projects, including the results of the Bellmon analysis, may be obtained from WVI, the lead agency of the Mozambican joint monetization umbrella group.

Monetization Results

World Vision serves as the Lead Agency in all monetization activities in Mozambique. They will send the required results to USAID directly.

II. RESOURCE REQUEST

A. PROGRAM REQUEST SUMMARIES

Food for the Hungry International – Mozambique
Summary of Request Table – FY 2003 A

	FY 2003					FY 2004					LOA				
Program Component	**Title II Commod. MT**	**S 202(e) Request US$**	**Monetiz'n US$**	**DA or PVOII US$**	**FHI Contrib'n US$**	**Title II Commod. MT**	**S 202(e) Request US$**	**Monetiz'n US$**	**DA or PVOII US$**	**FHI Contrib'n US$**	**Title II Commod. MT**	**S 202(e) Request US$**	**Monetiz'n US$**	**DA or PVOII US$**	**FHI Contrib'n US$**
Sustainable Agriculture															
Extension Network	3,149		481,360	174,028	58,010	3,130		455,684	180,566	60,186	15,093		2,372,005	804,166	268,055
Marketing & Rural Dev't	2,519		385,088	139,222	46,408	2,504		364,548	144,453	48,150	12,074		1,897,604	643,333	214,444
Apiculture	630		96,272	34,806	11,601	625		91,137	36,113	12,041	3,019		474,401	160,834	53,612
Sub Total- Agriculture	**6,298**	**-**	**962,720**	**348,056**	**116,019**	**6,259**	**-**	**911,369**	**361,132**	**120,377**	**30,186**	**-**	**4,744,010**	**1,608,333**	**536,111**
Nutrition and HIV AIDS	3,392	132,050	393,863			3,371	169,511	436,855			16,254	707,597	2,155,232		
Total Expenses	**9,690**	**132,050**	**1,356,583**	**348,056**	**116,019**	**9,630**	**169,511**	**1,348,224**	**361,132**	**120,377**	**46,440**	**707,597**	**6,899,242**	**1,608,333**	**536,111**

Note: *There has been no significant change (<5%) of the above budget from the original DAP.*

Beneficiary Summary by Technical Area

Program component Tech'l areas	Number of Beneficiaries During FY 1	Number of Beneficiaries During FY 2	Number of Beneficiaries During FY 3	Number of Beneficiaries During FY 4	Number of Beneficiaries During FY 5	Number of Beneficiaries Over LOA (not a sum)
Nutrition	21339	25894	42035	42035	41015	45432
Agriculture	9216	4278	4011	4826	2046	24659
Total	**30555**	**30172**	**46046**	**46861**	**43061**	**70091**

B. FINANCIAL PLAN

Comprehensive Budget (See Appendix B)

FY 2002 Section 202e Request and Narrative

This narrative refers to the resource request for FY 2003, which is shown in Appendix B. A total of $1,836,688 has been requested from the federal funds for the financial year, from three funding sources, Monetization proceeds, Section 202(e) and PVOII. This request does not differ significantly (less than 3%) from the original DAP request.

Section 202(e) Funds

As stated in the original DAP this fund is budgeted for nutrition and HIV/AIDS prevention training components to cover for foreign currency costs that can not be met by monetization funds. A total of $132, 050 has been requested from 202(e) funds for FY 2003. About 44% of the 202(e) grant is projected to cover personnel expenses for a full time expatriate staff manger's salary and benefits. The remaining funds are budgeted for training (3%), travel (8%), other direct costs – consultants, evaluations, professional fees, utilities etc (9%), supplies and equipment (9%), allocated direct costs (18%). NICRA is budgeted at 9.5% of total cost, the latest rate approved by USAID.

The training budget is planned to cover short -term staff training and workshop expenses abroad. The amount under the travel line item is budgeted for air travel and per diem expenses for training/workshop trips including expatriate staff's end of contract air travel costs. The budget under Other Direct Cost line item is intended to cover various professional costs, such as consultants, evaluation, auditors, rent and utilities that are needed to be paid in hard currency. Under supplies and equipment, FHI has budgeted to meet office equipment and various consumable supplies that are not easily available in the local market. Allocated direct cost budget, as stated above, are those costs that are difficult to directly allocate to a single individual project or program. FHI is applying a cost allocation system that has been approved by USAID to apportion these costs to each project.

PVO II (Mission) Funds

All of PVO II funds are requested for agricultural activities. This fund is projected to cover expatriate staff salaries and benefits, travel expenses, professional fees, supplies and equipment, other direct costs and NICRA. FHI will be raising non-federal funds to match PVOII funding. The match fund is expected to either cover for any fund shortage in the operation of the program activities or to fund separate related projects that would contribute to the achievement of the objectives in the above programs under SO1. FHI expects its match contribution to be in the form of cash and/or third party in kind commodities, including volunteer services.

Monetization Pipeline Analysis

	Foreign Currency Amount (MZM)	**Estimated Av. rate**	**US $**
Opening Balance at 10/01 From previous years monetization	13,358,982,465		603,339
Total anticipated funds to be received from prior yeas approved comm. From FY 2002 approved commodities1	5,161,100,000 16,730,000,000	25,000 25,000	206,444 669,200
Estimated Interest income in FY 02	250,000,000	25,000	10,000
Total estimated expenditure of Monetization funds during FY 2002	35,000,000,000	25,000	1,400,000
Estimated Closing Balance as on September 30/2002 before translation loss Estimated exchange rate translation loss Estimated Closing Balance as on September 30/2002	500,082,465 500,082,465	 25,000	88,983 68,980 20,003
Amount reserve funding needed to support program operation until FY 2003 Monetization sales (for five months)	14,420,000,000	25,000	576,800

Monetization LOA Analysis (Information not available)

Monetization Proceeds

(Provided by World Vision - Lead Agency in monetization)

Commodities

Annual Estimate of Requirements

FHI/Mozambique
CRS4 – Commodity Request FY 2003

Commodity	FY 2003 Year 2	FY 2004 Year 3	LOA Total	% of Total
Wheat – HRW in MT	4,845	4,815	23,220	50.0
Wheat – DNS in MT	4,845	4,815	23,220	50.0
Total Program	9,690	9,630	46,440	100

Commodity Procurement Schedule

(Provided by World Vision - Lead Agency in monetization)
Anticipated Monetization Cost Recovery Calculation and Estimate

(Provided by World Vision - Lead Agency in monetization)

Bellmon Analysis

(Provided by World Vision - Lead Agency in monetization)

C. ENVIRONMENTAL COMPLIANCE

TITLE II ENVIRONMENTAL STATUS REPORT FACESHEET

Title of Activity: Development Activity Proposal

CS name/Country/Region: Food for the Hungry International, Mozambique, Southern Africa

Funding Period: FY_1997__- FY__2001_

Resource Levels: Commodities (dollar equivalent, incl. monetization): _$ 6,211,896___
Total metric tonnage request: __44,056 MT of wheat__
Section 202 (e): $697,126___
USAID/Maputo PVO II Grant: $ 4,460,814 (original FY97 estimate)

Status Report Prepared by: Name:_Robert Snyder Title: Country Director
Date: __December 2001

Date of Previous Status Report: __March 2001

A. Status of the IEE/Categorical Exclusion/EA or PEA

IEE Reference: Date of most recent IEE or Categorical Exclusion (If all activities were CEs): March 2001

___**X**_ No revisions or modifications needed. IEE/CE or CE and all activities still applicable

_____ Amended IEE submitted, based on attached report, summary, etc., (referencing the body).

_____ EA or PEA needs to be amended to cover additional or modified activities. [Note: If yes, immediately notify the MEO, REO (where one exists) or the BHR BEO. Amended EA or PEA submitted, based on_____

B. Status of Fulfilling Conditions in the IEE, including Mitigative Measures and Monitoring

__**X**_ Environmental Status Report describing compliance measures taken is attached.

_____ For any condition that cannot be satisfied, a course of remedial action has been provided within an IEE Amendment. [Note: For conditions under an EA or PEA, consult the MEO, REO (where one exists) and/or BEO].

USAID APPROVAL OF ENVIRONMENTAL STATUS REPORT:
Clearance:

Mission Environmental Officer: _____ Date: _____
Robin Mason

Food For Peace Officer: _____ Date: _____
Melissa Knight

ENVIRONMENTAL STATUS REPORT (ESR)

Section A. Status of the IEE/Categorical Exclusion/EA or PEA

A1. Modified or New Activities:

All activities defined in the IEE submitted August 1998 remained unchanged. With the new DAP, FHI will be continuing most of those activities observing the same mitigating and monitoring standards as spelled out in the IEE.

A2. Resolution of Deferrals:

The August 1998 IEE and the subsequent ESR s submitted by FHI had no deferrals. All activities had specific determinations, and those determinations have remained unchanged.

A3. Conditions:

None of the conditions have changed. FHI is currently implementing, all the mitigations identified in the IEE.

A4. Amendments:

Based on the above, is an amended IEE needed?

___ Yes If yes, attach here. No_**X**_

If the previous documentation was a Categorical Exclusion Submission, is an amended Categorical Exclusion needed to deal with new Categorical Exclusions for new activities?

___ Yes If yes, attach here. No_**X**_ Not Applicable_**N/A**__

Is the Sponsor unable to meet recommendations and/or conditions that are part of an EA or PEA or does the Sponsor believe an EA or PEA needs to be amended to cover additional or modified activities?

___ Yes No____ Not Applicable_**X**_

If yes, immediately notify the MEO, REO (where available) or the BHR BEO.

Section B. Status of Fulfilling Conditions in the IEE, including Mitigative Measures and Monitoring

B1. Mitigative Measures and Monitoring:

The vast majority of FHI/M's activities will have no effect on the environment. In some cases, the state of the local environment will actually improve due to FHI/M interventions. Nevertheless, measures are in place to ensure that any potential environmental damage is avoided or minimized.

Agriculture Program

Applied Research

The area involving the most potential red flags is in the judicious use of pesticides on trials. As is stated more completely in Annex 1: General Pesticide Analysis, FHI/M has established a step-by-step procedure to insure that pesticides are safely used from the moment of procurement, through storage, use and disposal. Every counter measure is taken to insure no ill-effects will result to the environment due to pesticide use. As part of the mitigation procedures, FHI/M insures that research staff continue to follow proper IPM procedures. Synthetic pesticides will be used only as a last resort when a trial is at risk of being lost and when no effective alternative control method exists. Additionally, the least toxic pesticides recommended for the given problem are always chosen. Only staff trained in safe use can handle pesticides and are required to use proper protective equipment. Even though the risk of intoxication is extremely low, FHI/M keeps a stocked first aid kit with antidotes, and key staff members have been trained in using the kit.

As for the environmental impacts, FHI/M mitigates any possible side effects by observing certain procedures. Spraying is only done when the climatic conditions permit. In other words, FHI/M will not spray when there is a chance of rain or when it is windy. Obviously, beyond the environmental concerns, spraying under those conditions is neither very economical nor efficacious since the majority of the pesticides would be washed or blown away. Due to those precautions, the risk of contamination of water sources is minimal. FHI/M uses small quantities of lightly toxic pesticides that are not persistent in the environment. Plots that are sprayed are small (from 100 to 2,500 m^3) and the total area of the station is only three hectares. In addition, the plots are located at least 50 to 100 meters from the riverbank. The bank has a steep crest which precludes the possibility of run off reaching the surface water. Since the quantities of pesticides are low, there is little possibility of their reaching the underground water. FHI/M has a nearby well which has been tested for water quality. Yearly testing to insure that no pesticides are contaminating the water can be carried out should it be deemed necessary. It is worth reiterating: FHI/M uses the least toxic pesticides sparingly and only where a trial would otherwise probably be lost.

As the General Pesticide Analysis states, FHI/M follows well stated procedures to insure that no other people besides our highly trained personnel come in contact with the chemicals. The pesticides are locked in a clearly marked shed and kept off the ground to assure that there is no seepage during the damp rainy season. Only two individuals have the key, and they are FHI/M's most trained staff in terms of pesticide handling. FHI/M has taken precautions to guarantee that neighbors or other FHI/M personnel do not come in contact with recently sprayed fields. Barbwire fences, windbreaks and other barriers prevent people from entering the fields that are clearly marked with skull and cross bone signs stating "pesticides". For those that cannot read, the signs resemble the same ones used to mark minefields that people readily recognize. Furthermore, guards are on duty 24 hours per day to warn people away.

As for disposal, FHI/M has a one meter pit to bury the containers. Currently, the pit is located one kilometer from the nearest surface water, the Muda River, in an abandoned mango grove. Containers are only handled by trained personnel wearing protective clothing. Since the pit is not in arable land, there is little chance of farmers discovering the containers and coming in contact with the pesticide. Moreover, besides being a kilometer from the river, the pit is not near a run-off ditch or deep enough to permit seepage into the water table that is approximately 4 meters deep.

In the storage trials, besides using actellic for a control group, FHI/M is testing botanical pesticides. Some are registered by the USEPA or covered by the USAID/Maputo's Supplemental Environmental Assessment, such as "neem". However, FHI/M has identified four other botanicals not listed in either source. These were brought to research's attention by local farmers for their botanical properties and are currently being tested under the same strict conditions as the pesticide controls. FHI/M staff follows the same precautions in using the botanicals. However, none would be considered toxic. In fact, turmeric is a common condiment in India food. Others come from indigenous plants common to the area. Following testing protocols, each will evaluated over the course of numerous trials. USAID will be kept abreast of the results through quarterly and annual research reports. If these botanicals are found to be valuable as pesticides, FHI/M will only promote them once USAID has approved their use per Section 22 CFR 216.3 (b) (2) (iii) and after having the opportunity to review FHI/M's findings. For more information on FHI/M's pesticide policies, please see Annex 1: General Pesticide Analysis.

FHI/M research is also involved in the distribution of improved varieties. To mitigate possible impacts to the environment, FHI/M works closely with the Mozambican government research branch, INIA, to identify appropriate local varieties. Furthermore, the varieties are tested for numerous years under local conditions to insure that they can adapt to the varying climatical conditions of Sofala. FHI/M research gathers data on adaptability to excess rain/drought, pest resistance and production, but also evaluates the varieties through a series of farmer preference test to measure acceptability by the local population. Only then is the variety be multiplied for distribution. Since FHI/M's multiplication plots are small, the majority of the multiplication is done by INIA.

FHI/M is also promoting tree species for agroforestry purposes. To avoid impact on the environment, FHI/M will not promote any species that are considered invasive by the government. Hence, leucaena, even though it is renowned for its agroforestry properties, will not be distributed. Others, like Gliricidia and neem, will be distributed to interested farmers and follow-up is done through extension visits to insure that these species are not propagating in such a way as to be invasive.

Agricultural Marketing and Association Development

The majority of agriculture extension's activities, when properly implemented, will not have an adverse impact on the environment. As the August 1998 IEE suggests, positive improvements in soil fertility and reduced forest destruction can be the result should the messages be adopted by farmers. This does not detract from the fact that the installation of demonstration plots and community gardens do have an immediate effect on the environment and have to be monitored. To mitigate the possibility of additional lands being cleared thus putting more stress on local flora and fauna, FHI/M extension only established demonstration plots on fields volunteered by farmers. Since the site is carefully chosen to be in full view of other farmers to enhance the demonstration emphasis, these are lands that have been in production for some years. Once selected, extension observes protocols developed by research on how to set up the demonstrations and trials. Strict rules are followed to allow the results from the demonstration and trials to be comparable across the districts. In addition, each trial focuses on the promotion of different organic production methods. Obviously, to be a proper demonstration, these have to be implemented correctly. As a demonstration, should there be any pests or erosion, the extensionists will take advantage of this opportunity to promote botanical pesticides or dead barriers, respectively, for example.

As for monitoring and evaluation, supervisors visit each of the demonstration plots and trials before, during and periodically after installation to verify that extensionists are following proper procedures. The supervisors are also available to give advice on countering problems as they arise. To aid in the supervision process and to provide consistency in supervision, FHI/M uses quality control checklists for the various tasks extension agents implement in the field. Each list indicates the best practices for each activity. Extensionist's performance is evaluated using the checklist and the tool is used to encourage improvements. The checklists are constantly updated.

FHI/M will also be alert to other potential dangers to the environment caused either directly or indirectly from extension training. For example, FHI/M extensionists have been trained in IPM procedure and safe pesticide use. During the previous USAID-funded grant, the training department taught pesticide safety courses and certified each of our extensionists. This training proved especially valuable during the 1996/7 cereal season when there was an outbreak of red locust. FHI/M aided the government effort to combat the plague by organizing volunteer farmer brigades and training them in proper pesticide use under the emergency approval of USAID. During that time, FHI/M invested additional training to critical extension staff on safe pesticide use. This training will become invaluable in the future should agrochemicals become more prevalent. FHI/M is monitoring admitted pesticide use during the baseline, midterm and final surveys. In

addition, the Rural Enterprise Team will be monitoring the input dealers and will respond with safe pesticide handling in the cases where pesticides are sold. Based on these various sources, FHI/M will train farmers on necessary safety precautions to follow when handling these materials. This training is already part of the FHI/M curriculum in reference to using botanicals. Farmers are trained in the safe use of the least toxic natural pesticides. Extremely toxic botanicals, such as tobacco, are avoided altogether. FHI/M will not promote botanical pesticides for which adequate evidence of safety does not exist.

In Gorongosa, because of its unique topographical conditions, there are additional mitigations required. The extension team in Gorongosa uses similar criteria for the selection of sites to establish demonstration plots and the same supervisory methods to verify that extensionists complete the task as recommended. Since the topography is more dramatic, added emphasis in soil erosion techniques is needed to mitigate soil loss. The Gorongosa Extension Team work extensively with soil erosion control, especially the construction of bunds and other types of barriers. If farmers do not construct these barriers in such a way as to properly channel run-off, erosion could increase in the areas adjacent to these "protected" fields. Extensionists, with the oversight of the Agriculture Extension Coordinator, emphasize the importance of proper drainage and inspect barriers that have been constructed by assisted farmers. Short trips are arranged so that groups of farmers can visit others who have well-constructed barriers and drainage channels.

During the horticulture season, Gorongosa extensionists emphasize the need to maintain permanent vegetation on stream banks for watershed protection.

Gorongosa district also promotes beekeeping as an environmental enterprise. Traditional beekeeping is an environmentally destructive activity as hives are made from ring barking mature trees, which kills the tree. Only one bark hive is fashioned from every mature tree, and the hive lasts only for three years. FHI is promoting the use of Kenyan Top Bar Hives. These hives have been constructed from pine wood and not tropical hardwoods. The introduced hives offer farmers the ability to manage their honey production and produce a higher quantity and quality of honey. As beekeepers become more comfortable in using these hives then FHI will explore with them the possibility of developing hives from traditionally used locally materials whose use is not environmentally damaging, such as clay and reeds. This activity will not result in the expansion of traditional hives as it is virtually impossible to obtain the high quality honey which has a market outside of the area, and which FHI is assisting marketing. As beekeeping becomes established as a more lucrative activity it is likely that beekeeping associations will bring increasing pressure in their communities to control the burning of forested areas, as this reduces honey production.

Extension is also promoting improved granaries. In the no-action scenario, farmers would construct silos when harvests were successful, whether FHI/M was here or not. In doing so, they would require forest resources to carry out the construction. By FHI/M's extension program promoting practices that increase production, FHI storage activities could be looked upon as a form of mitigation to assure that the increased production does

not result in detrimental damage to the limited forest resources. FHI/M extensionists will work to insure that the species used for storage are not endangered species. Efforts will be made to construct more durable silos both in terms of reduced labor, more adequate crop protection and less demand for forest products. In order to accomplish this, the FHI Storage Team[27] developed a manual of "Best Practices" complete with a sheet used to evaluate different storage facilities. Based on the assessment sheets, extensionists and leader farmers trained in their use can recommend the best practices. While this may increase demand for certain types of storage facilities, it will reduce the demand placed on the environment caused by the construction of less desirable storage units. Continual qualitative assessments can evaluate the availability of construction materials to assess both the impact on the environment as well as the economic viability of constructing the improved silo.

Qualitative surveys led the Storage team to the conclusion that farmers were using DDT and other toxic chemicals for lack of adequate storage option. Warnings about these chemicals have been incorporated into the training. While the baseline survey did not identify the use of DDT, subsequent surveys could measure the continued use. Furthermore, follow-up qualitative monitoring will measure whether farmers continue to use toxic chemicals even after receiving FHI/M extension messages. This also applies to the use of botanical pesticides in storage currently being investigated by research. As stated above, FHI/M will reduce the likelihood of problems by avoiding the promotion of highly toxic botanicals. If there is great doubt as to the toxicity of a given botanical, FHI/M will hold off on its promotion until significant evidence is found that it is indeed safe.

The most immediate environmental impact of marketing activities is in the construction of the price information boards. The price information boards are only constructed after many discussions with local government administrators, district agriculture directors and local market administrators. The sites are selected in areas that are already cleared and involve no dislocations of sellers from the market place. Materials are purchase locally when available, and local masons and carpenters are used for construction. These contracted builders are responsible for the clean up of all materials around the site and the disposal of excess materials. Excess materials are generally used locally, and market administrators are present to assure that paint or cement is not dumped in local streams.

More importantly, FHI/M is measuring the impact of different information systems in the baseline, midterm and final surveys to determine how many people use them for sources of information. Regrettably, at the end of this project, it may be determined that such efforts to bring marketing information closer to the producer are not appropriate. However, before writing the obituary to price information boards, FHI/M is working jointly with the Department of Agriculture and other NGO's to determine the information needs of the farmer and tailor the price information to meet those needs. It is also important to recognize the price boards for what they are—a mere tool. Additional training will be given to farmer groups and association so that they can make better use of

[27] In the initial years of the Title II program, FHI had a Storage Team. This activity has been reintegrated into the Extension network.

the information for economic decisions. As farmers are trained, follow-up evaluations will determine the impact of the boards, identify restraints and work to provide farmers with information in a more timely and adequate fashion. If after all that effort the price information boards are not useful, the recommendation will be made to the Provincial Department of Agriculture that no more be constructed. These findings would have to be compared with other agencies like World Vision that are using a similar price board information system.

Another area listed as a negative determination with conditions is in the identification of new products for marketing. When looking into marketing, there is always the possibility that a new product can be introduced with a high market value. FHI/M has developed the criteria that preference be given to those secondary crops already established instead of promoting introduced species. This will save on the time needed to test new varieties, develop protocols and investigate potential impacts. It is FHI/M's conviction that an adequate number of crops are already planted as secondary farm products. Many of these like pigeon pea, chick peas and bird's eye chilies have an international market. It will require five years to get farmers from their current level to the point where they can grade, impose quality control, package and identify linkages to export. In effect, FHI/M will not need to introduce new crops to the area. In the remote case that a marketing opportunity presents itself with a new crop, FHI/M will involve Applied Research in the development of criteria. This alone will allow FHI/M time to evaluate potential impacts.

There is also general discussion of the disadvantages of promoting commercial farming. The general surveys carried out by FHI/M include questions about crop diversification, primarily for its importance as a safety net during the drought/flood years. Large shifts in planting practices will be perceptible through the surveys if not already identified by routine extension supervision. FHI/M will mitigate the tendency towards monoculture practices through a continued extension message in favor of inter-cropping, rotations and general diversification of crops within the farming system.

Rural Enterprises

Legally, all of Rural Enterprise's activities are classified as "categorical exclusions". Nonetheless, the Rural Enterprise team plays an important role in alerting FHI/M of pesticide use in the area by monitoring the import of pesticides by input dealers set up through their program. The Rural Enterprise Team conducts periodic follow-up visits to the input dealers in order to identify problems and assess impact of training. Should Rural Enterprise discover that a certain input dealer is distributing pesticides, they could then develop training on safe pesticide storage and handling. This would be an urgent concern as many of the input dealers also sell food as well as inputs. In addition, if input dealers are determined to market pesticides, the Rural Enterprise Team will provide valuable information on the safest pesticides on the market to avoid farmers purchasing extremely toxic chemicals. Once alerted to the influx of pesticides, Agriculture Extension can be given refresher courses in safe pesticide use and target those farmers interested in using the chemicals. This should not be inferred as FHI/M promoting pesticide use; simply, it is

a form of mitigating potential damaging impacts caused by ignorant use of pesticides in FHI's project area.

In effect, FHI/M has defined multi-prong approach for alerting decision-makers to potential pesticide use. Extensionists work directly with farmers and will be aware of any changes in pesticide use. Similarly, Rural Enterprise, through its periodic visits to input dealers, can verify if pesticides are being sold through them. Finally, various surveys, like those prepared by Crop Storage team identifying patterns of pesticide use in silos and quantitative surveys conducted during the baseline, midterm and final years, include questions to measure pesticide use. This reflects FHI/M's concern about potential side effects of pesticides and the looming possibility of pesticides becoming available in the future. Already, the Mozambican government has pilot programs promoting high input agriculture with fertilizers and pesticides. Organizations like SG2000 and projects that provide fertilizers and, in the near future, pesticides, at a subsidized price to select farmers. FHI/M is willing to play an active role in mitigating impacts caused by these programs in it's project areas and insuring that organic alternatives are not de-emphasized in the process.

FHI/M is looking into methods to establish retailers and eliminating FHI/M's role as the wholesaler. Once this is accomplished, FHI/M will have less influence over association / small business persons decisions, but will continue to provide consultancies to associations in order to avoid detrimental environmental impacts.

Rural Enterprise will be working increasingly with input dealers to supply capital items like water pumps. While more sustainable, it limits the amount of influence FHI has on the use of these items. Association Development in conjunction with the Rural Enterprise Team will continue to provide consultations to those groups and associations interested in investing in water pumps, etc. However, FHI/M recognizes that it will not be able to influence all people who could potentially purchase and misuse such items.

Rural enterprise also promotes appropriate technologies to farmer groups / associations developed by the extension team. Any technology promoted by FHI/M comes with a list of stipulated criteria that associations have to meet before they receive the technology from FHI/M on a credit basis. The criteria consider the economic viability of using the technology versus the status quo approach, ability of the association to use and maintain the equipment and the effects on local environment, especially if the technology uses raw materials gathered from the ecosystem.

For example, the rural enterprise team is currently selling water pumps to interested associations mainly for horticulture. With the association, FHI/M does a cost benefit analysis to determine whether the pump is the most feasible option or whether the association can make do with buckets. Also, FHI/M trains members of the association on basic pump maintenance and evaluates where and if they can purchase replacement parts when needed. This means that associations have to establish a fund for using the technology in order to assure the money will be available make the necessary repairs. Finally, FHI/M evaluates the water source. Does it dry up in the dry season? Who else

depends on this source? Have association members taken precautions to allow for proper drainage and avoid long-term salinization? This is done with each appropriate technology item before it is sold.

Health Program

As stated above the only anticipated negative impact of the Health Program would be that related to the promotion of home gardens. The gardens that health promoters prepare are small in size, number and are completely organic. Health staff works closely with the agriculture staff to ensure that the gardens are done properly.

General

To ensure that the various preventative/mitigative procedures are not overlooked, FHI/M will make a checklist of the various environmental threats that its interventions could possibly cause. The list will be reviewed in detail on a quarterly or annual basis by the management of each team following discussion with all extensionists and promoters. Managers will take corrective action whenever necessary. Information on this process will be provided to USAID via FHI/M's quarterly reports.

Quality control checklists monitoring the performance of program staff will, when appropriate, incorporate questions regarding environmental protection measures. For example, a quality control checklist for agricultural extensionists will require comments on the potential environmental impacts of his/her work. All pertinent staff will receive bi-annual training on what these impacts could be and how to minimize them.

B2. Status of Complying with Measures

Agriculture Program

Applied Research

The Applied Research program in FHI's Title II program was designed to investigate many potentially beneficial environmental practices such as green manures and intercropping legumes. However, one area traditionally suspect is the judicious use of synthetic pesticides as part of an integrated pest management system. FHI researchers observe procedures to insure that no detrimental effects occur due the use of pesticides. Annex 1: General Pesticide Analysis describes in detail the process FHI uses. In addition, FHI has elaborated various tracking systems to guarantee these procedures are strictly followed. For example, the Research Station uses a monitoring sheet to register what pesticides are used, why and by whom. The registration form tracks: date of application, chemical applied, target pests or diseases, crop applied, name of trial or seed multiplication, person who prepared the pesticide solution/mixture, pesticide applicator and who supervised the process. A copy of the form is included with Annex 1: General Pesticide Analysis.

FHI is also following the other procedures identified in IEE to insure that no harmful effects result from the limited use of pesticides. FHI maintains windbreaks, barbwire fences and sign posted fields in addition to 24-hour guards to avoid persons coming in contact with the chemicals. As an additional precaution, FHI constructed a better storage shed for housing the chemicals. With the landowner's permission, FHI built a cement block shed on the already cleared land of the research plot. The shed is a vast improvement over the previous building where the chemicals were stored. Only people trained in pesticide use have access to the shed.

FHI has also monitored the water quality of both the river and the well. Neither of these tests indicated a presence of chemicals. This is understandable given that FHI uses very limited quantities and only when it has exhausted other botanical methods. Likewise, FHI continues to observe strict controls related to the disposal of the chemicals. As stated in Annex 1, containers are only handled by qualified personnel and are buried in a one-meter pit a mango grove one, kilometer from the nearest water source where there is limited possibility of farmers to come in contact with the spent containers.

At the end of this coming fiscal year, FHI will be closing its research station in Lamego. Most of the research trials will be curtailed, but FHI will continue to conduct on-farm research trials. As part of FHI's desire to promote more sustainable research, pesticide will no longer be used on-farm. Likewise, since FHI is scaling back its research interventions, it will no longer be promoting agroforestry varieties and other crop variety testing will be passed on to the government research branch, INIA.

Agriculture Marketing and Association Development

FHI Agriculture Extension services promote environmentally friendly approaches to increasing agricultural production including mulching, green manures, contour planting and intercropping legumes. In addition, if FHI messages are followed, farmers can increase the productivity of land already cleared thus reducing the need to clear additional areas. Nonetheless, FHI has implemented procedures to insure that extension activities do not cause any undue, environmental damages.

FHI has implemented additional monitoring devises to insure that procedures are followed and potential impacts on the environmental are reduced. FHI is successfully using quality control checklists in the establishment of demonstration plots. The extension supervisors use these checklists to evaluate how the extensionists are installing the demonstration plots with their groups and make recommendations for improvements. This management tool insures that all extensionists produce the same standard of quality and reduces the potential for detrimental environmental impacts. Furthermore, management can follow up on the supervisor to guarantee that all extensionists have been visited and their demonstration plots adequately assessed. Additionally, checklists have been designed to evaluate extension messages and to measure quality of adoption of the messages on the part of the assisted farmers. These tools aid FHI in the improvement of its interventions. Similarly, FHI continues to use its "Best Practices Manual for Storage"

as a quality standard for improving farmer's storage technologies. Regrettably, due to heavy rains last years, most farmers did not have enough grain to store.

FHI extension continues to monitor farmer practices, including increases in pesticide use. The Midterm survey revealed an increase of farmers using chemical products from 0.8 to 1.4% of farmers, which is attributable to an increased use in Nhmatanda district. Only 4 of these 16 farmers had obtained their products from local shops.

The extension team also seeks to promote farmer associations and groups primarily through training which is a categorical exclusion. However, the extension team also links successful farmer groups to the rural enterprise team which promotes appropriate technologies like manual water pumps. The rural enterprise team then advises interested associations according to the list of questions laid out in the IEE.

Rural Enterprise

FHI's Rural Enterprise program trains input dealers in an effort to re-establish the rural supply of seeds and tools. As such, all its interventions are considered categorical exclusions. However, it plays an important role in monitoring rural input suppliers and alerting FHI to the influx of chemical pesticides into the target area. Should such a situation occur, FHI would respond with pesticide training to input dealers and training interested farmers in the safe use of pesticides. Since the IEE was written, there have been no cases of pesticides sold by any of FHI's assisted input dealers. Only SG2000 and the local Department of Agriculture have set up trials using some chemical fertilizers and irrigation systems. In both cases, the trials follow recommended procedures and do not require an intervention on the part of FHI.

FHI recognizes that it is not sustainable for a PVO to sell appropriate technologies and eventually the private sector has to be involved. In terms of sustainability, FHI's Rural Enterprise Team is working to establish input dealers that could eventually market such things as irrigation pumps themselves. In that eventuality, FHI will provide training to input dealers and will continue to consult associations interested in purchasing such items. However, it will obviously not be able to control the sale or the prospective impacts on the environment. Given the current state of the input dealers, it will be a number of years before they will be selling larger capital items. Given that possibility, FHI has trained associations and interested farmers in the proper use of irrigation pumps at the Research Station and during field demonstrations.

Health Program

The vast majority of Health's program is considered a categorical exclusion. However, Health uses demonstration gardens as a means by which to promote vitamin rich crops. Last year, Health promoters were trained by FHI extensionists who then supervised the installation of the Health demonstration gardens in their respective areas. The same criteria for the Agriculture Program's demonstration plots and gardens were observed and no environmental damage was recorded.

General

As stipulated in the IEE, FHI has developed a series of quality control checklists used as tool to guarantee that all FHI staff achieves similar quality standards. In doing this, staff have also been able to avoid potential environmental impacts. New checklists are created and old checklists are revised as required.

As for separate bi-annual training, it has been determined that additional training events are not feasible. However, FHI has always and will continue to include environmental messages in its training thus ingraining the message into staff. These messages are then passed on to farmers and other beneficiaries.

B3. Environmental Screening Forms and Reviews

FHI is not using Environmental Screening Forms since the preparation of the IEE in August 1998, and there are no scheduled Environmental Reviews.

Section C. Cooperating Sponsor Recommendations for Beyond Compliance and Institutionalization of Environmentally Sound Practices

No new comments to add since the last ECR.

ANNEX 1:

GENERAL PESTICIDE ANALYSIS:
Relevant to USAID Environmental Procedures Title 22, CFR 216.3 (b) (2) (iii)
Prepared by: Dr. A. D. Brock[28]
Pesticide Application at the Lamego Research Station
FHI/M/Mozambique

[28] A. D. Brock was the Coordinator for Agricultural Research of FHI/Mozambique till the end of FY 2000. She earned her Ph.D. in Crop Science from the University of Reading in 1991. Before joining FHI/Mozambique, she worked in the areas of crop production management and post-harvest technology in potatoes, sweet potatoes, wheat and maize for 14 years in the Philippines, Canada and the USA. She also did agricultural consulting in countries like Burkina Faso and Vietnam.

Background

The primary role of the adaptive research component of the FHI/M/Mozambique agricultural program is to develop sustainable and simple crop production techniques.
In order to achieve this goal, carefully monitored field experimentation and post-harvest testing are conducted in an approximately 3-ha research farm supervised by well-experienced and trained staff

At the research station, the application of any form of pesticides, either chemical or botanical, is limited to two cases. First, pesticide is applied when the threshold level has been reached at which a trial may be severely damaged due to a high degree of disease infection or increased pest population. In this instance, the least toxic and most effective of a range of recommended pesticides is selected. Secondly, pesticide is applied as part of an experimental trial in small, carefully controlled plots of $27m^2$ (replicated 4 times).

The following general pesticide analysis is presented according to the Pesticide Procedures, per 22 CFR 216.3 (b)(1)(a-l). Please see the tables annexed to this document for a list of chemicals used by FHI/M including botanical pesticides.

Analysis

USEPA's registration status of the requested pesticide

Table 1 shows the list of pesticides, chemical and botanical, for which authorization is being requested. All chemical pesticides are currently registered with USEPA with a low level of toxicity (WHO classification). Malathion and Trichlorfon, both organophosphates, are known to control a broad spectrum of destructive insect pests effectively. Perimophos-methly is a quick acting insecticide that is widely used to control insect pests in stored products. Mancozeb, a dithiocarbamate, is widely used as a foliar protectant for a variety of diseases. All of these chemical pesticides, except for Trichlorfon, are found to have low to moderate effects to beneficial organisms.

Of the six botanical pesticides, only neem is registered with USEPA. Three plant species (mango, groundnut and turmeric), which are unregistered with USEPA, are reported to be sources of botanical pesticide products and are edible to humans and animals. These are, thus, assumed safe for application as pesticides.

Bases for selection of the requested pesticide

The chemical pesticides are chosen because they are proven to be some of the most effective chemicals against the pest and diseases identified at the research station. Moreover, their level of toxicity to humans and hazards to the environment are known to be low to moderately low. All of the chemical pesticides are currently registered with the USEPA and with the Mozambican Government. The Supplementary Environmental Assessment of the USAID/Mozambique PVO Support Project also identifies all of the aforementioned chemical pesticides as acceptable for use.

Of the botanical pesticides, neem is selected because it is widely tested for its effectiveness as a pesticide and is not hazardous to humans and the environment. The tree is known to grow in this climatic regime and provides many uses for the farmers. Neem is a registered botanical pesticide source with USEPA. Mango is a common tree in Sofala. It is recommended that only unproductive or old mango tree limbs are cut for use (burnt to ash) as mango is an important source of cash. The use of mango wood ash is not known to cause any hazards to humans or beneficial organisms. Groundnut and turmeric are likewise common crops in the province of Sofala. Nsequesse and goye, are indigenous trees growing in many parts of Sofala. They have been reported by farmers to control insects in stored grains. These plant species, therefore, will be tested as a possible insect pest control in small amounts of stored grains.

Extent to which pesticide is a part of an IPM

FHI/M affirms and supports the principles of integrated pest management (IPM) and will follow the management practices and strategies of IPM in dealing with any pest and disease problems that arise in the project. The identification of key pests and monitoring of pest population are vital elements of an effective IPM system. FHI/M is staffed with research station personnel who have training and experience in this field. At the research station, various methods and options will be considered and evaluated in order to come up with the most economical, sustainable and environmentally safe system. The following techniques will be integrated in order that chemical pesticides are applied judiciously (at the "threshold level of action at which chemical application is taken to prevent losing the plots to severe damage due to the disease or pest"): use of rat traps or scarecrows; proper time of planting and harvest; hand picking of pests; good crop sanitation; the use of border or trap rows; and intercropping or relay cropping. Also, FHI/M is continuing its efforts to screen for botanical pesticides using indigenous plant species.

Proposed methods of application, including availability of appropriate application and safety equipment

The method of application will depend on the type of formulation. Malathion is in emulsifiable concentrate form and Mancozeb is a wettable powder. In either case, the recommended amount of chemical will be mixed with water. Upon mixing, it will be sprayed directly to the affected crop using a knapsack sprayer. Application will only be made early in the morning when it is calm (not-windy). The following protective equipments will be used during the preparation and application of the chemical: gloves and boots, protective dust masks and respirators and overalls.

Trichlorfon, as Dipterex granules, will be applied directly to the whorls of maize and sorghum at the recommended rate and time of application. The applicator will be required to wear protective outfits (gloves; boots; overall and masks).

Actellic powder (at the recommended rate of 50g/100kg seeds) will be mixed with grains of maize, cowpea or sorghum in the storage trial building. Some replicated trials will involve applying actellic in big quantities (about 40-50 kgs) and some in small quantities (5 kgs) of seeds. After treatment, both (big and small quantities) will be separately bagged and tied. They will be regularly monitored (ie. by weight, in order to check the damage caused by weevil) over a period of time. The applicator will be required to wear masks, gloves, boots and overalls.

All of the botanical pesticides listed in Table 1 will be applied in small packs of maize, cowpea or sorghum (5 ks) to evaluate their effectiveness to control weevil (*Sitophilus* sp.). Neem is extensively reported for its pesticide properties. The use of mango wood ash, groundnut oil and turmeric as insect protectants have been previously reported elsewhere (Stoll, 1992).

For the purpose of the trials, seeds of neem will be collected, dried and crushed until powder. Powdered neem will be mixed with the grains at 2% by weight. Cooled mango wood ash will be applied to the grain samples at 10 g per kg of grains. Turmeric powder will be mixed with the grains at 2% by weight. Oil of groundnut will be extracted and will be used to coat the grains at 15 ml/kg grains. Leaves of nsequesse and goye will be dried and powdered. Both materials will be applied at 2% by weight.

FHI/M Lamego research station is staffed with an agronomist, field supervisor and field technicians who have the training and experience in the preparation and application of chemical pesticides. They are also trained in the correct storage of chemicals and disposal of their containers and first-aid, in case of exposure to the chemical.

Any acute and long-term toxicological hazards, either human or environmental, associated with the proposed use and measures available to minimize such hazards

All chemical pesticides listed in Table 1 are classified to be low in toxicity (Classification III based on WHO). The corresponding lethal acute oral dosage (rats) for each chemical pesticide is given in Table 1. Not one of the listed chemicals is known to be allergenic (PAN and CTA, 1995). In cases of inappropriate use, however, Malathion is reported to be toxic to bees and fish, and Trichlorfon is toxic to fish. Only Trichlorfon is reported to be harmful to some beneficial organisms.

FHI/M Lamego research staff is well trained in the proper preparation and application of chemical pesticide. They are also knowledgeable in the hazards they may cause to humans and the environment. Therefore, appropriate measures will be applied. Among these measures: wearing the protective clothing and using the necessary gadgets; application of chemicals at the recommended rate, application at the right time and weather (early and not-windy), no smoking nor eating during the preparation or application of the pesticides; washing up hands or bathing immediately after pesticide application, keeping children or animals off the vicinity where the pesticides are being mixed and applied; posting “no-entry” signs at the area of application after spraying; proper disposal of the containers and proper cleaning up in case of accidental spillage.

Soap, towels and water are available for washing up after handling the pesticides. Moreover, the station has some antidotes in case of poisoning. The staff is also aware of first-aid techniques in the event that accidental poisoning occurs.

Procedures for the proper disposal of pesticide containers

FHI/M takes care to assure that the bottles, jugs and packages previously containing pesticides are properly disposed and are not handled or used by anyone but qualified individuals. The packaging is collected and buried in a one meter deep pit at least one kilometer from the nearest surface water. The pit is currently located in an old mango grove adjacent to the Lamego Research Station. Since the grove is not cultivated, there is little risk of farmers coming in contact with the containers. The pit is far enough away from the mango trees as to not effect the trees through leakage in or around the pit.

Effectiveness of the requested pesticide for the proposed use

The chemical pesticides being requested are listed as acceptable for use in the USAID/Mozambique PVO Support Project on cereals (maize, sorghum), leguminous (cowpea) and solanaceous crops (tomato) (Table 2). Moreover, the same chemicals are registered to effectively control specific pests and diseases on specific crops by the Government of Mozambique (Direccao Nacional de Agricultura).

Neem has been extensively reported for its effectiveness as a botanical pesticide (PAN and CTA, 1995). Seeds of neem are known to have a stronger pesticide property than the neem leaves. Thus, seeds of neem will be tested to control weevil damage in maize and cowpea grains. Likewise, groundnut oil, turmeric and wood ash have been previously found to be effective protectants against weevil in stored products like maize and legumes (Stoll, 1992). The use of nsequesse and goye as effective sources of pesticide was primarily based on local farmers' experiences and observations.

The conditions under which the pesticide is to be used, including climate, flora, fauna, geography, hydrology and soils

At the FHI/M Lamego research station, there are two types of field crop management activities: first, replicated plots, some trials of which may include plots that are being tested for a chemical or botanical pesticide as a treatment; second: multiplication plots.
In the first case, application is normally made on small 15-20 m^2 plots, replicated four times (eg. evaluation of botanical pesticides to control stalk borer in maize). Multiplication plots normally range from 100 to 500 m^2. In both cases, application of the pesticide will be done early in the morning when the wind is calm to avoid spray drift.

The research station is situated away from a populated village and is enclosed by barbed wire and wind breaks (*Leucaena* sp.). These factors keep passers-by and any animals out of the research area, especially during and after chemical application. Also, no entry warning signs are staked on the sprayed plots/ trials soon after application. The station is

right next to a deep running river, however, FHI/M strictly prohibits any type of activity related to the use of chemical pesticides that would result to water contamination. The soil at the FHI/M Lamego research station is considered fertile and well-managed. FHI/M consistently practices crop rotation and green manuring with leguminous cover crops (eg. crotolaria) to enrich the soil and improve the soil structure.

The availability and effectiveness of other pesticides or nonchemical methods

The pesticide chemicals listed in Table 2 are found to be the least toxic and most effective against the insects and diseases affecting the crops on station. (FHI/M is continuing its efforts to identify botanical pesticides using indigenous plant species.) The station consistently practices crop rotation (particularly leguminous species after cereals) in order to disturb the disease or pest cycle, thus, reduce the severity of pest infestation or disease infection. This technique is likewise practiced in order to improve the fertility level of the soil. Other techniques practiced are: use of traps and baits, planting border rows as trap crops, right time of planting and harvest, good crop sanitation and fertility management (eg. green manuring).

The requesting country's ability to regulate or control the distribution, storage, use and disposal of the requested pesticide

Mozambique has had a pesticide legislation in the past, however, pesticide law enforcement has been difficult for many reasons (eg. security situation, lack of trained personnel, fragmented responsibility among government agencies). The responsibility for safe and effective use of chemicals, therefore, lies on the PVO's themselves and the PVO Support project.

Provisions made for training of users and applicators

Chemical application will be applied by a staff member who have about six years of experience on pesticide use and application in research plots. He will be directly supervised by an expatriate Agronomist (about 30 years experience as a researcher; commercial farm producer and an agricultural development expert).

It is planned that research technicians, extensionists and agronomists will participate in some short-term training on pest identification, pest and disease control and concepts of IPM system. This is hoped to update the staff of the latest findings in this field, upgrade their skills and to reinforce the relevance of proper methods of handling chemicals both to humans and the environment.

Provisions made for monitoring the use and effectiveness of the pesticide

A monitoring pesticide use and application logsheet will be kept at the research station. The sheet will include the following information: what pesticides are in storage; what quantity, on what crops the pesticide was applied, what are the target pests and diseases; when was the application made, who prepared the pesticide solution or mixture, who applied the pesticide.

Trained staff will also monitor the treated crop or plots for pest population as soon as it is safe to enter the area.

Because here in Mozambique the PVO Support Project and PVO's themselves are responsible for the proper use of the pesticides, the Agronomist and Research Coordinator will monitor that the following are implemented: proper storage of chemicals, maintenance of an inventory of chemicals and their application, appropriate pesticide application practices (eg. wearing protective outfit), right time of application and recommended dosage of the chemical and proper disposal of chemical containers.

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Table 1. Pesticide use and application at FHI Lamego research station

Pesticide	**Trade name (or active substance)**	**USEPA Registration**	**Toxicity classification***	**LD50 (mg/kg) (oral)**
A. Chemical				
Malathion	Malathion	Yes	III	2100
Trichlorfon	Dipterex	Yes	III	560
Perimiphos-methyl	Actellic	Yes	III	2000
Mancozeb	Dithane M-45	Yes	III	7000
B. Botanical				
Neem	Azadirachtin	Yes		
Mango wood ash		No		
Groundnut oil		No		
Turmeric		No		
Nsequesse		No		
Goye		No		

Table 2. Pesticide use at FHI Lamego, target pests and disease and crop use *

Pesticide	Trade name (or active substance)	Target pest or Disease	Use
A. Chemical			
Malathion	Malathion	Caterpillar, fly, hopper Aphids, thrips	tomatoes, cowpea
Trichlorfon	Dipterex	Borer, caterpillar,fly Coleuptera	maize, sorghum
Perimiphos-methyl	Actellic	Weevil	stored grains (maize, sorghum cowpea)
Mancozeb	Dithane M-45	Late blight *(Phytopthora infestans)*	tomato
B. Botanical			
Neem	Azadirachtin	Weevil	stored maize, sorghum and cowpea
Mango wood ash		Weevil	same
Groundnut oil		Weevil	same
Turmeric		Weevil	same
Nsequesse		Weevil	same
Goye		Weevil	same

* Reference: Supplemental Environmental Assessment of Pest Management and Pesticide Use in the Private Voluntary Organization Support Project of USAID/Mozambique Volume I, USAID, Maputo. 1994.

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