ES:FH/SOM/022
Consultant Report 1

DEVELOPMENT OF RURAL FAMILY RESOURCES (IMPROVING FOOD PROCESSING AND STORAGE)

S O M A L I A

PROGRESS REPORT 1

based on the work of

Florence Efua Dovlo
Consultant in Rural Family Food
Processing and Storage

6 May - 27 June 1980

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Rome, 1981

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(Photos taken by Manfred Wehmann, of the German Adult Education Association attached to the AVA Section of the National Adult Education Centre, Ministry of Education, Somalia, May-June 1980)

1. INTRODUCTION

In addition to inadequate production of food in the developing countries, some of the limited supply is also damaged or lost through using inefficient processing and storage methods. There is thus an urgent need for the introduction of intermediate technological improvements in the systems of village-level food production, processing and storage. It is realized, however, that any improvements in techniques, no matter how simple, are likely to present problems of additional cost to those for whom they are intended. Rural people, living at subsistence level, survive in circumstances where there are few or no means for improving their production, processing or storage facilities. These poor farmers hold on to their age-old, traditional practices and may not readily adopt innovations, or be able to do so if any financial outlay is required. While the most in need, they are likely to be the least affected by modern developments.

The Government of Somalia in its three-year plan for 1979-81 has recognized that the achievement of complete self-sufficiency in food production depends on the extent to which the traditional farming sector can increase its output. It is now generally considered that programmes to increase production need reinforcing with activities designed to reduce food losses. It was for this purpose that the project FH/SOM/022, 'Development of Rural Family Resources in Somalia (improving food processing and storage)' was initiated. The intention was to complement other activities aimed at the larger-scale storage of food by providing assistance to rural families conserving food for their own consumption in order to alleviate their work load and avoid waste, contamination and loss of nutritive value.

To assist in carrying out the aims of this project, Dr. Florence E. Dovlo was appointed FAO Consultant in Rural Family Food Processing and Storage for two missions to Somalia. For her first mission (6 May - 21 June 1980) her terms of reference were:

1. to make contact with officials of the Government, University, FAO and other UN agencies connected with the project, including members of the project advisory committee;

2. to study the villages in which the project is to be implemented and, in particular, the equipment, tools and methods used in processing and storing food for family consumption;

3. to assist the Faculty of Agriculture to plan and initiate a study aimed at evaluating losses occurring in foods processed and stored for family consumption (with assistance of the FAO expert attached to project PFL/SOM/002);

4. to identify approximately 3-5 improvements (equipment, tools or techniques) designed to reduce losses and/or alleviate the work-load, and to assist the University, the Ministry of Education and the District Agricultural Extension Staff to establish trials of these improved techniques, etc., in 10-15 homes in each of two villages;

5. to plan systematic monitoring for one year of these experimental improvements by University and/or Ministry of Education and/or Ministry of Agriculture personnel;

6. to make preliminary plans for a programme of activities to be carried out with families in the project villages by University and/or Ministry of Education personnel;

7. to assist the University and the Audio-Visual Aids (AVA) Centre to begin keeping a photographic record of project activities (starting with traditional tools, techniques, etc.);

8. to prepare a progress report to record accomplishments and recommend action, especially regarding the plan of work to be carried out by the Government and the University before the next visit of the consultant.

2. SUMMARY OF ACCOMPLISHMENTS

As they fulfilled the criteria previously identified by the Ministry of Education, the villages of Mordile and Sagalad in Afgoi District were selected for implementation of the project. Both are farming villages which together produce sorghum, maize, sesame, cowpeas and green grams.

For the first phase of the project, a preliminary study was undertaken of food processing and storage techniques in the selected villages using a short questionnaire. Photographic records were made of the techniques, equipment, tools and methods used and a selection illustrates this report. Areas in the food processing system that are time and labour intensive, and which require some technological improvements, were identified as maize shelling, sorghum threshing and decorticating of the grains.

Two new techniques for maize shelling were selected for introduction. Simple hand-held maize shellers were made and demonstrated to the women of both villages. Advice was given regarding the design of improved adjustable hand-held shellers. One for larger quantity shelling was selected and arrangements made for its manufacture by the Mogadishu Technical Institute.

Storage techniques used in some other villages in Somalia were observed. These were, however, said to be useful only for storing finger millet. Improvements in traditional pit storage and the storage innovations introduced at the Farmers' Training Centre in Bonka were inspected. An improved traditional storage barn was selected for construction by the Faculty of Agriculture.

Action was initiated regarding the detailed studies to be made of processing and storage techniques and the assessment of losses incurred. These studies will be made by students and staff of the Faculty of Agriculture. The questionnaire used for the preliminary study was revised for this purpose (see Annex 1) and guidelines were prepared to assist the students.

Schedules of work were discussed and agreed for counterpart personnel in the Faculty of Agriculture and the Women's Education Service of the Ministry of Education. These included a plan for monitoring the use of the hand-held maize shellers (for details see Annex 2).

Consideration was given to providing opportunities for the acquisition of skills in the making of simple clothes and toys for children using time saved by the women following the introduction of improved techniques. It was felt, however, that such activities could only be implemented after an evaluation of the effect of the improved technology in providing extra time for other activities. It is envisaged that, through coming together to acquire such skills, topics such as environmental cleanliness, children's health and practical ways to improve these could be discussed and promoted.

An ad hoc committee of resource people, to provide supporting services towards general development of the villages, was formed. It comprises a counterpart from the Women's Education Service and personnel from Afgoi District Agriculture Extension Division, Plant Protection Services, Afgoi Local Council and Public Health Services. The committee had a first meeting in Mordile.

Several trips were made to the project villages for the preliminary study, for consultations with village leaders (Photo 1) and for supervision of work initiated on the building of the selected barn. Frequent consultations were also held with members of the project advisory group and other resource people (for full details of programme of activities and officials consulted see Annex 3).

3. NOTES ON CURRENT PRACTICES OF PROCESSING AND STORAGE OF FOOD FOR FAMILY CONSUMPTION

3.1 DIVISION OF LABOUR

Men and women together plough the fields, sow the seeds, harvest and dry the grains. Processing, which consists of threshing, shelling and decorticating, is the special responsibility of women. It is also their duty to transport the grains home after drying (Photo 2). Men's special duties are preparing the land for ploughing, watching over the grain while drying in the field and providing storage facilities.

3.2 GRAIN PROCESSING

Maize is normally manually shelled (Photo 3) then pounded in a mortar to decorticate it before grinding into a meal. Sorghum is threshed and decorticated by pounding in a mortar (Photo 4).

Grinding of both maize and sorghum is done using a hammer mill, if available, or a stone mill (Photo 5) or by continuing pounding in a mortar with intermittent winnowing to separate grits from flour. The grits are used for adult meals and the flour for children.

Beans are also threshed by pounding in a mortar or by beating on the ground. Sesame seeds are simply ground, water is added and the mixture is strained to obtain a milky liquid which is served with boiled maize or sorghum porridge. They may also be lightly roasted and pounded to extract oil.

3.3 STORAGE

Underground pits are the only storage techniques used in both villages for storing maize and sorghum and each household owns at least one. The pits are dug wide and about 2-3 m deep depending on the quantity of grain to be stored, which varies from 100-500 kg. Maize may be stored for 2-4 years and sorghum up to 7 years.

Dry grass is first burnt in the pit to kill any insects and to keep the pit dry. Large bundles made from dry stalks of maize are then closely packed in and around the sides of the pit. The grains are stored on the cob and are sufficiently covered with more bundles of maize stalks and sealed with heaps of soil. In Mordile a local plant (unidentified) which produces a milky juice, said to be dangerous to the eye, is placed in the storage pit to repel insects.

Damage during storage has been estimated by the farmers as 20-25% for maize and 4-5% for sorghum. The greatest damage or loss is said to occur during drying in the field where not only rodents and insects

but monkeys are most destructive, particularly to maize. Sorghum is said to be fairly resistant to rodents and insect attack, none the less it suffers loss in quality when stored on the cob. The calyx, which remains with the grains on the cob, is known to cause browning described as 'burning' of the grains during storage. Sorghum is, therefore, better stored in grain form, in which case the calyx has to be removed by further pounding.

No rodents were seen in the storage pits. The greatest damage is done by termites and crickets. Other insects identified as causing damage include Tenebroides mauritanicus, Tribolium castaneum, T. confusum and Sitophilus oryzae. (See Photos 6 and 7 for examples of damage).

3.4 COMMENT

Despite the fact that the women are obviously heavily involved in post-harvest activities it was found during discussions that, while the men contributed their opinions on all aspects of the work, it was difficult to obtain the women's views.

The practice observed in the villages of decorticating the maize and sorghum prior to further processing is labour intensive with possible losses of grain and nutritive value in the process. In order to facilitate the removal of the hull, water is sprinkled on the grain while pounding. The meal obtained is certainly of an increased moisture content which presumably affects its keeping quality. It is probably for this reason, coupled with the drudgery of pounding, that only small quantities of grain are decorticated at a time, making necessary frequent visits to the mills. In Sagalad, where there are no grinding mills, this means a daily trip of 6 km to Afgoi. While this is a time consuming activity, it is combined with the family's daily marketing. The hammer mill at Mordile only partially relieves the labour of grinding by breaking the grains into grits for winnowing and further grinding on stone.

Due to a delay in the rains, planting had just started when the consultant arrived, thus harvest and storage activities were only expected to begin in August or early September.

Opinions differ on the storage of sorghum, some farmers contending that sorghum stores best when threshed into grains. However, the labour involved in pounding large quantities of sorghum first to thresh it and then further to remove the calyx, may be the reason for storing on the cob.

The farmers' opinion about the underground storage pits as being the most suitable for maize and sorghum may result from their non-exposure to other techniques of storage.

The willingness (in both villages) to try other storage techniques and their ready offer of plots for the building of the selected barn for testing are seen as indications of their desire to be introduced to improved storage facilities.

The storage barn that was selected (Photo 8) has the advantage of eliminating the labour involved in opening an underground storage pit each time a quantity of grain is needed for household use. Its efficiency in preventing damage to the grains by insects and rodents remains to be evaluated against that of the underground pit and the other indigenous methods. However, the probable cost of this barn may be beyond the means of most villagers. The financial aspects should be carefully studied now and later when considering whether to recommend use of the barn.

4. CONCLUSIONS

Based on the situation described in Section 3, it was agreed with the advisory committee to introduce the following improved technologies. Regarding a proposal to experiment with a solar dryer it is thought preferable to leave this for a later stage of the project.

	Selected improved technology	I. Mordile Village	Number	II. Sagalad Village
a.	Simple hand-held maize sheller 1/	30		30
b.	Free-standing maize sheller 2/	-	1	-
c.	Sorghum thresher 3/	-	1	-
d.	Improved storage barn 2/ 3/	2 (maize only)		2 (maize) 2 (sorghum)
e.	Improved underground storage	2 (maize only)		2 (maize) 2 (sorghum)

1/ TPI model (Photo 10) or similar, adapted for different size cobs or adjustable model to be designed.

2/ Appropriate Village Technology for Basic Services, UNICEF: b) p. 19; d) p. 12.

3/ Processing and storage of foodgrains by rural families, FAO. AGS:MISC/79/10; c) p. 15, item 13; d) p. 126, item 192.

The construction of the various improved technologies is under the overall supervision of Dr. A.A. Arif, Faculty of Agriculture. Under his guidance the manufacture of the hand-held shellers is being undertaken by the carpenter from the Faculty of Agriculture, the free-standing sheller and the thresher are being made by the Mogadishu Polytechnic and the construction of the improved barns and improvement of the underground storage is being carried out in the villages, in collaboration with Ms Halimah Ahmed, Women's Education Service (for further details see Annex 2).

5. RECOMMENDATIONS

Recommendation	For consideration by
1. Facilities available for pest control should be strengthened and such services extended to small farmers.	Ministry of Agriculture; Plant Protection Division and Agriculture Extension.
2. Resource development efforts in the two project villages should also aim at promoting the overall development of these villages as models. It is recommended, therefore, that the proposed workshop be directed towards the needs of the villages considering practical programmes and activities in line with development plans for the District.	a. Ministry of Education, Women's Education Service. b. Ministry of Health, Public Health Divison.
3. A programme of education should be mounted to discourage the dehulling of maize in view of possible nutrient loss and to promote the use of dry whole grain flour.	Ministry of Education, Women's Education Service.
4. Work should be initiated to construct and test other selected improved technologies, as described in various publications, including the techniques of grain storage for household use.	Faculty of Agriculture, National University of Somalia.

6. ACKNOWLEDGMENTS

FAO and the consultant are grateful to every one mentioned in this report, in particular officers of the Ministry of Education and National University, Faculty of Agriculture, and the many others who have cooperated to make the work possible including:

Dr. A.H. Shirwa, Dean, Faculty of Agriculture, National University of Somalia;

Dr. A.A. Arif, Agronomist, Faculty of Agriculture, National University of Somalia;

Dr. A.M. Mohamed, Entomologist, Faculty of Agriculture, National University of Somalia;

Ms. Halimah Ibrahim, Student, Faculty of Agriculture, National University of Somalia;

Mr. Abdi Heybe, Director of Non-Formal Education, Ministry of Education;

Ms. Hawa Aden, Head, Women's Education Service, Ministry of Education;

Ms. Halimah Ahmed, Officer, Women's Education Service, Ministry of Education;

Ms. Jane Cole, Programme Officer, UNICEF;

Mr. Manfred Weh-mann, attached to Adult Education Centre, Ministry of Education.

Annex 1

REVISED QUESTIONNAIRE FOR STUDY OF FOOD PROCESSING AND STORAGE TECHNIQUES, MORDILE AND SAGALAD, SOMALIA

1. General information

   a. Population

   b. Sanitary conditions; sources of infection

   c. Source of water supply; waste disposal, etc.

   d. Social amenities, e.g. markets, schools, playgrounds, shops, etc.

   e. Food crops that are grown in the village

   f. Description of processing of:

      Maize Sesame

      Sorghum Other

      Beans

   g. Description of storage techniques used.

2. Information from each household

   1. Name of household head _____ (male : female)

   2. Number in household _____

   3. Division of labour

      Who does:

      (a) Ploughing the land _____ (e) Transporting the grains ___

      (b) Planting _____ (f) Shelling and threshing ____

      (c) Harvesting _____ (g) Care during storage ____

      (d) Drying the grains _____ (h) Removal from storage ____

4. How much grain do you store at a time? 1 bag, 2, 3, 4, etc.
5. How many underground storage pits does this household have? _____
6. How long do you keep the grain in storage? Sorghum _____ Maize _____
7. Are you worried about losses or damage?
8. What is your estimation of the quantity of stored grains damaged?
9. Have you tried any other storage technique apart from the underground pit? _____
10. Would you like to try a new one?
11. What, in your opinion, is the cause of damage to grain during storage? _____
12. What indigenous materials, plants or pesticides do you use, to prevent damage to the grain ? _____
13. What condition of the grain is considered spoiled?
    (e.g. mouldy and/or caked and/or infested with weevils, etc.)
14. What do you do with spoiled grains?
    Eat? _____
    Throw away? _____
    Feed to animals? _____

Annex 2

SCHEDULE OF WORK 1980-81

A. FACULTY OF AGRICULTURE, NATIONAL UNIVERSITY OF SOMALIA

1. The Faculty of Agriculture is responsible for the following activities under the terms of a contract with FAO No. TF/SOM/022-1(FH) AGOA:

I. The Faculty of Agriculture will collaborate with the consultant to the project in undertaking the following tasks in the two project villages:

1. Identification of:

(a) current techniques/tools used in conservation of food for family consumption and problems/losses arising;

(b) resources available through which villagers may establish improved techniques/tools;

(c) potential improvements in techniques/tools which could be made within resources available.

2. Obtaining, having made or prepared with participation of village families, 3-5 improved techniques/tools and establishing the use of at least 2 of these in each of 10-15 homes in each of 2 villages.

3. Plan and assist with systematic monitoring of the experimental improvements.

II. The Faculty of Agriculture will carry out a study to quantify the losses occurring during a period of 1 year in food conserved by families in the 2 project villages for their own consumption (complete June 1981).

III. The Faculty of Agriculture will prepare, in English, a short illustrated report (approximately 8 000 words) on current techniques/tools used by rural families in 2 villages in conservation of food retained for family consumption (complete September 1981).

1. These activities are the responsibility of a research team consisting of:

Dr. A.H. Shirwa, Dean of the Faculty (Coordinator and Convenor of Advisory Committee);
Dr. A.A. Arif, Agronomist (in charge of project activities);

Dr. A.M. Mohamed, Entomologist;
Ms. Halimah Ibrahim, undergraduate student.

2. Specific responsibilities:

I. Dr. A.A. Arif:

1. Grain storage studies in collaboration with Dr. Mohamed.

   (a) Assessment of food and nutrient losses during storage;

   (b) an evaluation of grain damage and photographic record of this;

2. An assessment of economic cost of food damaged during storage.

3. (In cooperation with Halimah Ahmed) pursue and supervise work on:

   (a) the building of the storage barns in the two villages. The barns should be completed and dried sufficiently for storage of the grains in August or early September 1980. See particularly to provision of rat guards and other security measures for the barns;

   (b) the construction of the free-standing maize sheller and the sorghum thresher at the Polytechnic in November;

   (c) organize building of improved underground storage pits to be ready close to the harvest period;

   (d) work to continue on suggested designs of the hand-held maize sheller until satisfactory results are obtained, e.g. a sheller with three different size holes, or an adjustable sheller.

II. Halimah Ibrahim:

1. Studies on social and cultural practices and techniques used in grain processing and storage. (Sample size: 30 households in each village). For general information and questionnaire design see Annex 1.

2. Special study to assess time input and food and nutrient losses during processing.

3. Studies on time saved by the use of the hand maize sheller.

III. Dr. A.M. Mohamed:

1. Identification and photographic presentation of insects found in the storage pits or barns under study, with statements on damage caused by each.

2. Suggestions for their prevention or control.

3. Identification of plants or powders used to repel insects during storage.

B. WOMEN'S EDUCATION SERVICE (WES), MINISTRY OF EDUCATION

1. Within the Ministry of Education responsibility for project activities at the present stage rests with:

Ms. Hawa Aden, Head, WES, for Ministry of Education;
Ms. Halimah Ahmed, WES (Counterpart) Liaison between project work at the Faculty of Agriculture and the villages.

2. Specific responsibilities:

I. Have sufficient hand-held maize shellers (improved and/or adjustable type) made for distribution to the households. Monitor their use and assess interest generated in its use by recording number of requests from other households.

II. Consult with Dr. Arif on progress of work on the storage barns in the villages. Plan weekly trips to inspect work. Note any faults and report for correction. Have a picture taken of the completed barn.

III. Follow up the construction of the free-standing maize sheller at the Polytechnic in November. Present to Dr. Arif for testing in the villages.

IV. Have regular meetings with the Resource Committee in conjunction with the District Commissioner or his representative to discuss and plan services that are required in the villages.

V. Plan a one-day campaign to be carried out in the villages to focus attention on the need for environmental cleanliness.

VI. Take preliminary steps to organize a meeting with the women of the two villages in conjunction with the Head of Family Life Education Centre, Afgoi, and with the help of the women leaders in the villages to discuss their priority needs and wishes for e.g. improved skills in food processing techniques; social amenities; other skills.

VII. Write brief monthly report on progress of work, including discussion of difficulties.

C. COORDINATORS

Dr. A.H. Shirwa (Faculty of Agriculture) and Ms. Hawa Aden (Ministry of Education):

1. To arrange meetings with Dr. Arif, Dr. Mohamed, Halimah Ahmed and Halimah Ibrahim to be briefed on progress of the project work as well as difficulties so as to offer advice.

2. To cooperate in providing facilities necessary for the execution of the project.

D. PROPOSED PROGRAMME

June-September 1980

1. Completion of the two storage huts started in Mordile and Sagalad villages.

2. Construction of six others: two in each of the two villages for maize and two in Sagalad for sorghum storage (on the cob and in the grain form).

3. Construction of six improved underground storage pits (as in 2 above). Cost each construction.

4. Improvements on the hand-held maize sheller to be designed and 30 made for each village;

5. Storage activities and preliminary recordings.

October 1980 - February 1981

1. Work to begin on the larger maize sheller in November 1980.

2. Studies on processing and storage techniques, losses out of storage, etc.

March-May 1981

Documentation of results of studies.

June-July 1981

Preparation for assessment of trials and for workshop and associated activities.

August-September 1981

Second visit of consultant;
Assessment of trials;
Development and testing of prototype teaching materials;
Workshop on improved techniques, etc.;
Preparation of pre-tested teaching materials for production;
Finalizing documentation on results of studies;
Planning terminal report.

Annex 3

PROGRAMME OF ACTIVITIES AND PRINCIPAL OFFICIALS CONTACTED

A. 7-12 MAY 1980. FAO HEADQUARTERS, ROME, FOR BRIEFING

Nora Armando, FFH/AD
Nena Bustrillos, Senior Home Economics Officer, ESHH
Frederick Dēvē, Associate Expert (PFL), AGS
D.C. Eva, Senior Country Project Officer, AGOA
F. Fusco, Personnel Officer, AGO
E.H. Hartmans, Director, AGO
A.A.C. Huysmans, Coordinator, PFL Programme
Elisabeth Linusson, Nutrition Officer, ESNP
M.S.O. Nicolas, Director, AGS
L. Perini, AFF
Barbara M. Purvis, Home Economics Officer, ESHH
F. Simmersbach, Nutrition Officer, ESND

B. 13 MAY - 20 JUNE. MOGADISHU, SOMALIA

13 May. Introductory meetings with:

O. Svennevik, Resident Representative, UNDP
W.E. Tomlinson, Assistant Resident Representative, UNDP
Siba Rajbhandary, Assistant Resident Representative, UNDP
Sharif Sufi Mudhir, Finance Assistant, UNDP
Ahmed Usuf, General Services Assistant, UNDP
Suleyman Mahamed Adan, Deputy Minister of Education
Osman Ali Juana, Director-General of Education
Abdi Heybe, Director, Non-formal Education, Ministry of Education
Mahamed Abdi Nur, Deputy Minister of Agriculture
Manfred Wehrmann, German Adult Education Association attached to the AVA Section of the National Adult Education Centre, Ministry of Education
Project Advisory Committee Members.

17 May. Visit to the Faculty of Agriculture, National University of Somalia, for discussion with Dr. A.H. Shirwa, Dean, and Mahamed Dahir, Agricultural Economist.

18 May. Preliminary visit to Mordile and Sagalad, accompanied by Dr. Shirwa.

19 May. Meeting with Hawa Aden, Head, Women's Education Service, Ministry of Education.

20-26 May. Studies of food processing and storage techniques in Mordile and Sagalad.

27 May. Discussion with Dr. Shirwa at the Faculty of Agriculture; with Dr. A.A. Arif, Agronomist, appointed to the research team, and Halimah Ismail Ibrahim, student selected to undertake the study of food processing techniques as her thesis in part fulfilment for her Bachelor's degree.

28 May. Consultation with Abdi Heybe, Director, Non-formal Education, and Hawa Aden, Women's Education Service.

29-31 May. In Sagalad: Inspection of underground storage pits; meeting with the village leaders; introduction and demonstration of hand-held maize sheller to the women.

1 June. At the Faculty of Agriculture for discussions on results of the surveys, improved techniques to be introduced and related extension services.

3 June. In Mordile for meeting with village leaders.

4 June. In Balad to observe different storage techniques.

7 June. Meeting with the Project Advisory Committee. Discussion on work so far accomplished, problems of food processing and storage in the village and possible improvements to be introduced.

8 June. In Mordile and Sagalad to organize labour for the building of the new storage barn.

9 June. In Afgoi for meeting with Afgoi District Officer and discussion on development projects for Mordile and Sagalad. Visit to Agricultural Experimental Station.

10 June. Discussion with manufacturer of metal and wood work. Visit to Mogadishu Technical Institute for discussion with principal on the manufacture of maize sheller. Courtesy call on Mr. Robertson, acting Senior Agricultural Adviser to UNDP and FAO Representative.

11 June. Meeting with the Director of Agriculture and Extension Programmes. In Afgoi for meeting with Coordinator of Agriculture Commissioners. Formation of Resource Services Committee.

14 June. In Sagalad and Mordile to inspect progress of work on the construction of the storage barns. At Mogadishu Polytechnic for discussion on manufacture of the maize sheller and the sorghum thresher with head of carpentry, the mechanical engineer and the Principal of the Polytechnic.

15 June. To Bonka to visit Farmers' Training Centre to observe improved storage barn and underground storage pits.

17 June. Final meeting with Project Advisory Committee and inspection of work at Sagalad.

C. 23-27 JUNE. FAO HEADQUARTERS, ROME, FOR DEBRIEFING

Members of the FAO PFL Programme Working Group and their alternates;
P. Hultgren, FAO expert attached to PFL/SOM/002;
Officers of administrative and personnel units;
Jean McNaughton, Chief, ESNP.

Photo 1. Project staff discuss activities with village leaders.

Photo 2. A woman transporting grains home.

Photo 3. Shelling maize by hand.

Photo 4. Threshing sorghum by pounding.

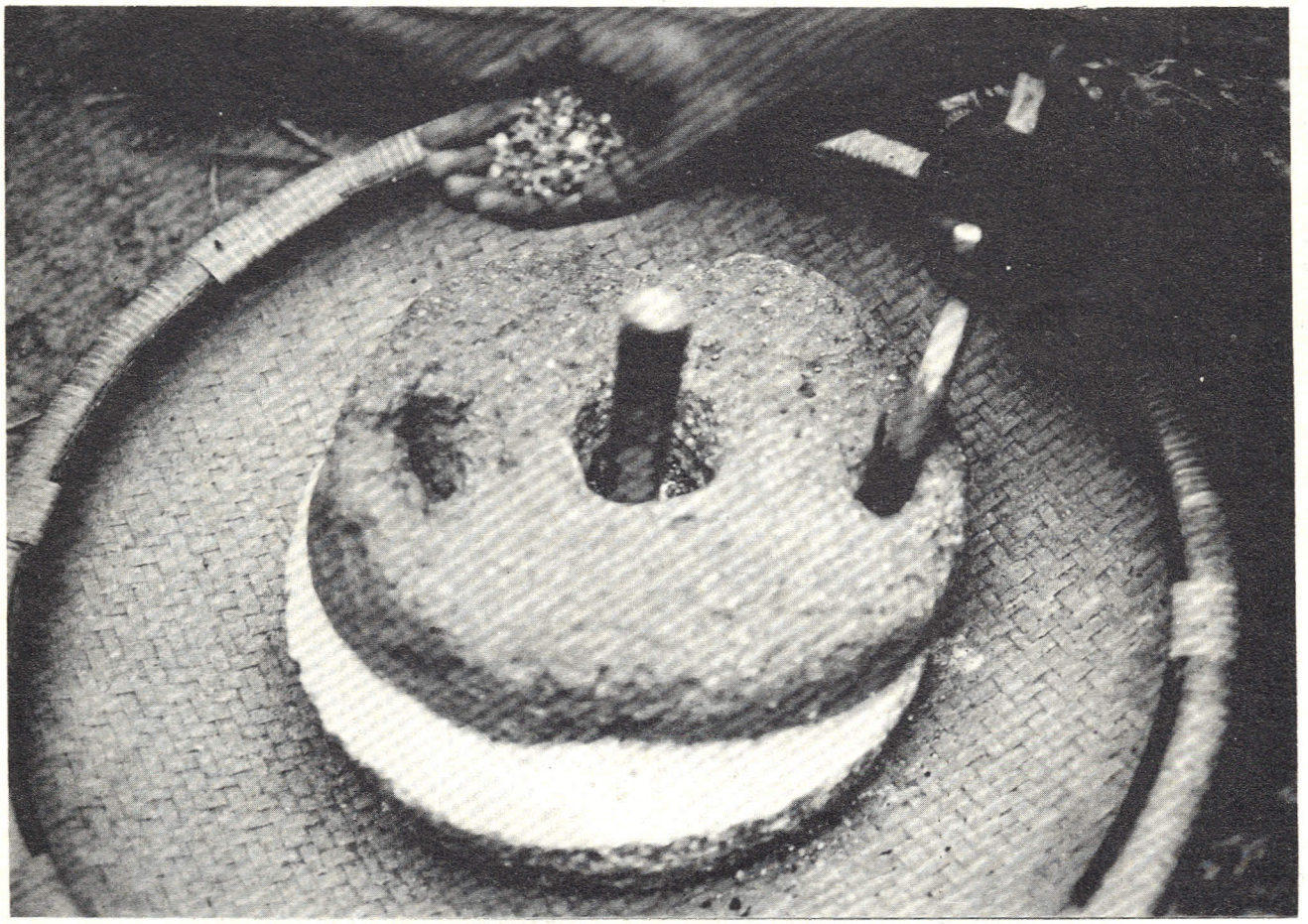

Photo 5. Stone mill used for grinding maize and sorghum.

Photo 6. Maize damaged during storage.

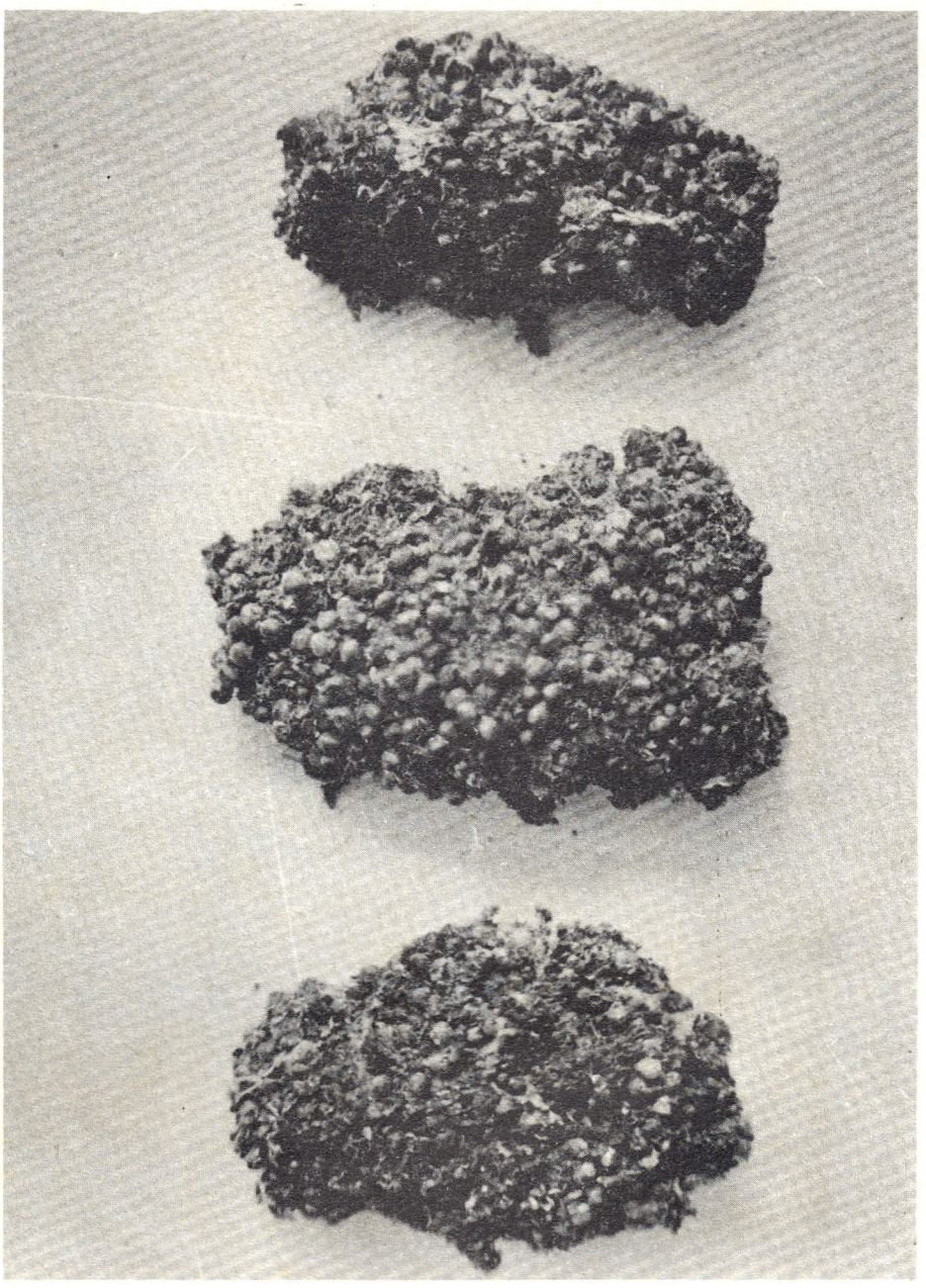

Photo 7. Sorghum damaged during storage.

Photo 8. An improved storage hut, selected for testing, under construction.

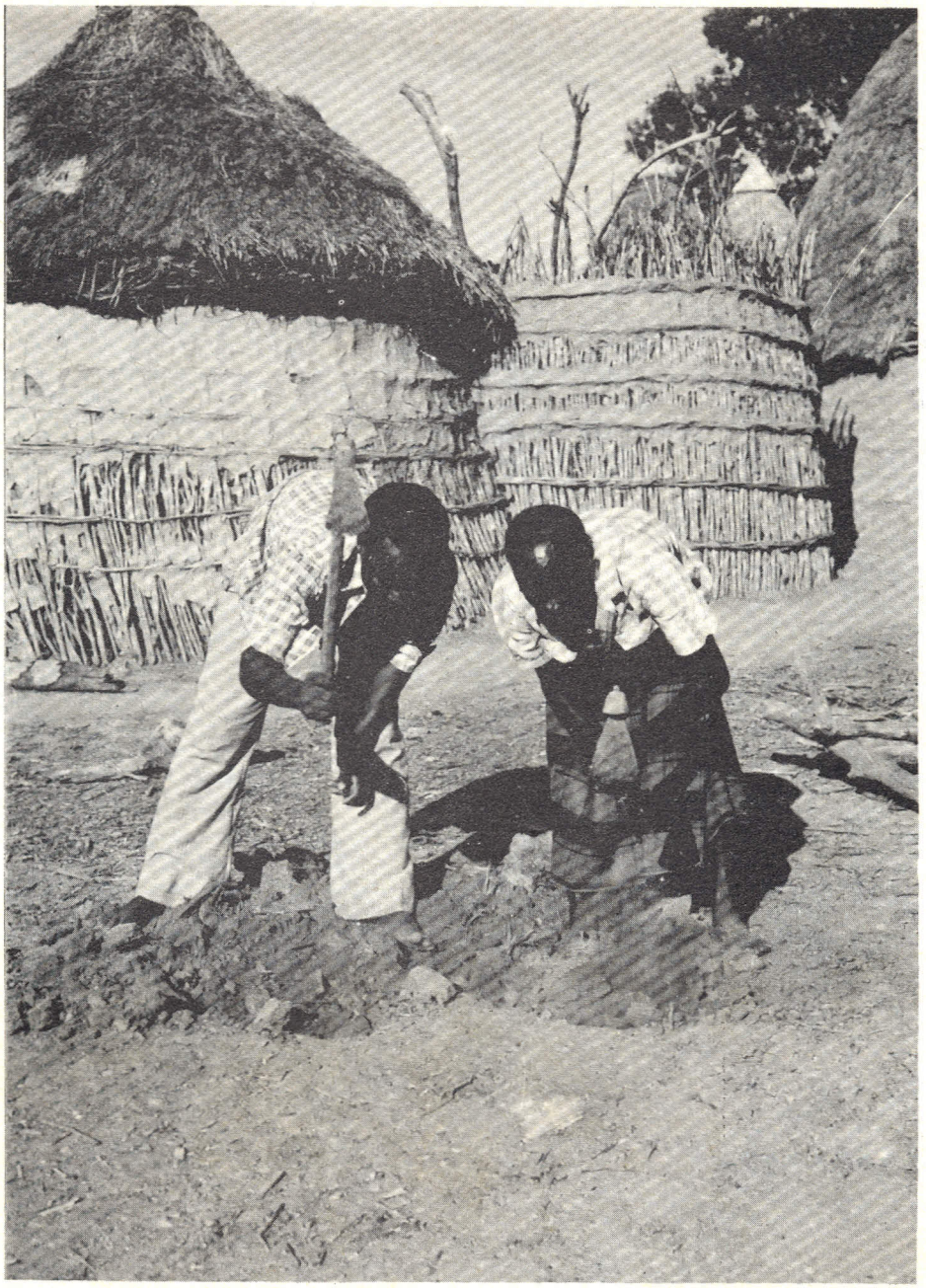

Photo 9. Opening underground storage pit.

Photo 10. Demonstration of hand maize sheller.