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Rural Prosperity is Nation's Economic Stability

A Partnership Approach to Attain Sustainable Production of Groundnut and Pigeonpea in Smallholder Agriculture for Quality Diet, Household Food Security, and Poverty Alleviation in Malawi

End of Project Report 1999-2001

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1 Executive Summary

Groundnut and pigeonpea are very important legume crops in Malawi. The two crops are similar in many aspects. Both crops are grown primarily by smallholder farmers especially women, are rich in protein (25%) and are thus critical in maintenance of quality of diet among the rural poor. Surplus produce is sold for cash, helping smallholder farmers, particularly women, move towards financial self-reliance. Both crops have considerable export potential: trading and marketing channels already exist, and demand far exceeds supply. Perhaps most important are the long-term benefits – groundnut and pigeonpea are legumes, with the ability to improve soil fertility through nitrogen fixation, and thus progressively improve the health and sustainability of the farming system.

New technologies are available, but their adoption in Malawi has been poor. Consequently, groundnut and pigeonpea yields have stagnated at 500 kg ha^{-1}. Clearly, greater efforts were needed to improve dissemination of improved agricultural technologies in Malawi. Hence, ICRISAT and the Department of Agricultural Research and Technical Services (DARTS), jointly developed a proposal targeting two key areas – seed production and distribution, and technology transfer. The objectives were:

1) *To provide high quality breeder seed and basic seed of high-yielding, disease-resistant groundnut and pigeonpea varieties to various stakeholders in Malawi.*

2) *To increase awareness of the value of improved varieties in enhancing the production of groundnut and pigeonpea among smallholder and commercial farmers through on-farm demonstrations, and*

3) *To strengthen the capacity of DARTS, the Department of Extension, and relevant NGOs in transferring groundnut and pigeonpea production technologies through short-term training courses.*

USAID-Malawi approved the proposal and generously provided $677,350.00 in support of the project for two years, (1999/00 and 2000/01). USAID/Malawi Mission Director Dr. Kiert Toh, and ICRISAT Director General, Dr. Shawki Barghouti signed the Memorandum of Agreement in Lilongwe in June 1999. Implementation of the project effectively started in November 1999 with the employment of a Visiting Scientist, a Scientific Officer and two Research Technicians.

Achievements of the project

- ***Groundnut and pigeonpea breeder seed:*** *We produced 26.3 tons of groundnut seed (varieties, CG 7, JL 24, ICGV-SM 90704, and ICG 12991) and 13.45 tons of pigeonpea seed (varieties, ICP 9145, ICEAP 00020 and ICEAP 00040) during the life of the project. All the seed was used for basic seed production.*

- ***Groundnut and pigeonpea basic seed:*** *We produced 289.76 tons of groundnut (CG 7 only in year 1, and CG 7, ICGV-SM 90704, and JL 24 in year 2) and 52.84 tons of pigeonpea (ICP 9145 and ICEAP 00040). Over 40% of the seed has been sold to various NGOs and others. In total we have realized US$ 162,483.74 from sale of the seed. This money is being maintained under a separate account code with ICRISAT. We will use this money for future operations of the project hence, achieving the sustainable supply of breeder and basic seed of improved groundnut and pigeonpea varieties in Malawi. Another lot of seed worth US$ 164,250.00 is yet to be sold. This seed lot has carefully been treated with insecticides and stored for sale next season.*

- ***On-farm demonstrations:*** *We conducted 2,185 field demonstrations of improved groundnut and pigeonpea varieties across the country, in partnership with NARS and the NGO community in Malawi.*

- ***Field days:*** *We held 130 field days on groundnut and pigeonpea where over 13,000 farmers (nearly half of them women) were exposed to new crop production and processing technologies.*

- ***Training courses:*** *We conducted four training courses, two each on groundnut and pigeonpea. Over 200 field technicians from the Ministry of Agriculture and Irrigation and some NGOs were trained in groundnut and pigeonpea production technologies.*

- ***Groundnut posters:*** *We produced 3,000 copies of groundnut posters in three languages: English, Chichewa, and Tumbuka. These posters are being distributed to our stakeholders.*

Project impact

The project has made available seed of improved groundnut and pigeonpea varieties along with production technologies to many people in Malawi, Mozambique, and Zambia. Such NGO's as PLAN International, CARE, and World Vision have benefited from the project through acquisition of seed of improved groundnut and pigeonpea varieties and have established community

seed banks for their communities. This will ensure availability of seed of these varieties in their communities for many years. Several men and women field technicians from the Ministry of Agriculture and the NGO community in Malawi, Mozambique, and Zambia have been trained in groundnut and pigeonpea production technologies through the project. The training has been augmented by distribution of groundnut posters in English and two local languages, Chichewa and Tumbuka that have been produced by the project.

Follow-up action

As the area under groundnut production increases, use of labor saving devices, concerns about quality of produce for export, and marketing arrangements become imminent. To consolidate gains made during this phase of the project, there is need to further promote sustainable increase in groundnut production through empowering farmers in improved crop production practices and enhance quality of produce in order to improve cash income to rural households. A second phase of the project will be prepared by ICRISAT for submission to USAID-Malawi.

2 Project Summary

Project Title: Rural prosperity is nations economic stability: a partnership approach to attain sustainable production of groundnut and pigeonpea in smallholder agriculture for quality diet, household food security, and poverty alleviation.

Goal: To enhance groundnut and pigeonpea productivity for household food security, nutrition, and poverty alleviation.

Purpose: To provide a sustainable seed production system for breeder, basic and certified seed and supporting technologies.

Outputs:

1. Increased productivity of groundnut and pigeonpea.
2. Reduced malnutrition among rural populations, especially women and children.
3. Provision of new export opportunities and raw materials for small-scale agro-based industries.
4. Improved soil fertility.

Activities:

1. Breeder seed production.
2. Basic seed production.
3. Farmer participatory on-farm demonstrations.
4. Short-term training courses.

Beneficiaries: Smallholder farmers, rural women, and children.

3 Project Objectives

1. To provide high quality breeder seed and basic seed of high-yielding, disease-resistant groundnut and pigeonpea varieties to various stakeholders in Malawi.

2. To increase awareness of the value of improved varieties in enhancing the production of groundnut and pigeonpea among smallholder and commercial farmers through on-farm demonstrations.

3. To strengthen the capacity of DARTS, the Department of Extension, and relevant NGOs in transferring groundnut and pigeonpea production technologies through short-term training courses.

4 Progress on the activities carried out during the project phase (1999-2001)

4.1 Introduction

Groundnut and pigeonpea are very important legume crops in Malawi. The two crops are similar in many aspects. Both crops are grown primarily by smallholder farmers especially women, are rich in protein (25%) and are thus critical in maintenance of quality of diet among the rural poor. Surplus produce is sold for cash, helping smallholder farmers, particularly women, move towards financial self-reliance. Both crops have considerable export potential: trading and marketing channels already exist, and demand far exceeds supply. Perhaps most important are the long-term benefits – groundnut and pigeonpea are legumes, with the ability to improve soil fertility through nitrogen fixation, and thus progressively improve the health and sustainability of the farming system.

New technologies are available, but their adoption in Malawi has been poor. Consequently, groundnut and pigeonpea yields have stagnated, at about 500 kg ha^{-1}. Clearly, greater efforts were needed to improve dissemination of improved agricultural technologies in Malawi. Hence, ICRISAT and the Department of Agricultural Research and Technical Services (DARTS), jointly developed a proposal targeting two key areas – seed production and distribution, and technology transfer.

USAID-Malawi approved the proposal and generously provided $677,350.00 in support of the project for two years, beginning August 1999. Implementation of the project effectively started in November 1999 with the employment of a Visiting Scientist, two Research Technicians and later a Scientific Officer.

4.2 Breeder seed production of groundnut and pigeonpea

During the life of the project, we have produced 26.3 tons of groundnut (varieties, CG 7, JL 24, ICGV-SM 90704, and ICG 12991) breeder seed and 13.4 tons of pigeonpea breeder seed (varieties, ICP 9145, ICEAP 00020 and ICEAP 00040). Quantities of the seed produced in year 1 and year 2 of the project are given in Table 1. The breeder seed was used for basic seed production.

Table 1. Quantities (t) of groundnut and pigeonpea breeder seed produced in year 1 (1999/00) and year 2 (2000/01) of the project.

	Groundnut	Pigeonpea
Year 1 (1999/00)	12.00	3.40
Year 2 (2000/01)	14.30	10.05
Total	**26.30**	**13.45**

4.3 Basic seed production of groundnut and pigeonpea

Twenty-five and 15 growers were contracted to produce groundnut and pigeonpea basic seed, respectively during the life of the project. In total, 289.76 tons of groundnut and 52.84 tons of pigeonpea basic seed was produced (Table 2).

Table 2. Area (ha) and quantity (t) of groundnut and pigeonpea basic seed produced in year 1 (1999/00) and year 2 (2000/01) of the project.

	Groundnut		Pigeonpea	
	Area (ha)	Quantity of seed (t)	Area (ha)	Quantity of seed (t)
Year 1	150	76.68	120	18.50
Year 2	215	213.08	85	34.34
Total	**365**	**289.76**	**205**	**52.84**

In general, the groundnut and pigeonpea seed realized was lower than expected. This was mainly due to erratic on set of the planting rains coupled with poor distribution. Apart from the late arrival of the rain, severe epidemic of groundnut rosette affected groundnut yields while a cold spell during the flowering stage coupled with severe pod infestation by insect pests led to a drastic reduction in yield in year 1 of the project.

4.4 On-farm demonstrations and field days

Technology exchange was another important aspect of the project. To this effect 2,185 on-farm demonstrations of improved groundnut and pigeonpea varieties were conducted in collaboration with the Department of Extension and selected NGOs. About 100 field days were conducted on groundnut and pigeonpea where over 9,000 farmers (nearly half of them women) participated.

4.4.1 On-farm demonstrations

The objective was to increase awareness of improved varieties and associated management practices. Six improved varieties were demonstrated – groundnut CG 7, ICGV-SM 90704, and JL 24, pigeonpea ICP 9145, ICEAP 00020, and ICEAP 00040. In total we conducted 2185 demonstrations, 1186 demonstrations for groundnut and 999 demonstrations for pigeonpea. Some of the demonstrations were conducted by selected Agricultural Development Divisions (ADDs), while others were conducted by such NGOs as PLAN International, World Vision Malawi and others (Table 3).

Table 3. On-farm demonstrations conducted in collaboration with various stakeholders during year 1 and year 2 of the project.

	No. of demonstrations conducted		
Stakeholder	**Groundnut**	**Pigeonpea**	**Totals**
Department of Extension	241	220	361
Care Malawi	260	NIL	260
Land o' Lakes	25	25	50
NASFAM	95	44	139
PLAN International	220	255	475
World Vision	200	310	510
OXFAM	25	25	50
CRS	100	100	200
IFS (GTZ) Project	20	20	40
Total	**1186**	**999**	**2185**

4.4.2 Field days

In partnership with the NGOs that planted on-farm demonstrations, we conducted 130 field days, 98 for groundnut and 32 for pigeonpea. These field days were aimed at accomplishing the following:

- Demonstrate the advantages of improved versus local varieties.
- Discuss with the farmers the most appropriate management practices for each crop.
- Offer a forum where farmers could discuss amongst themselves, and learn from each other, the best cultural practices to increase productivity of these crops.

Three groundnut varieties, CG 7, ICGV-SM 90704, and JL 24 and three pigeonpea varieties, ICP 9145, ICEAP 00020, and ICEAP 00040 were on display. Local varieties of both crops were planted alongside the improved ones. About 13,316 farmers, 49% of whom were women, attended the field days (Table 4). A list of farmers who participated in these field days can be obtained from ICRISAT-Malawi.

Table 4. Number of groundnut and pigeonpea field days conducted in collaboration with NGOs during year 1 (1999/00) and year 2 (2000/01) of the project.

NGO partner	# of field days held	Attendance at the field days		
		Women	Men	Total
Groundnut				
CARE	10	521	976	1497
NASFAM	27	563	955	1518
PLAN International	50	3138	2738	5876
World Vision	11	521	492	1013
Total	**98**	**4743**	**5161**	**9904**
Pigeonpea				
NASFAM	9	480	432	912
PLAN International	8	336	476	812
World Vision	8	354	420	774
CRS	2	292	154	446
OXFAM	2	115	60	175
IFSP (GTZ)	3	156	137	293
Total	**32**	**1733**	**1679**	**3412**
Overall Total	**130**	**6476**	**6840**	**13316**

4.5 Training courses

Four short-term, in service training courses were conducted during the life of the project. Two courses were on groundnut and two other courses on pigeonpea. Over 200 field-technicians attended the courses. The participants were drawn from the Ministry of Agriculture and Irrigation and from the NGO community in Malawi, Mozambique and Zambia. These courses were organized with the following objectives:

- To develop and upgrade skills of field-technicians from research, extension, and NGO communities in Malawi in improved groundnut and pigeonpea production technologies.

- To empower all participants with skills to increase groundnut and pigeonpea in Malawi as well as familiarize participants with new processing and utilization methods.

- To encourage cross-fertilization of ideas among participants through field visits and discussions.

4.5.1 Groundnut production training course

Two groundnut production technology-training courses were conducted at the Natural Resources College (NRC), Lilongwe in March of 2000 and 2001. Participants were drawn from the Ministry of Agriculture and Irrigation and such NGOs as World Vision, CARE, NASFAM, Christian Service Committee, OXFAM, and the GTZ Integrated Food Security Project. Participants from Zambia and Mozambique also attended the March 2001 training course.

Resource persons for the courses were drawn from ICRISAT, the Ministry of Agriculture and Irrigation, and the NGO community. In total 109 participants attended the courses, 24 of them were women (Table 5).

Table 5. Number of participants attending groundnut production technology training courses at the Natural Resources College, Lilongwe, March 2000 and 2001.

Organization	Number of male participants	Number of female participants	Total number of participants
CARE	5	3	8
World Vision	2	1	3
World Vision Mozambique	3	1	4
CLUSA Zambia	3	-	3
NASFAM	7	1	8
Min. of Agric.	56	15	71
Christian Service Committee	1	1	2
OXFAM	1	1	2
IFSP (GTZ)	1	1	2
ICRISAT	6	-	6
Total	**85**	**24**	**109**

The courses covered most aspects of groundnut production in Malawi. Socio-economics aspects that affect productivity, soil fertility management aspects and trade opportunities for Malawi groundnuts, both within and outside Malawi were also discussed. Field visits were made to augment classroom lectures. In addition, participants received various ICRISAT publications, a certificate of attendance, and a Course Manual, copies of which are available with ICRISAT.

4.5.2 Pigeonpea production training course

Two short-term training courses on pigeonpea production technology were conducted in July of 2000 and 2001. The first course was held at Motel Paradise in Blantyre and the other at Mulanje View Motel in Mulanje. Participants to the course were drawn from Malawi and Mozambique.

Participants from Malawi were drawn from the Ministry of Agriculture & Irrigation, Bunda College of Agriculture, the Malawi Agroforestry Extension Project (MAFE), and such NGOs as NASFAM, PLAN International, World Vision Malawi, Save the Children Federation, Inc. Catholic Relief Services, Christian Service Committee, the GTZ Integrated Food Security Project (IFSP), ICRAF, and ICRISAT. Participants from Mozambique came from World Vision Mozambique, CARE Mozambique, INIA, and Technoserve. In total 97 participants attended the course and 13 of them were women (Table 6).

Table 6. Number of participants attending the pigeonpea production technology training course at Motel Paradise, Blantyre, July 2000 and Mulanje View Motel, Mulanje, July 2001.

Organization	Number of male participants	Number of female participants	Total number of participants
CARE Mozambique	2	-	2
World Vision Malawi	9	-	9
World Vision Mozambique	2	-	2
NASFAM	7	1	8
Min. of Agric.	32	7	39
PLAN International	2	2	4
Save the Children Fed. Inc.	5	-	5
Malawi Agroforestry Ext.	2	-	2
Bunda College of Agric.	1	1	2
Technoserve-Mozambique	1	-	1
Christian Service Comm.	3	-	3
Catholic Relief Services	4	1	5
IFSP	4	1	5
ICRAF	2	-	2
ICRISAT	6	-	6
Total	**84**	**13**	**97**

The course covered most aspects of pigeonpea production. The topics covered included varietal development, general crop management practices and disease and pest management strategies. Soil fertility aspects related to pigeonpea and processing and trade opportunities were also discussed.

The course in 2000 included field visits to Makoka Research Station, farmers' fields and seed production farms within Blantyre. The participants also visited pigeonpea processing plants at Rab Processors and Grain Manufacturing and Trading Company Limited in Blantyre. The participants at the 2001 course visited pigeonpea fields in two of the IFSP and OXFAM impact areas.

Each participant received a certificate of attendance and a course manual containing all course materials presented during the courses. Copies of the training manuals used in the courses, which also contains a list of participants in training courses are available with ICRISAT-Malawi.

4.6 Groundnut posters

We produced 3000 groundnut posters in three languages: English, Chichewa, and Tumbuka. The poster highlights the most important groundnut varieties and cultural practices required for increased groundnut production in Malawi. These posters are being distributed to our stakeholders.

5 Disposal of breeder and basic seed

The primary objective of the project was to provide good quality breeder and basic seed of both groundnut and pigeonpea to the various stakeholders in Malawi. In line with objective 1 of the project, the breeder seed was used for basic seed production while the basic seed was sold to various stakeholders for certified seed production through community-managed seed banks. As a sustainability plan for the project, funds recovered from the sale of the seed are to be used to meet the costs of breeder and basic seed production in subsequent years.

5.1 Recovery of money for groundnut and pigeonpea breeder seed supplied to contract growers

As part of the basic seed production contract, ICRISAT issued breeder seed of both groundnut and pigeonpea to the growers on loan at the cost of 1 US$ per kg as stipulated in the project document. The cost of the seed was recovered from the basic seed sales to ICRISAT. In year 1 of the project, we recovered US$ 13,250 while in year 2 we recovered US$ 18,095. Total sales realized from breeder seed for the two years of the project was US$ 31,345.

5.2 Sale of groundnut and pigeonpea basic seed

As indicated earlier, the bulk of the basic seed produced was sold to various stakeholders at the cost of 1 US$ per kg for groundnut and 0.75 US$ per kg for pigeonpea. Over the two-year period of the project, we have realized US$ 162,483.74 cash (this includes US$ 31,345 for breeder seed) from seed sales. We still have available groundnut and pigeonpea seed worth US$ 164,240.00 (150 t groundnut worth US$ 150,000 and 19 t pigeonpea worth US$ 14,240).

5.3 Establishment of a revolving fund account

In order to sustain breeder and basic seed production of improved groundnut and pigeonpea varieties in Malawi, it was agreed at the start of the project to establish a Seed Revolving Account. These funds will be used for future operations of breeder and basic seed production, hence achieving the sustainable supply of breeder and basic seed of improved groundnut and pigeonpea varieties in Malawi. The account has a total income of US$ 162,483.74, which is being maintained under a separate account code with ICRISAT.

6 Comparison of actual accomplishments with the goals and objectives established for the project

Achievements made during Phase I of the project (1999-2001) are presented in Table 7. Essentially all activities planned for the project were accomplished.

Table 7. Comparison of actual accomplishments with the goals and objectives established for the project (1999-2001).

Established Objectives	Outputs established for the project	Accomplishments	Remarks
1. To provide high quality breeder seed and basic seed of high-yielding, disease-resistant groundnut and pigeonpea varieties to various stakeholders in Malawi.	1. Production of good quality, authentic breeder seed of groundnut (9.0 t) and pigeonpea (2.0 t). (22 t total for the two years).	Produced a total of 39.75 t of authentic groundnut (26.3 t) and pigeonpea (13.45 t) breeder seed.	Exceeded the target 17.75 t of breeder seed.
	2. Availability of good quality basic seed of groundnut (150 t) and pigeonpea (100 t) for sale to seed producers, NGOs, NASFAM, and other stakeholders.	Produced a total of 342.56 t of groundnut basic seed (289.76 t) and pigeonpea basic seed (52.84 t).	Target not fully achieved due to bad weather and under delivery by some growers.
	3. Recovery of production costs through sale of basic seed. This money will be cycled into the project for long-term sustainability.	Over 40% of the seed produced has been sold. So far US$ 134,082.25 has been realized.	We have established a seed revolving account where the proceeds from seed sales deposited. We will use this money for future operations of the project to achieve a sustainable supply of breeder and basic seed of improved groundnut and pigeonpea varieties in Malawi.
2. To increase awareness of the value of improved varieties in enhancing the production of groundnut and pigeonpea among smallholder and commercial farmers through on-farm demonstrations.	1. Creation of awareness in thousands of farmers in improved varieties and crop production and management technologies and labor saving devices	We conducted 2185 field demonstrations of improved groundnut and pigeonpea varieties. We held 130 field days on groundnut and pigeonpea where over 13,000 farmers participated. -Produced 3000 copies of groundnut posters in English, Chichewa, and Tumbuka.	-We exceeded the target by 185 demonstrations. -Farmers appreciated these field days and were able to appreciate the difference between their local varieties and the improved varieties demonstated. -Over 13,000 farmers participated at these field days, exceeding the target set.
3. To strengthen the capacity of DARTS, the Department of Extension and relevant NGOs in transferring groundnut and pigeonpea production through short-term training courses.	1. Well trained technicians available for efficient management of their functions.	-We conducted four training courses two on groundnut and the other two on pigeonpea. -Over 200 field technicians were trained in groundnut and pigeonpea production practices.	-The groundnut training course were conducted in March 2000 and 2001 while the pigeonpea training course were conducted in July 2000 and 2001. Exceeded the target.