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PROGRAMME REGIONAL DE PROMOTION DES CEREALES LOCALES AU SAHEL

PROCELOS

REUNION REGIONALE

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CILSS DOCUMENTATION

WORKSHOP ON LOCAL GRAINS PROMOTION IN THE GAMBIA

Report of the PROCELOS National Team of The Gambia

Held at PPMU - May 3 & 4 , 1988

Ministry of Agriculture - Banjul - The Gambia

Organisée conjointement par :

ENDA TM - Relais Technologique
BP 3370
Dakar - Sénégal
Tél : 21 60 27 ou 22 42 29
Télex : 456 ou 51456 SG

ALTERSIAL - GRET - CEEMAT
213, rue La Fayette
75010 Paris - France
Tél : 42 39 13 14
Télex : 212 890 F

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Ce document provisoire est édité pour l'usage interne des participants à la Réunion Régionale du PROCELOS.

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CILSS DOCUMENTATION

PREFACE:

The two days workshop on Local Grains Promotion was organized by the local grains promotion committee under the Ministry of Agriculture. This Committee was established within the framework of the implementation of the Mindelo Conference on cereal policies in the Sahelian Countries, CILSS and the Club du Sahel decided to initiate and carry at a Regional Programme on local grains promotion in the Sahel.

The principal objective of this programme is to use a variety of approaches to provide encouragement to economic operators that process or distribute food products based on local cereals. This programme is to be launched in for Sahelian Countries namely Burkina Faso, Mali, The Gambia and Senegal.

A study on local grain promotion was one of the activities to be carried out within the context of the Regional Programme on local grains promotion. The study was to be carried out by a National Team to perform the following duties:

(a) To identify activities inorder to collect information on local grain promotion;

(b) To analyse the results of these activities inorder to identify the constraints based on the data collected and the results of the analyses, to consider the

  (1) Setting up of local cereals baby food production units

  (2) Training and assistance to blacksmiths for a local production and better diffusion of good quality processing machines (hammer mills, dehulling machines and other types of processing machines).

(c) To disseminate the information collected in The Gambia to other Sahelian partners.

In view of the above, a National Team was set up to carry out the above functions.

The team thus organized a workshop which brought together participants from all the relevant organizations to discuss and make proposal on the issue of local grains promotion.

The members of the National Team are:

Mr. Yaya Jallow	-	CILSS Coordinator in the Gambia
Mr. B. Secka	-	National Committee member on local cereal Promotion - Ministry of Agriculture
Mrs. Coumba Marenah	-	Women's Bureau
Mr. Kenbugul Johm	-	PPMU
Mr. Tamsir Jagne	-	Dept. of Agriculture
Mrs. Kuje Manneh	-	Food and Nutrition Programme Department of Agriculture
Mr. Papa Cham	-	Agriculture Engineering Unit

The workshop started with an introduction of its objectives by Mr. Kenbugul Johm, Assistant Director, PPMU. He then invited participants to introduce themselves. This was followed by presentation of papers by participants. The papers presented are reflected in Annex 2 - 9.

ACKNOWLEDGEMENT

The objectives of the workshop would not have been realized without the financial support of CILSS and the timely disbursement of the funds by the CILSS National Coordinator in the Gambia. Sincere gratitude is extended to them.

Special thanks goes to the Convener of the workshop Mr. Kenbugul Johm and his two Co-Coordinators Mrs. Coumba Marenah and Kuje Manneh for their relentless efforts in organizing the workshop and ensuring its success.

The good cooperation and kind support of the Director of PPMU Mr. Kinteh and all his staff made the workshop proceed smoothly not withstanding the very comfortable room offered to the National Grain Promotion Committee for the workshop.

The continued interest and active participation of the National Local Grain Promotion Committee and it's coordinators Mr. Yaya Jallow, Under Secretary, Ministry of Agriculture and Mr. Secka, Senior Assistant Secretary and all the other staff of the Ministry requires commendation.

All those who presented papers to the workshop, deserves special commendation for making it a big success.

SUMMARY OF PAPERS PRESENTED

Diffusion of Local Baby Food:- by Seedy Taal, C.R.S.

This paper dealth with low-cost weaning and young toddler foods that would be combined for some desired high nutrient density, low bulk properties, utilization of low-cost and widely used cereals, pulses and oilseeds with traditional processing methods that have the potential of being easily adopted at homes.

The basic problems with our home made weaning porridges were highlighted. Those include:

(a) High dietary bulk/low nutrient density

(b) Average energy density is about 0.40 K cal/g

(c) High bacterial contamination

(d) Poor Storage Conditions

The paper hthen went on to suggest approaches to be taken when developing home made low cost weaning foods which also require modification of our starch based cereal weanings. It also suggested other formulation methods to incorporate low cost and widely used cereals, pulses and oilseeds. These include rice, millet, maize, sorghum and fonio, groundnuts, cowpeas and berri seeds.

For details of this paper, please refer to annex I.

SAVE THE CHILDREN (USA) NUTRITION PROGRAMME

- Save the Children operates mainly in the NED and has about 10 (ten) high impact areas.
- They deal with 1000 to 1500 women of child bearing age.
- Save the children forms divisional committees for nutrition programmes. They provide sugar and the local people provides groundnuts, coos etc for their nutritional programmes.

They have realized that 60% of the malnourished were severely malnourished and weaning foods will be best needed during the rainy season which is the hungry and busy season.

Annex 2 give details of this paper.

MINISTRY OF HEALTH NUTRITION UNIT (MOHNU).

GOVERNMENT'S INTERVENTION IN LOCAL BABY FOOD PRODUCT

The MOH's Nutrition Unit have detected that malnutrition is more common with children during the weaning period.

Weaning foods are more cereal based but enjoys very few suplementary foods. That is a contributing factor to the malnutrition.

Most of the low density in the food content is from the preparation stage.

Containers for weaning foods such as clay would keep the pap without temperature.

The paper further elaborates on the types of weaning foods given to babies locally which in some cases lack the nutritious foods due to a number of factors such as:

(a) Food taboos associated with them

(b) Ignorance - lack of understanding in families on the nutritional benefits obtained from eating these foods.

(c) Unavailability in the household or compound.

The paper further lists out the various problems associated with weaning foods and their impact on the todler. The health problems associated with those foods were also highlighted.

The objectives of a weaning food which is to contribute to the improvement of nutritional status during the weaning period and to the prevention of infant and childhood malnutrition were fully emphasised.

Suggestions were made on ways of improving the quality of Home Prepared Foods; the Advantages and Disadvantages associated with Home Prepared Weaning Foods and various steps on the Food Chain leading to a weaning food were also highlighted.

For details of this paper, please refer to Annex 3.

RECIPES OF LOCAL WEANING FOODS BY KUJE MANNEH
AGRICULTURE NUTRITION UNIT

This paper highlighted various recipes which are locally used for weaning foods and gave its objectives as follows:

- To help female farmers maintain well nourished healthy children, so that their productive hours are not spent nursing malnourished sick children.

- It then suggested strategies for implementing weaning foods and highlighted the constraints. It made recommendations and suggested various types of Baby Foods that could be produced in The Gambia.

The recipes and details of the presentation are contained in Annex 4A and B.

The UNICEF representative also give an exposure on UNICEF's programme in the Gambia and the various ways it is assisting. UNICEF intervenes mainly in the area of health, children and mothers. It support immunization programmes and MCH programmes with a view to reducing maternal mortality by 10%, infant mortality by 10% and malarial risk by 10%.

UNICEF also assists CUSO in 10 villages with women gardens and training etc. It supports the Ministry of Health's nutrition programme in terms of materials etc; GAFNA - an integrated nutrition programme.

Finally, it will fund weaning foods for babies if an agency submits a viable project document. Such project is possible within UNICEF's 1987 - 1991 budget period.

At the end of Day I participants noted that all papers presented focused on types of weaning foods and what was needed to make better nutrientional foods. It was also noted that:

(a) Cereals are used as weaning foods

(b) Final product for weaning foods readily mixed but just to add water to it is more suitable

(c) Futo Kanya can be used as a weaning food for children over one year old.

(d) Sesame and other locally based cereals will form weaning foods for babies.

Based on the above, it was agreed that maize, millet mixed with sesame or groundnut will form an INSTANT BABY FOOD. The types of ingredients to be used needs to be pre-conditioned, blended, toasted and milled. It should be mixed together and packaged and the mixed product should be used directly without further cooking.

The second day of the workshop was devoted to the types of machinery appropriated for processing weaning foods. Various institutions presented papers on the types of machines they are distributing and the various places where these machines were installed.

The first presentation was done by Mr. Papa Cham, Agriculture Engineering Unit. His paper started by introducing the types of machines to be considered for introduction in a group and the factors guiding it; namely, crop type, production level, crop and target group. Distribution will determine the type of power source to be used for the machines. It also mentioned the four main types of machines used in the Gambia and these are:

Threshers, dehullers, winnowers and flour mills where cereals are concerned.

Mr. Cham went on to state the objectives of the milling machines viz:

(a) to reduce the drudgery and work load of women

(b) to eliminate over processing of grain and obtain a better quality finished product

(c) to enable women save time and be able to spend more time with their families.

In addition, there are set objectives in testing milling machines to ascertain their suitability. These are:

(a) to ascertain whether the machine meet the basic requirements of the different crops

(b) to assess the durability of the machines

(c) to be acquainted with the operation and maintenance requirements

There are numerous strategies for implementing a milling machine programme and these when followed will ensure its sustainability. (See Annex 6, Page 2). The paper also highlighted a lot of constraints which affect the implementation of milling machine programmes in the Gambia and made recommendations (as indicated in Annex 6, Page 2, 3 and 4). Among the recommendations made, were the following:

(a) Maintenance and repair operations - In this regard, a selected number of blacksmiths should be trained and provided with tools such as portable welding generators, hand tools, specific loans etc.

(b) Local production activities - The services of governmental and NGO's should be made readily available to entrepreneurs wishing to be involved in these activities.

On the diffusion of finished products, the paper recommended that

(a) exhibitions of finished products should be organized by manufacturers' association. Funds should be provided for this activity to generate interest in the products.

(b) Local retail shops e.g. NTC and consumer cooperatives should be encouraged to sell locally produced equipment.

(c) It should be the responsibility of the association to advertise the suitability of finished products under local conditions as well as diffusing their use.

Other issues that came up during the discussions were: the issue of standardization of the marks and types of machines to facilitate acquisition of spare parts and the provision of the necessary spare parts, training and a revolving fund for blacksmiths was recommended by all participants. Annex 6 gives the details of this presentation.

The Women's Bureau's milling machines are funded by UNIFEM. This project was designed to provide time and labour saving devices for women in the processing of food for home consumption in 15 villages where 15 coose milling and 15 decorticating machines are distributed with sheds currently under construction. The bureau has also distributed 4 milling machines in 1984. In addition to providing labour saving devices to women, the project aims at improving the skills of women in management of their projects.

There are management committees set-up in each of the fifteen villages to look into the day-to-day operations of the mills. These comprise women from the villages. Three of the 15 mills are loans to three business entrepreneurs but they follow the same rules as the other machines.

Every user of the machines has to pay 25 bututs per cup and c records are kept for the daily revenues. Each management committee has a savings bank account. The savings is meant to purchase spare parts and to replace the machine when it is worn-out.

However, there are some problems encountered in the implementation of the mills project which includes:

(a) inavailability of spare parts

(b) frequent breakdowns of the machine

(c) inappropriate decorticators

The paper thus recommended that:

(a) Literacy classes should be conducted for management committee members

(b) The management committees should be supervised

(c) All the committees should contribute a certain amount for revolving loans.

During the presentations, it was revealed that a mill costs D9400, a decorticator cost D27,184 and the cost of a shed was D25,600 thus making the total cost to be D62,800 per complete package.

For a complete text of this paper, please refer to Annex 7.

Likewise FFHC also operates two motor milling machines in the URD. In addition, they run serial banks. For the work for FFHC and their programmes, please refer to Annex 8.

The Department of Community Development also operates similar projects like the Agriculture Engineering Unit. The appropriate technology unit of the D.C.D. has the following activities:

(a) Building materials production in 1979

(b) Service teaching aids

(c) Revisible energy into biogas plants

(d) Solar dryers for crop drying.

However, they do not have the expertise to design prototypes for processing. But, if they are given the necessary specifications and a prototype, they will be able to develop any type of equipment. Annex 9 gives details of the work of D.C.D.

Similarly, the CRS has developed dehullers which can process a batch of three to seven kilogrammes. With the CRS type of dehullers, twice the quantity takes three to four minutes to dehull, about a minute to winnow and about five minutes to mill by machine. That is a saving of one hour for 7 kg. It gives about 90% grain recovery by weight.

Description of the dehuller is in Annex 10. The prototype of this machine came from Canada (the International Development Research Center). It was found desirable and adoptable and was developed for four places, Basse, Sibanor, Basouri and one electric powered used in Brikama. It is planned that the project will be expanded in the second phase of the project.

Annex 10 describes the dehuller project.

WORKSHOP CONCLUSIONS

The workshop participants made the following recommendations:

1. That (IBF) INSTANT BABY FOOD is ideal for weaning food.

2. That maize millet mixed with sesame or groundnut pre-conditioned, blended, toasted and milled could be the ingredients for the IBF.

3. That the mixed product should be packaged and used with water instantly. The quantity should be for one feed only.

4. That the materials to be used and ratio of each should be worked-out by the nutrition unit of the Department of Agriculture, nutrition unit of the Ministry of Health and CRS.

5. There should be some awareness building programme over Radio Gambia and other medias to be coordinated by Women's Bureau, on the importance of the (IBF) Instant Baby Foods.

6. That there should be trials in some selected villages where CRS has it's programmes. These trials will be conducted by Agriculture Nutrition Unit, Ministry of Health Nutrition Unit and CRS.

7. That a committee be set-up comprising Agriculture Engineering Unit, CRS, Department of Community Development's appropriated technology unit to recommend the types of equipment or machines to be used for the processing of the IBF.

Where possible, a prototype should be developed for the processing of the IBF to be tested in selected villages.

The Department of Agriculture Engineering Unit should coordinate these activities.

ATTENDANCE LIST DAY 1

	NAME	DESIGNATE	INSTITUTION
1.	Coumba Jarenah	Pro	Women's Bureau
2.	Natividad Torralba	UNU	Women's Bureau
3.	Surangkana Pitaksuntipan	Asst. Representative	UNICEF
4.	Isatou Semega-Janneh	Head, Nutrition Unit	MOH
5.	Papa A. Cham	Head, Agric. Engineering Unit. Dep. of Agric.	Ministry of Agriculture
6.	Ken John	Deupty Director	PHU
7.	Glen Knapp	CRS Agric. Adviser	CRS
8.	Isatou Jallow	FFHC/WAP	Manskonko
9.	Fakebba Darboe	A.T.U.,	Dept. of Community Dev.
10.	Fatou B nja Camara	Social Dev. Coordinator	S.C.F.
11.	Kuje Manneh	A/O	D O A
12.	Kinday Samba	Nutrition Unit	M O H
13.	Trisha Caffrey	Save The Children USA	Director
14.	Seedy Taal	M/N Co-ord.	CRS

ATTENDANCE LIST DAY 2

NAME	DESIGNATION	INSTITUTION
K. Johm	D. Director	PPMU
Kinday Samba	Nutritionist	M O H
Kuje Manneh	A/O FHU	D O A
Fatou Banja Camara	S.D.C.	S.C.F.
Seedy Taal	H/N Co-ord.	CRS
Isatou Jallow	Extension Worker	FFHC/WAP
Glen Knapp	Agric. Adviser	CRS
Papa Cham	Chief Agric. Engineer	Agric. Dept.
Isatou Semega-Janneh	Head, Nutrition Unit	M O H
Coumba Marenah	Pro	Women's Bureau
Natividad Torralba	UNU	Women's Bureau
Lindsay Davison	on behalf of Ms. Surangkana Pitaksuntipan UNICEF Programme Officer	UNICEF

Annex 1

WORKSHOP ON
DOMESTIC GRAIN PROTECTION
May 3 - 4 1988

LIST OF PARTICIPANTS

Ms. Collette Jones	- Medical Research Council Keneba
Mr. Fabakary Darboe	- Community Rural Development Institute
Mr. Glen Knapp	- Catholic Relief Services
Mrs Isatou Jannch	- Department of Medical Services
Mr. Ken John	- PHIU
Ms. Kumba Marenah	- Women's Bureau
Ms. Kuje Nanneh	- Food & Nutrition Unit, Department of Agriculture
Ms. Natividad Toralba	- Women's Bureau
Mr. Papa Cham	- Agricultural Engineering Unit Department of Agriculture
Patricia Caffrey	- Save The Children - USA
Ms. Petra Mueller-Glodde	- Freedom From Hunger Campaign
P. Yip	- CUSO
Mr. Sidi Thal	- Catholic Relief Services
Mr. Sonko	- Rural Vocational Training Program
S. Pipaksantipan	- UNICEF

WORKSHOP ON
LOCAL GRAINS PROMOTION
MAY 3 - 4 1988

Day 1	May 3, 1988	
9.30 am	Opening Remarks	Yaya Jallow CONACILLS
10.00	Research Findings on Baby Food Production from Local Grains	Collette Jones - MRC
10.30	Diffusion of Local Baby Foods	Sidi Taal - CRS
11.00	P. Yip	CUSO
11.15	S. Pipaksantipan	UNICEF
11.30	Patricia Caffrey (Fatou Banja)	Save the Children USA
12.00	Government Interventions in Local Baby Food Product	Kaindeh Samba - MOH Isatou Janneh - MOH
12.30	Results of Recipes for Local Baby Foods	Kuje Manneh - DOA
1.00 - 2.00	Break	
2.00	Discussion	Ken Johm - PPMU

Day 2 May 4, 1988

10:00	Tests of Millin Machines Diffusion of Mills	Papa Chan - NIU/DOA
11:00	Diffusion of small scale Grain Processing Units in Rural Areas	Fabakary Daboe - CRDI
12:00	Blacksmith Training for Agricultural Tools & Grain Processing Units	Sonko - RVTP
12:30	Diffusion of Mills	Natividad Torralba Women's Bureau
1:00	Diffusion of Mills	Petra Mueller-Glodde (Isatou Jallow) PPHC
1:30 - 2:00	Break	
2:00	Discussion	Ken John - PPHU

WORKSHOP ON LOCAL GRAINS PROMOTION FROM MAY 3-4, 1988

First of all I would like to thank you the workshop organizer for kindly inviting UNICEF to participate in this valuable gathering for promotion of the local grains which will have an impact on nutrition improvement.

The contribution that I may share with the workshop participants will be briefly on the UNICEF programme cooperation in The Gambia including nutrition programme area.

STRATEGY

In order to optimize our current limited resources and concentrate action on critical problems, priority thus is given to saving lives at the most vulnerable stage of children i.e. infancy and under 5 years old and the perinatal period.

Under above strategy, the planned activities are broken down into the following programme components.

I Health

For direct impact on child survival, UNICEF will support a package of services combining control of acute respiratory infections (ARI) and malaria, and training of health staff and traditional birth attendants (TBAs), complemented by immunization, oral rehydration therapy (ORT) and water supply and sanitation. The activities are designed to:

(a) Reduce mortality and morbidity due to acute respiratory tract infections by 10 percent per year and maintain the reduced levels thereafter;

(b) Reduce malaria mortality and morbidity by 10 percent per year through joint curative and preventive programmes and social awareness campaigns and techniques during the peak incidence period of the rainy season;

ANNEX 2

WORKSHOP ON LOCAL GRAIN PROMOTION

03 - 04 MAY 1988

Topic: Briefing on

UNICEF Programme Cooperation in The Gambia

Surangkana PITAKSUNTIPAN
Assistant UNICEF Representative
UNICEF Banjul - May 1988

(c) REduce maternal mortality by upgrading basic health services referral facilities at the health centre level and by retraining health staff;

(d) Provide information on the actions mothers should take, especially in case of diarrhoea, malaria and ARI;

(e) Obtain mothers' continued participation in immunization and the promotion of sanitation.

UNICEF will focus its programme on strengthening those components of the national health development plan directly related to child survival, in particular EPI, ARI, malaria, maternal mortality, nutrition and diarrhoea-related diseases. The focus will be on high-impact health interventions within the PHC system that will have immediate and quantifiable effects on infant, child and maternal mortality.

II Expanded Programme of Immunization

EPI is a prominent aspect of MCH services in the Gambia. The immunization campaign has been well established since 1979 when a national immunization plan was developed with the overall objective of making immunization services available to all children and pregnant women by the year 1990. With financing from the Government of Italy, EPI is now fully integrated into the national health system.

According to annual cluster surveys and other evaluations, the level of immunization is high, with over 60 percent of children fully immunized in 1987. A significant feature of EPI in the Gambia is the high level of support by mothers. However, the programme has not yet reached its full potential. Supervision at all levels must be improved and the overall cold chain re-examined. Substantial training needs remain and more sustained efforts in community education are required. UNICEF is monitoring the implementation of EPI activities in the Gambia and will participate in the supervision and evaluation of the programme.

III Water Supply, Sanitation and Control of Diarrhoea Diseases

Proposed assistance in this sector will be subject to the availability of specific-purpose contributions for a "noted" project aiming:

(a) To continue village well-digging and rehabilitation activities by annually digging 20 new wells, rehabilitating 36 wells, installing hand-pumps, training village pump mechanics and providing sanitation and social amenities;

(b) To increase public use of appropriate sanitation facilities by designing and equipping low cost models;

(c) To use public mass media and traditional forms of communication to enhance knowledge of health hygiene and diarrhoea-related diseases to reduce such diseases and increase the use of oral rehydration salts.

The UNICEF assisted project attempts, on a national scale, to co-ordinate village-level water provision by combining the construction of sanitation facilities and the national diarrhoea programme into a joint intersectoral community-based project. The Ministries of Health, Water Resources and Community Development will be supported in fostering better understanding and treatment of diarrhoea-related diseases. A more systematic and well-designed CDD teaching programme will be established for health and other extension personnel. More sustained efforts will be made at social mobilization, using mass media information for infant health. An attempt will be made to re-implement some of the substantial gains achieved by the mass media regarding ORT.

IV Education

(a) Education sector activities are severely constrained by the limited number and quality of teachers, the lack of permanent school structures and inadequate basic equipment such as blackboards and chalk.

To improve the quality of education in the most needy areas, it is essential to support the existing teaching staff by providing sufficient in-service training, professional guidance and supervision.

(b) The Government has identified the upgrading and retraining of existing female home economics teachers as a possible response to the shortage of teachers. In addition, such training will enhance the position of women teachers and may influence the incremental enrolment of female students in the primary school system. UNICEF will also assist the school inspectorate units in improving in-services training and supervision capability, as well as to enable the design of individual school-focused training sessions. Support will also be provided for the local production of elementary text books for both teachers and pupils.

V Nutrition - (Food Security and Applied Nutrition)

(a) Recent research shows that while children age five and under make up 17 percent of the total population, this group accounts for half of total deaths. More than half of all child deaths occur in the three months following the rainy season. Repeated infections, the high prevalence of disease, complications in pregnancy and endemic malnutrition result in a national average life expectancy of 36 years, which is among the world's lowest.

(b) Child malnutrition is a major and growing problem in the Gambia. Although food shortage is a relatively recent phenomenon, food production, availability and consumption trends have deteriorated steadily due in part to the persistent drought and worsening economy, and the season of hunger has lengthened recently. Malnutrition among children and mothers, including anaemia among the latter, is caused mainly by inadequate income, food shortages, frequent episodes of diarrhoea, closely spaced pregnancies and early marriage. The lack of proper nutritional knowledge combined with certain traditional practices is also a factor.

(c) Malnutrition trends to be seasonal. Studies reveal that during the rainy season, nearly 80 percent of children between 13 and 18 months are under-weight for age, of whom one third suffer clinical malnutrition. Similarly, the incidence of low birth weight correlates strongly with maternal nutrition during the last trimester of pregnancy.

(d) Nutrition activities aim at promoting food production and developing associated income-generating activities to benefit rural village women. To support this goal, UNICEF will foster national co-ordination of the many organizations already working in the area of nutrition. UNICEF will advocate a more rational and co-ordinated approach to nutrition education, growth monitoring and food production activities. Support will be given to strengthen the Government's capacity to collate and analyse data, and to identify groups at nutritional risk.

(e) At village level, UNICEF will assist in improving food production by identifying each year 10 villages at most nutritional risk and by helping 100 women (10 per village) to develop kitchen and market gardens and small subsistence crops. This is an effect to replicate the success of non-governmental organizations (NGOs) in this area in the Gambia. The aim is to increase self-sufficiency and self reliance in food production at the household level in villages at risk. In addition, UNICEF will contribute to improving local technologies and skills in the production, storage and management of food at village level.

(f) The school garden project aims to integrate practical agriculture and nutrition education into the primary school curriculum and to supplement the school-feeding programme co-ordinated by the World Food Programme (WFP).

(g) UNICEF will continue to support the nutrition units in the Ministries of Health and Agriculture by supplying materials, equipment and cash grants for training extension workers.

Emphasis will be given to improving the quality of nutrition education, promotion of local weaning foods, effective treatment of micro-nutritional deficiencies, and development of practical nutrition interventions as part of the regular primary and MCH services, including a standardized growth monitoring methodology.

ANNEX 3

WORKSHOP ON LOCAL GRAINS PROMOTION

For the past several years a lot of serious ventures have been taken to combat problems surrounding the above topic in the North Bank Division and the country at large. Like in many other African countries, the results remain to be questioned. We still register high rates of malnutrition, maternal mortality and infant mortality.

For example in Save the Children Federation USA 'SCF) baseline survey conducted in 1984, the Upper Baddibu High Impact Area (UBHIPA) registered a maternal mortality rate of 3750/100,000 pregnancies, an infant mortality rate of 180/1000 live births and 10-20% malnourished kids aged 0-5 years.

To address these problems, SCF has taken several concrete steps. Three main areas of activity have been the promotion of a local pregnancy food supplement (futu kanya), an intensive campaign to reduce child malnutrition, and a division-wide organising effort to coordinate nutritional activities of several health care agencies on the North Bank Division.

"Futu Kanya", which is a local snack made from a mixture of coos, groundnut paste and sugar, is used as a means to reduce the prvalence of low birth weights and maternal morbidity and mortality. Our latest statistics show a reduction in low birth weights from 17% - 6%, severe anaemia from 45% to 15% and maternal mortality from 3750/100,000 to 800/100,000. But the supplement alone cannot be considered solely responsible for the dramatic changes. Regular health and nutrition Education/Demonstrations, pregnancy monitoring using specially designed pictograms home visits and timely referal of at Risk cases also play a very important role.

In August, 1987, our impact area staff recorded a sharp increase in the rate of child malnutrition. The calculation, done at the height of the rainy season, put the rate at 60% of children under 5. In addressing this critical situation SCF has adopted the following village based interventions.

a) Use of "Futu Kanya" as a weaning food for children one year of age and older (enriched with milk and water).
b) Rehabilitation of critically malnourished children by administering the S.O.S. solution a mixture of sugar oil and skinned milk.
c) De-worming of infants.

d) Referral of severely malnourished kids who fail to respond to the S.O.S. solution after 3 months to the nearest health center (i.e. Farafenni)

After five months of intense efforts, the rate of severe malnutrition among children under five had dropped to 10%. The infant mortality rate of 180/1000.

Finally, a Divisional Nutrition Workshop with a cross section of all extension workers in the North Bank Division was held to design, develop and adopt a six months Divisional Nutrition Campaign. The campaign was launched to promote the use of several local weaning foods, all made from rice, maize and coos. These included:-

1) Coos pap enriched with milk, eggs, oil, groundnut powder/paste and green vegetables
2) Maize pap with milk, eggs, oil, and or green vegetables.
3) Maise porridge blended with dried fish powder
4) Coos porridge with dry fish powder
5) Maize or coos porridge with eggs
6) "Churaigertch" with milk, sugar and oil
7) 'Futu Kanya' with milk and water (for older children only)

Our implementation strategy emphasizes integration and coordination between village based extension workers and local group leaders like the village Health board members and Traditional Birth Attendants. The following steps will help to explain the process:-

- Discussion and confirmation of the strategy with village extension workers;
- Training village women's group leaders and Health board members to help implement the strategy;
- Demonstration conducted by Health Board members and TBAs under the supervision of SCF and other extension staff;
- Follow up through home visits;
- Program Monitoring via nutrition surveillance;
- Regular recording or pregnancies and pregnancy out comes; and
- Regular death investigation and recording.

SCF's program calls for two levels of investment. That is, from the agency and from the village itself. The interventions are relatively low cost. Ingredients for the various food supplements such as sugar, oil, skimmed milk and eggs are sometimes provided by SCF, in addition to technical support for all Demonstrations. The village on the other hand provides coos, maize, groundnuts, and other local food stuffs for all demonstrations. The cost of a single demonstration depends on the size of the village, but overall, for the 1987/1988 fiscal year, SCF spent ₡500 to conduct 20 demonstrations rogram in ten villages.

SCF also maintains a staff of two health recorders to serve the population of 6,000 persons in its Upper Baddibu High Impact Area. Their role is to maintain all program statistics and assist in carrying our village based demonstations. Support for the health recorders and two program coordinators totals roughly ₡7000 per annum including salaries a Vehicle, driver, and auto operation costs total an additional ₡8000 each year.

Specific constraints faced by the program at this stage include:-

1) Lack of any formal institutionalised system of getting certain major ingredients such as skimmed milk. As a result, SCF open market' after long delays.
2) Lack of public awareness of our program activities
3) Instability of funding mechanisms. Most of our funding sources must be renewed annually. This condition hampers our long term planning efforts. This occasionally threatens the security of certain staff positions, notably the health recorders.

Finally to continue the same degree of program success I would like to make the following recommendations:-

- A closer and more formally collaboration between SCF and the CRS pre-school feeding program to facilitate procurement of program inputs.
- Increase Radio coverage SCF's nutrition education activities. This will provide broader awareness of the program, and also give more room for criticisms and suggestions from outside sources.

- Finally, I think it is clear from the foregoing that there is great potential for the use of local grains to improve nutritional standards of malnourished children in The Gambia. It is also clear that this can be done through relatively low cost programmes what is needed to ensure the success of such programmes in the future is a mechanism for funding that can be sustained for more than one year, and that is targeted directly at the rural area where the problem actually exists.

BY FATOU BANJA-CAMARA

ANNEX 4

GOVERNMENT INTERVENTIONS IN LOCAL BABY FOOD PRODUCT

WHY DO WE NEED AN IMPROVED WEANING ROOD?

The Gambia, is one of the few countries, in the developing world that conducts a nationwide, village based, nutrition surveillance programme bi-annually.

Data collected from the surveys, have enlightened us, on the causes, prevalence and distribution of malnutrition amongst under five year old children in The Gambia.

As far as age distribution is concerned, malnutrition is most common amongst children in the WEANING PERIOD. This period starts at 4 months when the childs diet changes from breastmilk alone to foods that are available locally and should end between 18 and 24 months when the child is gradually taken off the breast. The major contributory factors to this pattern of distribution are the infant feeding practices carried out during this period.

The typical weaning food given to children is a CEREAL - BASED Pap or Mono. The main cereals used are Millet, Maize and Rice. The paps are usually made from one ingredient only. When additional foods are added. the most common ones used are sugar, salt and milk.

The more nutritious locally available foods are excluded for a number of reasons.

1. Food taboos associated with them,
2. Ignorance - lack of understanding in families, on the nutritional benefits obtained from eating these foods,
3. Unavailability in the household or compound.

There are 4 methods of pap preparation.

a. Whole dry flour is added to boiling water,
b. Cereal flour is mixed with water, and the mixture added to boiling water.
c. Cereal flour is mixed with water, the liquid is decanted from the sediment and is discarded. The sediment residue is then used for pap preparations.
d. Cereal flour is mixed with cold water, the mixture is sieved and the liquid passing through is used for mono preparation.

Methods (b) and (d) were the two most common methods observed during a study of INFANT WEANING in the Gambia by Helen Kearns and members of the Nutrition unit in 1985.

In methods (c) and (d), sieving has an effect on the distribution of protein and carbohydrate into the liquid and sediment residues. In method (d) 30 - 40% of the nutritive value of the original mixture is retained in the liquid used to prepare the pap. This is a practice of great concern that should be discouraged. In cooking the pap, it is boiled for an average time of 6 minutes. This is not considered long enough to significantly reduce the levels of contamination in weaning foods especially in the rainy season. Sources of bacterial contamination in weaning foods are water, cookung ingredients and utensils and the food handler. Most mothers do not boil the water used for feeding their children.

One of the consequences of eating bacterially contaminated food is DIARRHOEA. This condition is most common amongst children in the Weaning period especially in the rainy season when diarrhoeal prevalence is at its highest.

The duration of the interval between preparation and consumption and the methods of storage of the prepared pap are also conducive to bacterial multiplication and overgrowth. Most mothers prepare their child's requirement of pap for a whole day in the morning, store it indoors in a covered bowl and the child is served from this for the rest ofthe day. The climate we live in further exacerbated the situation because our room temperatures are highly favourable to bacterial contamination. Therefore by the time the child is eating its last feed of pap for the day, the bacterial contents might have reached dagerous levels.

In pap preparation, large amounts of water are added to the cereal for a number of reasons:

- to economise on the quantity of flour being used and
- to produce a pap of larger volume.

This degree of dilution not only produces a pap of low viscosity (i.e. a watery pap) but it also reduces the energy and nutrient density of the pap. The mother might succeed in filling up the childs stomach and satisfying its hunger, but, the childs energy requirements will not be met and this might result in malnutrition.

A pap of low viscosity also results from mothers not boiling their paps long enough since prolonged boiling results in a thick pap which mothers might find undesirable to feed to children.

Due to the chemical nature of the starch molecule, gelatinisation occurs at a specific temperature during boiling. This phenomenon results from a swelling of the starch molecule which causes an increase in thickness or paste viscosity of the pap. On further boiling, swelling increases. At about 85°c some of the starch molecules break down and there is a slight decrease in viscosity. However, on cooling, the gel reforms and viscosity increases again.

The swelling properties of the starch can be modified by:-

1. Physical means e.g. pre-gelatinisation.
2. Chemical means e.g. enzymic hydrolysis.
3. Presence of substances which reduce the swelling properties of starch e.g. vegetable proteins, fats, sugars and acid conditions.

No isolated action can result in a significant improvement of Childhood nutritional status. Combatting malnutrition must take into consideration a multitude of sectors - health, population, economics, agriculture and education.

Two of the many activities which may improve the nutrition situation are:-

1. THE IMPROVEMENT IN QUALITY OF HOME PREPARED WEANING FOODS,
2. THE PRODUCTION OF A PRE-PACKAGED RECONSTITUTABLE WEANING FOOD.

The main objective of a WEANING FOOD is to contribute to the IMPROVEMENT of NUTRITIONAL STATUS during the WEANING PERIOD and to the PREVENTION of INFANT and CHILDHOOD MALNUTRITION. To achieve this, a number of conditions most be met. The weaning food must be:-

1. sufficiently nutritious to cover the requirements of children, with the possible help of other traditional foods:

2. appropriate to infant's digestive abilities;

3. of a satisfactory microbiological quality, considering it is prepared in homes;

4. Cheap enough to be purchased by all families, including the poorest;
5. acceptable, meaning that the taste, colour, odour and texture are appreciated by the population;
6. available, always in supply, close to living quarters;
7. seen as an ordinary food, more specially for children, and not as a supplement;
8. eaten regularly;
9. known and appreciated by health workers, who should participate in popularizing it.

THE IMPROVEMENT IN QUALITY OF HOME PREPARED WEANING FOODS

On this aspect the Nutrition Unit has been involved in a number of ways:

1. During the recent World Health Day celebrations on the 7th April 1988, the local theme chosen was WISE WEANING. The Nutrition Unit developed 8 steps for Wise Weaning:

- start weaning at about 4 months of age by introducing a thick pap made from Coos, Maize, Rice or Findo strengthened with milk, sugar and fruits.
- prepare a fresh bowl of pap for each feed and boil the pap longer during cooking.
- feed your child at least 5 times a day.
- at 6-7 months of age, the pap should be made thicker. You should also add more nutritious foods such as groundnut paste, fish, eggs, beans, green vegetables and oil.
- at 9 months your child can start taking adult foods served in its own bowl.
- continue to feed your child 5 times a day.
- continue breastfeeding your child for 18-24 months.
- take your child off the breast gradually and keep your child at home with you instead of sending it away to relatives.

These 8 steps have been incorporated into a poster produced by the Health education Unit. The posters are being distributed to all levels of the health sector, other government departments and non-governmental organisations involved in work concerning childhood malnutrition.

Radio programmes were recorded in English, Wollof and Mandinka and have been repeatedly broadcasted. Broadcasts in the other local languages are to foloow.

2. At the Regional levels, the preparation and feeding of local weaning foods in the management of malnourished children is being encouraged. At present, there are only a few Health Centres where this is practiced due to manpower and resource contraints preventing widespread and efficient practice.

3. At the Village level, Community Health Nurses in their home visits to malnourished children; identified during the National Nutrition Surveillance Programmes, give to the mothers of these children,

- nutrition and health education,
- cookery demonstrations on weaning foods for children.

To improve on knowledge at this level, we are proposing a joint Medical & Health/Department of Agriculture Nutrition Units Workshop for CHN's, on the preparation of home prepared weaning foods using recipes developed at the Food Science and Nutrition Unit of the Department of Agriculture.

To combat the problem associated with the storage of prepared paps, there is at present only two solutions available to the rural mother.

1. The preparation of a fresh bowl of pap for each feed. This is an impossibility for the average rural mother who spends a good proportion of her day working outside her compound.

2. The storage of the daily requirement of pap in a Thermos flask. Unfortunately, mothers of very low socio-economic status might not be able to afford one.

There is therefore a need for the development of a locally made storage container, made of a material that conserves heat, in which, a mother can store a days requirement of weaning food and limit the risk of bacterial growth.

ADVANTAGES & DISADVANTAGES ASSOCIATED WITH HOME-PREPARED WEANING FOODS

Advantages:-

1. The costs to the family are minimal
2. The ingredients are available locally.
3. It involves no new technology
4. There are no distribution and packaging costs.
5. There is a potential to affect everyday behavioud and changes will occur over time.

The use of local foods may also have a positive impact in the family and community through an increase in agricultural production of these foods due to the increase in demand for them.

Disadvantages:-

1. It may require more of womens time in preparation.

2. Effective Nutrition education is needed in the training of staff about the messages and how to communicate them.
3. The food quality is variable.
4. Seasonal variations may leave families with few options during periods of food shortage e.g. the rainy season.

PROPOSED STUDIES ON THE IMPROVEMENT OF HOME PREPARED WEANING FOODS:

Certain developments have been made in the Food Science world which could make an impact on the quality of our weaning foods.
One of the mechanisms for reducing the viscosity of cereal-based paps is by the ENZYME HYDROLYSIS of STARCH. The enzyme which hydrolyses starch is AMYLASE.

STARCH ---------- GLUCOSE
amylase

Sources of the enzyme: 1. present in cereal grains
2. Human saliva
3. Synthetic

In her studies in 1985, Helen Kearns found that cereal paps of the same viscosity could be made with 5 times as much enzyme treated flour as untreated flour. Her source of amylase was Human saliva. Unfortunately, the hygienic implications of this practice will prevent it from ever leaving the laboratory door.

The enzyme treated paps also had an energy density 4 times that of the untreated paps.

The Dunn Nutrition Unit in Cambridge, have brought to our knowledge, the development of an AMYLASE enzyme, which could be incorporated into cereal paps at the preparation stage. The action of the enzyme, will make it possible for paps to be boiled for longer periods. and still have a high viscosity on cooling. Prolonged boiling will also reduce the level of pathogenic bacteria present in the pap.

The sugar produced at the end of the catalytic reaction, will, increase the level of vailable carbohydrates and possible the energy density, It will also increase the sensory appeal ofthe weaning food by making it sweeter.

Tentative plans have been made to carry out a study on. "the effect of the amylase enxyme on the diarrhoeal patterns of 'weaning children'".

The results obtained from this study might lead us one step closer to the development of a PRE-PACKED, RECONSTITUTABLE WEANING FOOD.

STEPS ON THE FOOD CHAIN LEADING TO A WEANING FOOD

supply of raw materials	producers	importers
	Wholesalers	
	food-processing workshop	
processing	buildings management	storage of raw materials
	personnel	transformation packaging reserve supply
distribution	distributor	
	health centres	shops markets
purchasing	families	
preparation	water	preparation of pap
	fuel cooking utensils	cooking
eating	consumer	

Nutritional status

Each of these steps must be analysed thoroughly to discover any possible obstacles and to examine the most appropriate solutions before production is started.

ADVANTAGES & DISADVANTAGES OF PRE-PACKAGED WEANING FOODS:-

Advantages

1. Foods are made under supervision therefore nutrient content is controlled.
2. Labour, fuel and time saving in preparation at home.
3. Stored without great risk of contamination.
4. Efficient way for government's to provide food for families who cannot afford more or different foods.

Disadvantages

1. Cost of product high to government or families.
2. make families dependent on purchased food.
3. Requires capital investment for physical investment for physical facilities for storage and processing.
4. Requires a marketing plan to ensure price policies, distribution networks and promotional strategies are finely tuned.
5. Commercial foods may not reach the target group, but only those who can afford it.
6. Raw materials may be difficult to supply in sufficient quantity.

Some progress has been made in this area as well.
Work has been done on the modification of cereal-based paps that could be prepared at the local level and that:-

1. could be stored in a dry state until point of use.
2. reconstitute instantly in cold water or milk
3. had a low paste viscosity on reconstitution than an equal weight of untreated flour. This would allow the preparation of more energy dense foods that could be further enriched with foods such as groundnuts.

In the above study, the cereal flour was modified physically by PRE-GELATINISATION. This process involved only cooking the cereal flour and drying it.
On reconstituting the treated flour with cold water, the pap produced had a reduced swelling capacity in comparison to that of untreated flour. However, the difference was very small.

To rpoduce paps of the same viscosity more pre-gelled flour that untreated flour was used. This represented an almost 2 fold increase in energy density.

Unfortunately, paps produced from pre-gelled flour, were frequently lumpy on redonstitution whereas untreated flour weaning foods were smooth and lump free. This difference in texture might present problems in feeding and might be unaccpetable to mothers.

Finally, which ever option is chosen to contribute to the improvement of nutritional status during the weaning period will depend on:-

- the results obtained from future associated studies,
- the needs of the majority of the population,
- the most cost effective option.

Kinday Samba - NUTRITIONIST.

LOCAL WEANING FOOD RECIPES

INTRODUCTION

Womens productivity is highly hindered by the poor health of their children. Many mothers are forced to stay away from their work to attend to their malnourished sick childre n especially during the rains.

Studies in this country have shown that the quality of weaning foods given to children is very poor both in terms of nutritional and sanitary quality. Poor weaning diets is considered the most important cause of protein energy malnutrition, an important cause of infant mortality commonin the country.

Several weaning food recipes have been developed using locally available ingredients for use as a part of the regular extension packages. This is to help mothers of farm families maintaining wel-nourished healthy children. There is an evident need for a local weaning food industry which should respond to specific identified problems pertaining to weaning foods e.g. reduction of microbial contamination and bulk reduction.

OBJECTIVE

To help female farmers maintain well nourished healthy children, in order that their productive hours are not spent nursing malnourished sick children.

IMPLEMENTING STRATEGY

1. design weaning food recipes using locally available food ingredients, taking into consideration the following:
   - The nutritiveness of the final product. This takes into account the complements of the ingredients used, and bulk, (i.e. flour to water ratio).
   - The ingredients used must be readily available to be afforded by the poorest farm family.
   - The method of preparation ensures significant reduction of the initial microbial load.
   - The dishes prepared must be acceptable interms of taste, texture, colour and odour.
   - The dry ingredients can be prepared in bulk and stored.

2. The recipes designed and tested are promoted as part of the regular extension package to female farmers. This is done by conducting series of demonstrations accompanied by nutrition education messages to ensure their adoption.

3. Women groups are encourage to produce and store variety of food crops to ensure availability of sufficient foods during the food gap period, when most farm families are likely to exhaust their food reserved. Mothers are more likely to prepare special foods for their children when they have the food ingredients in their stores than when they have to buy them.

4. Part of the produce from the women's communal farms supplemented with subscriptions from mothers for purchase of other ingredients are used to prepare sufficient quantities of the recipe mix (dry ingredients) so each mother at the end of the demonstration is given a package to take home to last her several weeks. This is to get mothers used to the habit of preparing and securing sufficient foods for their infants.

CONSTRAINTS

1. Mothers often complain that children reject the special weaning foods prepared for them, once they start eating the family food, thus, Mothers are inclined to stop preparing special foods for the children too early without any regard for how much food the child is able to consume from the family meal.

2. During the rains especially, mothers time is so limited that, adequate attention is not given to the infants food. This they always prepare in the morning before they leave for the farm, and the child is left to feed on this throughout the day, many children suffer frequent diarrhea at this time of the year. This may be so serious that, the mother is forced to leave her farm to take the child to hospital or stay at home with her.

3. The village extension workers in constant contact with farm families are not sufficiently knowledgeable in the basic principles of food and nutrition especially in food handling to incorporate in their daily extension activities. This is especially important for those working with women.

RECOMMENDATIONS

1. Prototype (small scale) food industries located in different part of the country, should be established, to produce precooked weaning food packages (requiring no further cooking before consumption). It is important that, the weaning food produced is made of only locally available food ingredients, and is precooked.

The availability of a precooked weaning food which can be served to the child by just mixing it with clean cold water, will not only increase the frequency with which children are fed, but will also eliminate the chance mothers mixing large quantities to keep through the day. One might ask whether the cold water used for mixing without boiling would not be bad for the child? My answer to this is that, the child is already using this for drinking water, since very few mothers boil the drinking water for their children. In addition, the child in this care is only subjected to the initial microbial load, which may not be at a lethal level so as to create complications.

2. Organised women's groups should be used as the producers of the raw materials needed for such industries.

3. All village extension workers in daily cantact with farm families must be fully involved and knowledgeable in the use and importance of the product developed, so that they can participate in its promotion.

TYPES OF BABY FOODS THAT CAN BE PRODUC D IN THIS COUNTRY

A most suitable weaning food mix for this country will be the maize sesame blend. This is suitable for many reasons:

- A blend of maize and sesame provide a good quality weaning food in terms of protein and energy content.
- Sesame is easy to produce and does not have to compete with other with other crops for time.
- Both maize and sesame are produced in large quantities by women (the ultimate users of the product), so that a reliable sources of raw materials is assured, because of the women's interest in this product.
- sesame has an advantage over other legumes like groundnuts and cowpeas, in that unlike groundnuts it does not have the problem of aflatoxin and unlike cowpeas it is easy to store.
- Maize has advantages over other cereals in that it produces a more acceptable product attributed to its colour appeal. It is also a crop with a high turnover, and women can better produce maize than any other coarse grain. In-addition it is also a more versatile crop, maise production can be promoted with little fear of marketing problems in care of surplus. It can be easily used as a rice substitute, and also because of the increasing poultry industry, it can be easily sold out.

INSTITUTIONALIZATION OF BABY FOOD INDUSTRY

A Baby food industry can be better institutionalized in the private sector. This should preferably be small scale, so that a local women's group can operate and run it. It should be of a type with low investment.

This is important, to ensure that the price of the produce is low enough to be afforded by the poorest farm family. Thus low cost technologies applicable to this industry should be sufficiently studied by the technologist.

CEREAL SESAME PAP

Ingredients	Handy measure	Quantity (g)
Cereal flour	2 table spoon (heaped)	
Roasted Sesame paste	1 " " "	
Water	3 cups	
salt to taste		

METHOD

1. Bring water to boil in a saucepan and add salt.
2. Add water to cereal flour and sesame and mix into a smooth ligh paste
3. Add misture to the boiling water stirring continuously to avoid lumps.
4. Boil for 25 minutes or until the foams seen at the beginning of cooking disappears.
5. Add sugar and boil for another 5 minutes
6. Serve.

MAIZE - GROUNDNUT PAP

Ingredients	Handy Measure	Quantity (g)
Fine maize grits	2 table spoons	
Groundnut paste (Roasted)	1 table spoon	
Sugar	1 teaspoon	
Salt	a pinch	
Water	4 cups	

METHOD:

1. Bring water to boil in a saucepan
2. Add water to maize grits, groundnut paste and salt and mix into a light smooth paste
3. Add mixture to boiling water stirring continuously to avoid lumps
4. Continue boiling for 25 to 30 minutes or until, grits are very soft.
5. Add sugar and simmer for 5 minutes
6. Serve with milk or mashed fruit.

CEREAL - GROUNDNUT PAP

Ingredients	Handy Measures	Quantity
Cereal flour (heaped)	2 tablespoons	
Raw groundnut flour	1 tablespoon	
Water	3 cups	
Sugar	1 teaspoon	
Salt	a pinch	

METHOD:

1. Bring water and salt to boil in a saucepan
2. Add water to cereal and groundnut flours and mix to a light smooth paste
3. Add mixture to boiling water stirring continuously to avoid lumps
4. Continue boiling for 20 - 25 minutes
5. Add sugar and simmer for 5 minutes
6. Sefve

CEREAL-FRUIT PAP

Ingredients	Handy Measure	Quantity (g)
Cereal flour (heaped)	2 tablespoons	
Banana (mashed)	1	
Sugar	1 Teaspoon	
water	3 cups	
Salt	a pinch	

METHOD

1. Bring water and salt to boil in a saucepan
2. Mix cereal flour with cold water to form a lught smooth paste
3. Add paste to boiling water
4. Continue boiling for 25 - 30 minutes
5. Add sugar and simmer for 5 minutes
6. Cool slightly and add mashed banana
7. Serve cool.

Note:

A reasonable amount of any mashed fruit can be used. e.g. mashed pawpaw, mangoes or Advocado pear.

Immediately add sugar and lime to banana and mash.

Cereal -Amaranthus Pap

Ingredients	Handy measure	Quantity (g)
Cereal flour	2 tablespoon (heaped)	
Juice strained from pounded amaranthus	1 cup	
sugar	1 teaspoon	
water	2 cups	
Salt to taste		

METHOD

1. Boil water and salt in sauce pan
2. Mix cereal flour with cold water to make a light paste
4. Add vegetable juice and sugar and boil for another 10 minutes.
5. Serve with milk

CEREAL FISH PAP

Ingredients	Handy measure	Quantity (g)
Cereal flour	2 tablespoon (heaped)	
Dried smoked fish (ground)	1 tablespoon (heaped)	
Palm oil	1 tablespoon	
Water	3 cups	
Salt to taste		

METHOD

1. Bring water to boil in a sauce pan
2. Mix cereal flour and fish powder with cold water to make a light paste
3. Add mixture to sauce pan stirring continuously to avoid lumps
4. Add salt and continue boiling for 20 minutes
5. Add palm oil and boil for another 10 minutes
6. Serve

CEREAL - GROUNDNUT PAP

Ingredients	Handy Measure	Quantity (g)
Cereal flour	2 tablespoons	
Groundnut paste (roasted)	1 tablespoon	
Sugar	1 teaspoon	
Water	3 cups	
Salt	a pinch	

METHOD

1. Add water to cereal flour and groundnut paste and mix into a smooth light paste
2. Bring water to boil in a saucepan and add salt
3. Add mixture to boiling water stirring continusly to avoid lumps
4. Continue boiling for 25 minutes or until the foams seen at the beginning of cooking disappear
5. Add sugar and simmer for 5 minutes
6. Serve.

Note:

Consistency will vary according to age group.

CEREAL COWPEA PAP

Ingredients	Handy Measure	Quantity (g)
Cereal flour	2 tablespoon	
Cowpea flour(roasted)	1 tablespoon	
Sugar	1 teaspoon	
Salt	pinch	
Water	3 cups	

METHOD

1. Bring water and salt to boil in a saucepan
2. Mix cereal flour with cowpea flour, add little water to make a light paste
3. Add paste to boiling water stirring all the time with a wooden spoon
4. Boil for 15 minutes and add sugar
5. Boil for another 10 minutes and serve

CEREAL - EGG PAP

Ingredients	Handy Measure	Quantity (g)
Cereal flour	2 tablespoon	
Egg	1	
Sugar	1 teaspoon	
Salt	pinch	
Water	3 cups	

METHOD

1. Bring water and salt to boil in a pot.
2. Mix cereal flour with cold water to form a light smooth paste
3. Add paste to boiling water
4. Continue boiling for 25 - 30 minutes, and add sugar.
5. Remove pap from fire, cool slightly and add beaten egg
6. Serve

Annex 6

WORKSHOP ON LOCAL GRAINS PROMOTION, MAY 3 - 4, 1988

HELD AT P.P.M.U., MINISTRY OF AGRICULTURE, BANJUL

Paper on: Evaluation and Diffusion of Milling Machines

Presented by P. A. Cham, Department of Agriculture

1. INTRODUCTION

The types of milling machines to be considered for introduction to a given target group would depend upon 2 basic factors as follows:

- Crop types being grown and levels of production of each of these crops, i.e. number of hectares cultivated or tonnes produced and their distribution.
  Crop Type - every crop has its specific processing requirements, therefore crop type will determine the processes for which the machines will be required.
  Production Levels would influence choice of machine capacity.
  Crop and target group distribution will determine the type of power source to use for the machines.
- Level of technological achievements. This will determine the degree of sophistication of the technology (ies) to use in the focal areas. In the Gambian context, we are concerned basically, with threshers, dehullers winnowers and flour mills where cereals are concerned.

2. OBJECTIVES

The basic reasons for considering milling machines are:
to reduce drudgery, health hazards and losses and eliminate over processing of grain and in the end obtain a better quality finished product. Secondly, use of milling machines will enable women to increase their rest periods and spend more time attending to their families or spend time on other income generating activities, since, with improved methods, less time will be spent on milling operations.

The main objectives for testing milling machines are:

- to assess the machines' suitability to meet the basic processing requirements of the different crops.
- to assess the durability of the machine
- to be acquainted with the operation and maintenance requirements.

Ideally, machines to be introduced must be durable and be able to fulfill the desired tasks, they must be easily maintained by local personnel and spares should be available locally.

3. IMPLEMENTATION STRATEGY

3.1. The strategy adopted for testing and diffusion of milling machines is guided by certain basic aspects as follows:

3.1.1. Identification of the target groups' needs, resources (material & human) and constraints existing in their traditional systems.

3.1.2. Search for suitable machines (either test and adapt proven machines or conduct basic research.

3.1.3. Conduct on-Station tests.

3.1.4. Conduct tests in the environment of the target groups and if successful

3.1.5. Organise small-scale production of limited quantities so as to test for limited adoption.

3.1.6. Success in the limited adoption stage should lead to production of machines in larger numbers to test for widespread adoption. This stage should involve more manufacturers.

3.2. Once an acceptable design of milling machine is identified and a production capacity established, the following procedures should be taken into account in the diffusion process, to ensure sustainability.

3.2.1. Rational criteria should be established for selecting target groups and mill sites.

3.2.2. Programme objectives should be explained in detail to target groups, who should be asked to elect committees to manage the local project. The committees should be issued suitabl e guidelines, for project implementation, by the implementing agency.

3.2.3. Key management committee members and mill operators should receive training on the various activities they will be expected to administer, e.g. proper maintenance, financial management, work organisation etc.

3.2.4. Organisation of spare parts supplies and epair services and periodic refresher courses for machine operators.

4. MAIN CONSTRAINTS TO THE IMPLEMENTATION OF MILLING PROGRAMMES IN THE GAMBIA

4.1. In availability of spare parts in large enough numbers, for use on maintenance of machines, which is partly due to lack of sufficient foreign exchange or capital to purchase spares in large quantities and lack of a distribution network.

4.2 Lack of sufficient number of trained personnel to maintain or repair machines.

4.3. Lack of commitment on the part of the management committees and operators, partly due to lack of management skills on the part of the key members (Secretary, treasurer & Chairperson).

4.4. Lack of saving facilities to safe guard incomes accrued from processing operations.

4.5. Improper scheduling of processing operations. This results in poor fuel economy and also makes it difficult for operators to plan their time.

4.6. Lack of adequate transport facilities for implementing agencies to perform maintenance functions efficiently.

4.7. Rural blacksmiths who have a part to play in the technology diffusion process lack the additional skills and capital outlay required to enable them maintain new technologies.

4.8. Target Groups lack sources of finance to procure and benefit from finished products.

4.9. Poor levels of record keeping on the part of secretaries of management committees.

5. RECOMMENDATIONS

5.1. There should be a co-ordinated approach in the promotion of new ways of using different grains in different forms for food preparation.

5.2. There should be maximum private - sector participation in the provision of milling machines, spare parts and repair services. Distribution/retail networks should be established in strategic areas users of machines can make maximum use of their machines on a sustained basis.

5.3. Where local production of certain types of milling machine is not considered technically or economically feasible and external sources have to be used, generous tax concessions should be given for importation of machines and components etc.

5.4. There should be an association of grain processing societies and entrepreneurs through which credit can be channeled by financial institutions, for grain milling projects. Such societies could also be responsible for negotiating contracts with milling equipment manufacturers and mechanics. There should also be a manufacturers' association.

5.5. Women should receive training on the operation of milling machines.

5.6. Implementing agencies for milling projects should be provided with well-equipped mobile workshops to enable them cater for maintenance operations, initially, while the associations are making arrangements to employ mechanics. Also, mechanics employed for maintenance operations should be adequately trained by the implementing agencies and provided with tools, on credit basis, by a financial institution such as IBAS, on the recommendation of the associations. Mechanics should be adequately remunerated by proprietors to ensure their full commitment to the task of maintaining machines officiently.

5.7. The number of milling machines in the country is increasing rapidly, as such the possibility of having mobile banking facilities should be considered by the relevant agencies.

5.8. Key members of mill management committees and mill operators should receive training on project management and machine operation aspects, respectively, from implementing agencies and committees should be encouraged to adopt fixed processing periods, for both operator convenience and fuel economy. Also, the secretaries of mill management committees should be literate (the local school teacher, community Development assistant or village extension worker), to facilitate daily recording of relevant data.

5.9. Since rural blacksmiths have a vital role to play in the diffusion of grain milling equipment serious consideration should be given to launching projects to enable them participate as desired.

5.9.1. Maintenance and Repair Operations

A selected number of blacksmiths should be trained and provided with:

- Portable welding generators
- Hand tools
- Specific loans.

Financial institutions should demand a certain percentage of income generated as periodic loan repayment. Equipment should be issued on hire purchase basis. Only prospective debtors who are guaranteed by village authorities (committees) should be entertained by financial institutions.

5.9.2. Local Production Activities

The services of government agencies and N.G.O.'s' should be made readily available to entreprenours wishing to involve in these activities.

5.9.3. Diffusion of finished products

- Exhibitions of finished products should be organised by the manufacturers' association. Funds should be provided for this activity to generate interest in the products.
- Local retail shops e.g. N.T.C. and consumer co-operatives should be encouraged to sell locally produced equipment.
- It should be the responsibility of the association to advertise the suitability of finished products for local conditions.

ANNEX 7

WOMEN' BUREAU

The Government of the Gambia set up the National Council and Bureau by an Act of Parliament in 1980. The function of the Council and Bureau is to advice the government on maters affecting women's welfare and to organize mechnanism that will integrate women in development planning and programmes at all levels.

The Bureau's permanent staff consists of Executive Secretary, Deputy Executive Secretary, Public Relations Officer, one field officer, typist, cleaner, messenger and driver. Under Project GAM/84/WC3 STRENGTHENING OF THE WOMEN'S BUREAU which is funded by UNIFEM The Bureau has acquired the services of a UNV and local staff (4field officers, 2 field investigators, filling clerk and driver).

The specific functions of the Bureau include the following:

- Organize activities of the National Women's Council through meetings and seminars.
- Collect data and conduct socio-economic research.
- Develop and conduct training programmes for women in skills development.
- Provide base line data for preparation of development programmes at national and sectoral level.
- Coordinate and monitor development programmes to ensure womens concerns are included and have equal access to development resources.
- Implement and develop projects not included in other ministries.
- Process credit requests and disburse small loans to women engaged in agriculture and in formal sector.
- Help in project preparation stage and implementation of the World Bank Women's Development Project.

OBJECTIVES

A. Medium-term goals(developmental)

1. To strengthen capabilities of Women' Bureau so that it can execute its functions more efficiently.
2. To equip the Women's Bureau so that it can play its role in the preparation and eventual implementation of the proposed World Bank/ UNIFEM Women's Development Project.

B. Short-term objectives (immediate)

1. Improve the research, data collection and documentation capability of the Women's Bureau
2. Sttengthen the management capability of the Bureau.
3. Ensure the Bureau's presence in the preparation and formulation of the proposed World Bank/UNIFEM Women's Development Project.
4. Ensure the proper orientation of the World Bank/UNIFEM Project to priority needs of Gambian women.

The Bureau supervise and monitor different projects funded by government and non government organizations such as loan guarantee fund, vegetable garden project, irrigated rice project, fish smoking oven, animal traction and plough and milling and decorticating machine funded by UNIFEM.

SORGHUM & MILLET DECORTICATION AND FLOUR MILLING

This project was designed to provide time and labour saving device for women in the processing of food for home consumption. There are 15 coose milling and 15 decorticating machines in 15 permanently build sheds located in different parts of the country. Prior to the UNIFEM funding 4 milling machines was acquired by the Bureau through CUSO. This machines came in 1984.

The project is multi purpose in nature. In addition to providing labour saving devices, it also aims to improve the skills of women in management of projects that involves them directly.

Local management committees have been set up in all project areas to look after the day to day operations. Three of the fifteen mills are loaned to three women entrepreneurs. Women who utilize the mills and decorticators pay 25 bututs per cup of grains processed. Records are kept for the daily revenues collected. Part of the fund is used in running the maintenance cost of the machine such as spare parts and honorarium for the operators, while the remaining amount is kept in the bank with the committees account. All management committees under this project operate savings account in the bank. The savings they have is used to purchase spare parts and to replace the machine after it has served its duration. The project has taken shape and revenues from respective areas are encouraging. However there are problems encountered in the implementation.

- Spare parts are not readily available, if they are their cost is very high.
- Cracks on funnel due to vibr tion (concrete foundation not firm and strong)
- Women can not afford to pay in some cases.
- Some areas do not have records because no literate person within the committee is willing to take up the job.
- Frequent changing of operators.
- Fuel is not available in some areas.
- Women usually mix two kinds of grains to be processed.

RECOMMENDATIONS:

- Conduct literacy class to management committee members
- Supervise manage ent committee for their recordings and revenues collected.
- contribute certain amount for revolving fund for spare parts.

CASH - ACCOUNT - SHEET

lling Machine:..... Year:.....

om:..... To:.....

Month	Previous Balance	INPAYMENTS				OUTPAYMENTS				
		From Milling Machine	Withdrawal From Bank Account	From Others	Total Amount	For Milling Machine	Deposit Into Bank Account	For Others	Total Amount	Cash Balance
TOTAL										

ANNEX 8

REPORT

ON THE IMPLEMENTATION

OF TWO MOTOR MILLING MACHINES

IN THE UPPER RIVER DIVISION (URD) OF THE GAMBIA

BY

THE GAMBIA FREEDOM FROM HUNGER CAMPAIGN

FFHC

presented by

Petra Mueller-Glodde

c/o Gambia F F H C
P.O.Box 856
Banjul
The Gambia
Westafrica

phone: 9 50 40 (home)
International Code of
The Gambia: 00 22 0
telex: 2212 Booth GV
(please transfer to FFHC)

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THE FFHC MILLING-MACHINE PROGRAMME

1.0 Background

The FFHC Food Security Programme (FSP) in The Gambia focuses mainly on rice cultivation. Using the food-for-work approach for infrastructure work, FFHC tries on the one hand to alleviate short-term food-shortages and simultaneously to increase rice production by constructing causeways, footpaths and bridges in order to facilitate better access for women to their rice fields. These activities are accompanied by an agricultural follow-up by the Women's Agricultural Programme (WAP), and aims for food self-sufficiency on a village level.

Rice is one of the staple food crops in The Gambia. Nevertheless, there are estimates that rice only contributed around 35% (including rice imports) of the total demand for cereals in 1986. Assuming that, in line with FAO estimations, the 760,000 inhabitants of The Gambia in 1986 (an approximation) had a per capita consumption of 187 kg per year, the total demand for cereals was around 140,000 tons that year. According to statistics from the Gambian Planning, Programming and Monitoring Unit (PPMU) of the Ministry of Agriculture, in the 1985/1986 season, 23,000 tons of paddy rice and 93,000 tons of coarse grains were produced, leaving a gap of around 24,000 tons, which presumably was mainly closed by rice imports.

However, this was different a few years ago. In 1980/1981 the total coarse grain production was only around 37,000 tons and around 43,000 tons of paddy rice was produced in The Gambia. Since then, the cultivated rice area has diminished from 24,500 ha to 13,700 ha in 1985/86 and the total paddy yield decreased from 42,700 tons in 1980/81 to 23,000 tons in 1985/86. At the same time the area cultivated with coarse grains, like Early Millet, Maize, Late Millet, Sorghum and Findo increased from 46,700 ha to 84,800 ha and the production rose from 36,600 tons in 1980/81 to 93,000 tons in 1985/86. For 1986/87 divergent estimations from different institutions are available: PPMU assesses 20,000 ha of cultivated rice land with yields of 24,000 tons (including irrigated rice production). Figures from the Department of Agriculture show a cultivated area of between 23,000 and 26,000 ha and corresponding yields of between 29,500 tons and 33,400 tons (excluding irrigated rice production). Estimations for coarse grain production vary between 67,000 and 75,000 ha with yields from 87,000 till 98,000 tons, as stated by the Department of Agriculture.

This shift to higher coarse grain production in the last few years, may have been favoured by their higher drought resistance. Coincidentally, the Minister of Agriculture encouraged the implementation of milling machines in order to facilitate the highly time- and labour consuming work of traditional coarse grain processing.

FFHC, like all other organizations working in the agricultural sector, had been requested in 1985 by the Minister of Agriculture, to participate in a nation wide implementation programme of milling machines. Negotiations between FFHC and German Agro Action (GAA) resulted finally in an agreement to implement two motor milling machines and one animal traction milling machine (Goepel) as a pilot scheme for small mechanization. This programme is part of the FFHC activities and lies within the responsibility of the Secretary General of FFHC.

2.0. The Advantages of Milling Machines Compared with the Traditional Milling Process

Traditionally, coose is stored unhusked in the compounds. Women prepare only the quantity needed on the specific day.

The preparation of coose, especially of millet, which is one of the most consumed cereals, involves threshing and winnowing, decortication and grinding. Decortication and grinding are the main labour and time consuming operations. After threshing and winnowing (where the grains are separated from the chaff), the grain is moistened with water and then pounded in wooden mortars with long pestles to remove the skin from the grain. The pounded grain is washed in water, to remove the bran. Afterwards, the cleaned grain is dried for some time and then, while still moist, it is again hand pounded in a mortar until the women get the desired fineness of flour.

Often women have to get up at five o'clock in the morning or even earlier to prepare the food for the family. This work is excessively time-consuming and affects the health of women through back-aches and injuries of the hands. Consequently women prefer their husbands to buy clean rice which has only to be cooked without any time-consuming preparatory work. Thus, in regions where there is some purchasing power, but where traditionally and for ecological reasons no rice is produced, people prefer to buy rice, (in general imported rice) and less coarse grains are consumed. This happens to some extent in the Basse area, where farmers produce coarse grains for their basic food supply and groundnuts to get cash income. A higher consumption of locally produced grains can be encouraged by the facilitation of processing of coarse grains. This could even be an incentive for higher production of local coarse grain which may in the long run diminish the dependence of food aid and other commercial food imports and thus may be a further step towards food self-sufficiency in The Gambia.

But the immediate positive effect of the milling machines, the reduction of the work load for women, should be emphasized. Although the reduction in work is limited to the last pounding process, (a further facilitation is possible by the additional implementation of a dehuller, to carry out the decortication

work) the reduction of labour and time through the use of a milling machine is significant. As the villagers are not used to multiple technical processes, a step by step introduction seemed to be most convenient. If the milling machines succeed, the villagers may decide on their own to buy complementary machines.

3.0 The Pilot Programme

Until now in The Gambia, only milling machines with a gas oil or an electricity driven motor are used. Generally in rural areas, there is no electricity supply and donors give gas oil driven motor milling machines to village groups.

These machines have the *advantage, that coose is milled very quickly*, and they are especially useful in areas with a dense population, where a big quantity of coose has to be milled.

However, right from the beginning, FFHC was aware of some problems which may endanger the organizational and economic success of the implementation of the motor milling machines:

- The machines are expensive.
  A motor milling machine costs around Dalasi (D) 33,000:00 (around Deutsch Marks, DM, 8,430.00, according to the exchange rate of DM 1 = D 3.915) including transport and installation. Donor organizations normally give the machines as a grant to the village groups. If these machines should not only serve to temporarily facilitate women's work, but if they are seen as a step towards a sustained improvement of the women's situation, the village groups should at least save the depreciation during the years of using the milling machine. This means, they should be able to save at least the money to buy a new machine: D 33,000.00 (future increases of prices are not yet included), besides their current expenses for gas oil, engine oil, salaries of millers, spareparts and repairs.

- Spareparts are expensive and often not available.
  As the technical parts of the milling machines come from Europe, spareparts have to be imported as well and are only available at present in Dakar.

- A regular gas oil supply, and a good maintenance and repair service is necessary.
  Especially during the rainy season, when roads are difficult to travel on, the smooth running of the milling machine may be endangered by an irregular gas oil supply. General maintenance and small repairs can usually be done by technical experienced villagers. But sometimes their may arise problems, which only can be solved by skilled mechanic who have to be appointed from a distant place or even from the supplier.

- An administrative and organizational monitoring is necessary.
  The administration of motor milling machines requires special organizational and financial skills of the management.
  In order to avoid a longer standstill of the milling machine, the gas oil, engine oil and sparepart supply has to be well organized right from the beginning.
  The investment and running costs of milling machines are high, so enough money has to be saved to finance the running costs and the depreciation.
  Therefore a simple accounting system has to be introduced which may be particularly difficult if villagers are illiterate.
  The organization of villagers has to be strengthened in order to enable them to control the milling committee and to avoid misuse of the money gained through the milling process.

In comparison, animal traction milling machines have the following advantages:

- They are less expensive.
  Animal traction milling machines, which are produced in Senegal, cost around D 10,000.00 (around DM 2,500,00) including transport and installation at the site. This is almost one third of the costs of a motor milling machine. If no animals are available in the village, two oxen, horses or donkeys have to be bought. However this will not increase the costs substantially.

- The technique is less complicated.
  Today only the milling body, including the mill stones has to be imported. Actually the construction work is totally done in Senegal. In the long run, interested blacksmiths can be trained in Senegal and start with local construction in The Gambia.
  The current costs and costs of spareparts are smaller and break downs can normally be repaired by local fitters.
  Usually the milling process is totally executed by women, who are not paid.

But animal traction milling machines will cause different problems:

- Women will spend more time by getting their coose milled.
  Probably these machines fit only for smaller villages.

- Women are not used to work with animal traction machines.
  In general, women in The Gambia have less access to animal traction agricultural inputs than men. Seldom women possess donkeys, horses or oxen, and if they cannot afford to buy animals or it is not possible for cultural reasons, they may depend on the animals that belong to their husbands, who need them during the cultivation period and who may not lend them even in the dry season. To start with an animal traction milling machine pilot programme, villages must be identified, where men encourage women to use this technology.

- An administrative and organizational monitoring is necessary.
  A small accounting system has to be set up.
  But in general as the groups involved and the amount of money to administer are smaller, less organizational skills are required than in the motor milling machine case.
  However, feeding of the animals, especially in the dry season has to be well organized and may be expensive.

For the time being only motor milling machines are familiar in The Gambia, so it was decided to implement two of those milling machines, already accepted in the country and one animal traction milling machine as a pilot project. Comparisons between the two types may later allow a decision as to which conditions in The Gambia favour each kind of machine.

Due to the existing tasks of the expatriates and the FFHC-staff in the main project, it was not possible, to implement both types of machines at the same time. Consequently, it was agreed, to implement the motor milling machines first and the animal traction milling machine afterwards.

It was agreed with Ms Eva Marischen, GAA, that I should do the implementation work voluntarily, together with Mrs. Isatou Jallow, one of the female extension workers of the WAP under the direction of the Women's Agricultural Officer, Ms Marlene Richter.

4.0. Co-ordination with Other Organizations Sponsoring Milling Machines in The Gambia

Under the tutelage of the National Women's Bureau, which is directly attached to the President's Office, there exists a National Coose Mill Committee, which aims to co-ordinate the activities of the at least eight donor organizations, which intend to spread about two hundred milling machines over the country. All the organizations involved were invited to participate in this committee and since its creation, even before starting the preparatory works, FFHC joined the regular meetings of this co-ordination group.

This committee gives donor organizations the possibility to exchange experiences and to discuss problems concerning the milling machines, for example the supply of spareparts, the training of the millers and the appropriate construction of milling machine houses. In the case of general problems with suppliers, the committee may try to solve it on behalf of all the concerned organizations, rather than everybody trying it on his own.

One important point implemented was the co-ordination of sites, where the machines should be based. This is necessary, because if the potential amount of coose to be milled in a certain area

is low, the existence of two machines in one area may prevent both machines from running economically.

As this concept is based on voluntarily decisions, failures cannot be excluded as the case of Demba Kunda will show.

5.0. Choice of the Villages to Implement the Milling Machines

FFHC decided to implement the milling machines in those villages which are already working with cereal banks. For eight years, FFHC has supported a cereal bank programme in the Basse area, in the east of The Gambia. There, the main food crops are millet, sorghum, and maize. This programme should help farmers to become more independent from traders who in general buy the cereals after the harvest from the farmers at low prices. At that time farmers need cash for their social activities in the dry season. In the "hungry season", the time before the next harvest, when farmers cultivate their fields, in general they have no food supply and depend on these traders who will then sell the grain at elevated prices, due to the general food shortage. Now, farmers have the opportunity to sell their surplus after the harvest to the cereal bank in order to get the cash income needed, but they can buy back the cereals whenever they need it, at reasonable prices. The cereal bank is self administered by the village population who receives support from the FFHC extension worker in Basse. Every cereal bank works with around five to eighteen surrounding villages. With this cereal bank management, men became experienced in communal work, and accounting systems. This was thought to be a solid base for a successful implementation of a milling machine pilot project. Although there are linkages between both programmes, there should be no overlapping of functions. The administration of the milling machines should be totally separated from the cereal bank management. Nevertheless both programmes may be of mutual support and a joint activity towards food-self-sufficiency in the village.

As there are nine cereal banks working in the Upper River Division supported by FFHC, the Secretary General proposed the criterion of giving the milling machines to those villages whose cereal banks have worked most successfully. This criterion may guarantee that the villagers, based on their experiences, will use the milling machines in a responsible way. However a socio-economic survey of the villages in question, had not been conducted before the decision was taken. According to the agreed criterion, Demba Kunda on the South Bank, near Basse and Sare Gubu on the North Bank have been chosen (Annex 1). The surrounding villages which participate in the cereal-bank-programme would also use these milling machines. Investigations into the desired type of milling machine in those villages showed that people preferred to have a motor milling machine.

6.0. Information about the two Villages Sare Gubu and Demba Kunda.

6.1. Sare Gubu

Sare Gubu is situated on the Northbank, approximately 30 km from Basse ferry. From the ferry, there are about 16 km of feeder roads, which are in good condition and about 14 km of trails through the bush, which are difficult to travel on during the rainy season. On the feeder roads, private collective taxis provide an irregular transport service, but from Sare Gubu to the feeder roads, transport is very difficult to get. Donkey carts and bicycles are the most important means of transport. Five other surrounding villages beside Sare Gubu, which also benefit from the cereal bank programme, participate in the milling machine activities. According to a rough overview, there are approximately 317 women in the six villages, who may potentially use the milling machine. The Fula-village Sare Gubu is the biggest of these six villages. In the greater area of Sare Gubu there has existed for almost four years a commercial milling machine. However, women will probably prefer to use their own machine, which will support their independence from third persons.

In all villages women are familiar with working together, as most of them are organized into women's societies, or so called "kafo", where they cultivate about one to two acre of coose communally. Especially the harvested maize is sold to the cereal bank. Women and the women's society earn additional income by undertaking paid work on the fields of other village members. People also participate in a CRS (Catholic Relief Service) sponsored programme to cultivate sesame, which will be pressed into oil and may substitute groundnut oil.

Sare Gubu and the surrounding villages do not possess a school, thus the whole population is illiterate and only the Imam, an islamic priest and koranic teacher for the village, is able to read and write in arabic.

6.2 Demba Kunda

Demba Kunda is situated on the South Bank, approximately 8 km from Basse. Although only trails lead to the village, access to Demba Kunda is far easier than to Sare Gubu. Demba Kunda is a comparatively rich Serahuli village, whose population grow predominantly maize groundnuts and millet. Here men and women are also organized into separated communal societies, where they save some money to meet unexpected events. The cereal-bank activities and the milling machine programme in Demba Kunda include the village itself and seventeen surrounding villages. The total number of inhabitants and especially the number of women who may mill their coose, have not been made available yet, but as there are more and bigger villages, and the people

possess a larger cash income than the people in Sare Gubu, the prospects for running the milling machine economically are quite promising.

However, although FFHC informed the National Coose Milling Committee early on about its intention to implement a milling machine in Demba Kunda, and the preparatory works for the installation had already been started, another organization, acting in The Gambia, installed a further milling machine of the same type in one of the villages participating in the Demba Kunda programme. This kind of parallel activity in the same area should have been avoided by efficient coordination, but unfortunately not all the organizations make use of it. In Demba Kunda however, both machines can probably work in an economically satisfying way, due to the high number of inhabitants in the villages concerned.

As in Sare Gubu, the villagers in Demba Kunda are not able to read and write in english or in a local language, except arabic, which they learned in the local koranic schools. An extension worker from the Agricultural Department, who lives in Demba Kunda is ready to support the population and to co-operate with the local FFHC extension worker.

7.0. Organization of Preparatory Works

Work started at the beginning of February 1987. The exact time schedule can be seen in Annex 2. On February 6 and 7 the first visit to Basse, Sare Gubu and Demba Kunda had been effectuated by the Secretary General, Mr. Samateh, the Women's Agricultural Officer, Ms Marlene Richter, the extension worker from WAP, Isatou Jallow, and Petra Mueller-Gloddo, the latter two, in charge of the implementation of the milling machine programme, under the direction of WAP. The FFHC extension worker for cereal banks, Mr. Momodou Sanyang, who is stationed in Basse, accompanied the group to the villages.

During the first few meetings in Sare Gubu and Demba Kunda, the responsibilities of each partner were discussed and the following was agreed between the representatives of the villages and FFHC:

- The milling machine will only be delivered after the construction of an appropriate milling house.
- The villages concerned will choose a suitable place for construction in the key village.
- For the building of the house, FFHC takes on the responsibility to provide cement, corrugated iron sheets, timber, wire mesh, nails, hinges, padlocks, white lime brushes and any further necessary materials which have to be bought and the payments for a mason and a carpenter.

- The villages are responsible to provide sand, gravel, water, rhun palms and its transport to the construction place, village labourers and boarding and lodging of the mason and carpenter during their stay in the villages.

- Each key village will choose a milling committee, which would represent the management of the milling machine.

- Furthermore there should in each area be elected a milling board, to include one male and one female representative for every surrounding village as well as representatives from the milling committee. This milling board will have the task to guarantee the participation of the surrounding villages in important decisions and to be a controlling organ.

- Two technically experienced men should be elected in the key villages to execute the milling work (millers).

- The villagers should give an initial contribution to secure the first weeks of activity of the milling machines, when perhaps only a small income is yielded and to have a first reserve for possible future repairs.

8.0. Construction of the Milling Machine Houses

Concerning the type of the milling machine houses, to be constructed, various models have been compared, which already exist in The Gambia. Intensive discussions about the requirements of an appropriate milling machine house had been held with CRS representatives who have broad experiences working with milling machines. The main criteria for the construction were: use of local materials as far as possible, low costs and good ventilation. The latter is important, because the dust, produced by the milling process may cause serious health problems for the millers if no appropriate ventilation is guaranteed. Taking into consideration this argument, and comparing the costs of the two main types, built by CRS and the Gambian Women's Bureau, it was decided, to copy the construction plans of the CRS houses (Annex 3).

The ground plan is six by eight meters, the milling room itself is six by six meters and at the back there are two separate stores of two by six meters. The whole milling room consists of a wall five bricks high on three sides, closed with wire mesh up to the roof, to guarantee a good ventilation. At the back of the milling room, walls of cement blocks form the division between the milling room and the two stores with one door for each store. These doors and the two outside doors are constructed of corrugated iron sheets and timber and can be closed with padlocks. Each store possesses a small window constructed in the same manner, and gives space for fuel reserves, engine oil, sieves and other necessary equipment or coose to be stored overnight if necessary. The roof is made of

corrugated iron sheets and rhun palms. The coose milling house has a small covered veranda to protect women waiting outside against sun and rain. The cement floor is well-leveled, to prevent the machine from vibrating strongly which quickly lead to a cracking of the machines and the place where the machine stands is fortified with BRC-MESH. The milling machine room is big enough, to enable women to queue up with their calabashes , waiting for their coose being milled.

For the construction of the milling houses, a mason and a carpenter was needed, to provide the necessary skills and to secure the supervision of the construction. The Department of Agriculture in Basse seconded the skilled labourers needed and asked FFHC to pay only the allowances of D 5 per night.

With the support of the local population, the mason made the cement blocks and the mason and the carpenter built the houses. As agreed before, the villages made their contribution, including the purchase of rhun palms and their transport. FFHC provided the other necessary materials, transporting it from Banjul or Mansakonko, where it is either cheaper or only available for purchase, to the villages. Transport was combined with the nearly weekly visits to the villages during the four months of the preparatory and construction phase.

The total costs of the construction of one motor milling machine house, excluding costs of transport of materials amount to D 8,210 (DM 2,097) (Annex 4).

9.0. Organization of the Village Population

Parallel to the construction process, meetings with the various villages have been held, in order to discuss the organizational process and the future management of the milling machines. In Demba Kunda and Sare Gubu and their respective surrounding villages, a milling committee and a milling board have been elected.

The milling committee consists of the president, the vice president, the secretary, the cashier, the treasurer, the adviser, the auditor and the millers. In both committees, the president, the vice president, the cashier and the treasurer are women, the Secretary, the Adviser and the millers are men. The secretary was in both villages the only one able to read and write in arabic. The men wanted to represent the adviser as they felt they already had a lot of experience in managing their cereal banks. They wished, that the millers should be men as well, as women have had less technical experience until now. However it is thought to train women as millers later, a practice, which has already been realized in Senegal. The auditor in Demba Kunda is a woman, in Sare Gubu it is a man. Additionally in both villages four further cashiers have been elected to work, alternating in the milling house. This was

necessary, as cashiers are not paid, and it is not possible for one woman to spend about four hours a day seven days a week in the milling room, neglecting her duties at home and on the fields.

To control the stock of gas oil and engine oil and to provide a new supply, a gas oil committee of two villagers, one woman and one man has been elected. The keys of the stores and of the entrance door of the milling house are with different people, to avoid misuse (Annex 5).

A milling board as a controlling organ has been chosen by the population of the respective villages. Every participating village chose one man and one woman to represent it in the milling board.

10.0 Delivery of the Milling Machines and Starting the Milling Process.

The purchase of the machines was organized by the FFHC financial officer, Rainer Mueller-Glodde. FFHC decided to buy the machines from Matforce in Dakar, a Senegalese enterprise. Up till now motor milling machines have not been produced in The Gambia or in the neighbouring countries. However Matforce only imports the necessary technical equipment and had developed an appropriate frame for the machine and the motor, enabling them to carry out the final construction work in Dakar itself. So, one reason for buying the machines in Dakar, was the support of African production rather than purchases from Europe. Furthermore, Matforce offers training for the millers and installs the machines at the sites with their own skilled personal. Spareparts can be bought in Dakar and since most of the milling machines in The Gambia are provided by Matforce, they are thinking about establishing a maintenance service for The Gambia.

Between the 18th and the 23rd of June, the two milling machines were delivered by Matforce. They installed the machines in both villages and introduced the know-how of the milling process to the millers and the villagers concerned, so that they should be able to operate the machines without further external help. As the Matforce team had only three days for the training in both villages, it spent two days in Sare Gubu, to give people the chance of comprehensive training. Due to their remote location, they have fewer possibilities to receive further technical advice from people working with the same machines on the south bank in the Basse area and it will be more difficult for them to organize technical repairs. Consequently, the training in Demba Kunda took only one day. This was thought to be sufficient as people are more familiar with these kind of techniques. The technical adviser, Mr. Mustapha Ceesay of FFHC Mansakonko, accompanied the group, in order to learn how to do the maintenance and small repairs of the machines. After the

training, the villagers themselves were able to do the basic maintenance for example changing the engine oil. For small repairs, which they cannot execute within the village, local fitters from the neighbouring villages or from Basse have to be appointed by the villagers. If severe problems arise, the FFHC technical adviser may be sent to the area on a special request, in order to solve the problem or to contact Matforce in accordance with the persons responsible in WAP.

11.0. Actual Organization of the Milling Process

After meetings held in Demba Kunda and Sare Gubu, the villagers decided on the following procedure of the milling process:

- The machine will run seven days a week.
- The milling time should be one to two hours in the morning and in the afternoon, so that women from the surrounding villages have the chance to get there in time.
- The unit of measure is a cup or a tomato tin which is well known by the whole population and corresponds almost to one kilo in content.
- The price, which has to be paid to mill one tin of coose was decided at 25 bututs.
- Women have to queue up in separate rows according to the fineness of flour desired, so that the sieves have to be changed only once.
- Before milling their coose, women have to pay the fee to the cashier and simultaneously the adviser counts the numbers of tins, collecting a small stones for each tin, in order to control the cashiers and the millers.
- After finishing the milling process the money is handed over to the main cashier who possesses in Demba Kunda a lockable cashbox. In Sare Gubu the money is still stored in plastic bags with the Alkalo.
- The secretary records the inpayments and the number of tins milled every morning and evening, which has to correspond to the cash income of the day.
- The secretary registers all the expenditures concerning the milling machine on a separate form.

12.0 The Financial Organization

The villages participating in the Sare Gubu milling machine programme initially contributed D 440.00 to start the milling process. The richer villages in the Demba Kunda programme contributed D 2,500.00 at the beginning and announced that an even bigger sum will probably be collected.

The women of Demba Kunda chose four representatives to open a bank account at the Standard Chartered Bank in Basse, where the cereal banks also have their accounts. The Lady President of the milling committee, the main cashier, the auditor and the treasurer assumed responsibility for the bank account and they are the only persons who should deposit and can withdraw the money. As the women need all their time at the moment to cultivate their fields, they charged the cereal bank president, who has a commercial business at Basse, to deposit their money into their bank account during the time of intensive field work. However the women will take over their responsibility to deposit the money as soon as possible.

Up till now, Sare Gubu has not opened a bank account because the transport to Basse is difficult during the rainy season. Moreover there is little money remaining to deposit in the bank and during the actual cultivation period people cannot afford to lose one day or more to travel to Basse.

A small accounting system which up till now has three different forms has been introduced to the villages. One form shows the daily amount milled and the respective inpayments, on the second form the villagers note the different kinds of expenditure and the third form compares the inpayments and the outpayments (including the deposits and withdrawals of the bank account) and the cash balance. (Annex 6). The secretaries fill the forms in arabic and either the FFHC extension worker in Basse or the extension workers from the WAP translate it to english in order to facilitate a control. In Demba Kunda, the agricultural extension worker helps the community to translate the figures to english.

The villagers of Demba Kunda and Sare Gubu decided to pay the two trained millers, instead of employing only one miller and leave the second as a substitute, in order to share the burden of responsibility of the millers. It was agreed to pay 15% of the monthly income of the milling machine business to the millers. This corresponds to 7.5% for each one.

13.0 Balance of the Milling Machine Accounts at the End of July 1987

Overview over income and expenditures of the milling machines in Sare Gubu between 23rd of June and 28th of July and Demba Kunda between 24th of June and 29th of July 1987 in Dalasi

	Sare Gubu	Demba Kunda
Initial contribution	440.00	2,500.00
Initial expenditures	-	239.00
Reserve	440.00	2,261.00
Income	804.75	1,334.50
Expenditures	410.95	585.18
Loss(-)/gain(+)	-5.30	+22.50
Net benefit	388.50	771.82
Reserve + net benefit	828.50	3,032.82

Between the 23rd, of June and the 28th of July 1987, Sare Gubu had an income of D 804.75, which corresponds to 3,219 tins of coose, or almost the same amount in kg. After subtracting all expenditures, the net benefit of the group on 28th of July in Sare Gubu was D 388.50, excluding the initial contribution, and considering a loss of D 5.30, which could not be explained by the villagers. Adding the initial contribution and the net benefit, Sare Gubu had D 828.50 on the 28th of July 1987 and still had some reserves of gas oil and engine oil.

Between the 24th of June and the 29th of July 1987, Demba Kunda received income from the milling machine of D 1,334.50, which equals 5,338 tins or kg of coose. After subtracting all expenditures, the net benefit in Demba Kunda was D 771.82 on the 29th of July 1987, excluding the initial contribution of D 2.500.00 less initial expenditures of D 239.00. Here, there was found a positive balance in the cash box of D 22.50, which the cashier explained to be the result of lack of change, which should have been given to the women. Reserve and net benefit amounted on the 29th of July 1987 to D 3,032.82 in Demba Kunda.

14.0 First Experiences, Problems and Perspectives

In both areas the start of the activities was promising. The villagers contributed to the building of the milling machine houses as agreed in the beginning. They assumed the necessary responsibilities by electing the milling committees and millin boards. Furthermore, corresponding to their possibilities they gathered money for the initial financial contribution. People in both villages showed satisfaction at receiving the milling machines and pointed out that this would be a further incentive for them to cultivate more coose, for the women now need less time to prepare the grain.

14.1. Financial Organization

The financial overview shows, that the start of the milling machine activities seems to be quite promising in Demba Kunda and reasonable in Sare Gubu. During the first month of operation the Demba Kunda machine milled 144 kg coose on an average per day. During the same period, the Sare Gubu machine milled 87 kg coose on an average per day. Calculations of CRS showed, that on the daily average at least 100 kg coose has to be milled (assumption: operation of the machine 300 days a year or 83 kg if the machine runs 365 days a year) to get the necessary income to meet all expenditures including depreciation.

If people in Demba Kunda could proceed in the same manner, the pilot scheme may work successfully, especially if the future income in Demba Kunda is even higher. In the first weeks there was tension between the two villages in the Demba Kunda area which possess milling machines. The people responsible in the neighbouring village, who had another milling machine from a different organization, forbade the women to use the FFHC sponsored milling machine, which charges less than the other one. At the end of July, the villagers settled their conflict and women can choose, where to mill their coose. Thus probably the amount to be milled in Demba Kunda will increase.

Furthermore according to a proposition by the FFHC WAP extension worker, Isatou Jallow, in Demba Kunda the women's society organized this year for the first time a new communal maize field with the aim to increase their contribution to the milling machine fund by selling the maize to the local cereal bank.

Sare Gubu and the neighbouring villages have less inhabitants than the villages in the Demba Kunda area. Therefore they may have more difficulties to earn the running costs and the depreciation.

The idea discussed in the beginning that every milling machine should earn beside its depreciation enough money to buy a "daughter milling machine" for another village seems not to be realistic at the moment.

In both areas, even the awareness of the need to save money not only to finance the running costs and repairs but also the depreciation is not yet very intense. Further discussions with the villagers concerning this point are necessary.

14.2. Repairs, Gas Oil, Engine Oil and Sparepart Supply

In the case, the machines have to be repaired by a mechanic who has to be paid by the villagers, they still prefer to discuss the proceeding first with FFHC before they decide, how to resolve their problem. For example in Demba Kunda people only appointed a fitter to repair a leakage in the gas oil tank or

the motor after discussion with the FFHC staff. However, if they see a possibility to resolve their problem, relying on their own capacities, they do it. Matforce could not supply right from the beginning rubber feet for the machine. They are necessary, to avoid vibrations, which lead to movements of the machine in the milling room. When it was obvious, that the rubber feet could only be delivered some weeks later, as solution for the time being, the villagers tried to stabilize the machine by their own means.

The gas oil and engine oil supply seems not to cause problems in Demba Kunda. However on the occasion of our visits, we already brought along gas oil and engine oil to Sare Gubu, because there, due to their remote location, villagers have greater difficulties to secure their supply.

Concerning the sparepart supply the villagers will depend on FFHC as intermediary as long as the supplier enterprise Matforce has no agency in Banjul.

In order to avoid longer stand stills of the milling machines, caused by difficulties of sparepart supply, FFHC bought some of the most important parts from Matforce. People from Sare Gubu and Demba Kunda can buy it directly from FFHC. Nevertheless special spareparts have to be ordered in Dakar.

In Sare Gubu for example, already after one month of operation, a sieve broke and could not be used any more. This probably happened because of inappropriate utilization. The sieve was not available in Banjul and had to be ordered in Dakar. As mailing often is difficult, it is safer to go to Dakar to buy the spareparts. This however causes in general considerable delays. Fortunately this time FFHC got a substitute for the broken sieve free of charge from Matforce. Since the price of one sieve amounts to around D 400.00, with this payment villagers would have spent half of their actual savings.

14.3. Village Organization and Administration

The organizational structures like the milling committee and the milling board were built up and the responsibilities and proceedings defined. In the milling committee, women are represented in the decision making functions and overlapping of responsibilities with the cereal bank administration was avoided. Men support the milling machine programme strongly. Their real influence yet, exceeds their functions as advisers.

In Demba Kunda the cereal bank president is the husband of the Lady President of the milling machine committee. He seems to dominate the financial administration of the milling machines and not to encourage women to take over their responsibilities.

Sare Gubu gives the impression of having a less dominant leadership from the male side than Demba Kunda. In one of the

last meetings, women participated rather active in the financial and organizational discussions and decision making.

From the actual point of view, both villages still need a regular monitoring of their organization and administration, in order to strengthen particularly women to take over their responsibilities. Moreover for several reasons, the participation of the surrounding villages in the decision making process concerning the milling machines was weak. In future, regular milling board meetings should be supported.

A major problem seems to be actually the incapacity of men and women to write and read. A milling machine administration needs an even more complicated book keeping system than the cereal banks. Here, income has to be recorded every day and the control of the different items of expenditures, which also have to be recorded, is difficult for the illiterate villagers.

Therefore at least a functional literacy course for men and women is necessary, to help villagers to become independent from the support of extension workers and to control cashiers, secretary and treasurers. As long as especially women are not able to write and read at least in a local language, they will hardly manage the milling machines by their own. Then, in the long run even the danger may occur, that milling machine and cereal bank administration will be mixed up.

14.4. The Monitoring Work

The milling machine programme as part of the WAP has been monitored by WAP extension worker Isatou Jallow and Petra Mueller-Glodde. The FFHC extension worker, Mr. Momodou Sanyang, who is based in Basse, has almost always been accompanying us to the sites, supports our work and liaises with the villages in the times between our visits. In case that problems occur, he tries to find a solution together with the villagers concerned or informs WAP in Mansakenko. His familiarity with the villages facilitated our work.

The monitoring work has been done on a partnership basis between both persons involved. As the implementation of milling machines was a new programme for FFHC, every step of our work has been discussed in advance.

Isatou Jallow assumed the responsibility of the necessary payments during our visits to Basse and the villages. With the experiences gathered, he now knows how to organize a milling machine programme. Particularly advantageous for our work was her familiarity to discussions with village groups and her knowledge of different local languages beside english. Being Fulà she gained confidence at once in the Fula village Sare Gubu. Her knowledge of Mandinka facilitated the communication with the Serahuli/ Mandinka population of Demba Kunda.

Until now the main work concentrated on the initial village organization and the technique of running the machine and administration. In future, a close follow-up with at least one visit per month is necessary, to monitor the technical and administrative process and to strengthen the participation of the villagers and the awareness of their responsibilities.

Considering the above mentioned problems, one female WAP extension worker should be charged officially to monitor this programme in order to guarantee its sustainability in the long run.

15.0. Propositions for Further Activities

The experiences made in Demba Kunda and Sare Gubu show that the following points should be considered before implementing motor milling machines:

- Amount of coose to be milled in the area.
- Availability of sufficient cash income in the hand of women, to pay the milling fees.
- Situation of the village, in order to ensure supply of gas oil, engine oil, spareparts and access to a local bank and possibilities of repair.

In order to ensure the appropriate management of the motor milling machines, besides the above described technical activities, the following steps must be supported:

- Strengthening the women's societies in order to improve their management capacity.
- Including men in the decision making process in order to secure their support on a village level.
- Continuous support of the organizational process, after the direct implementation period.
- Introduction of an appropriate accounting system and if possible a functional literacy course to ensure self management.

To guarantee the close monitoring of the implementation process the villages should lie within a reasonable distance of the supporting organization's headquarters.

The main difficulty accompanying the construction- and implementation work in Demba Kunda and Sare Gubu is the distance from Mansakonko(200 km) and even Banjul, around 400 km, one way. Moreover the means of communication with Basse are

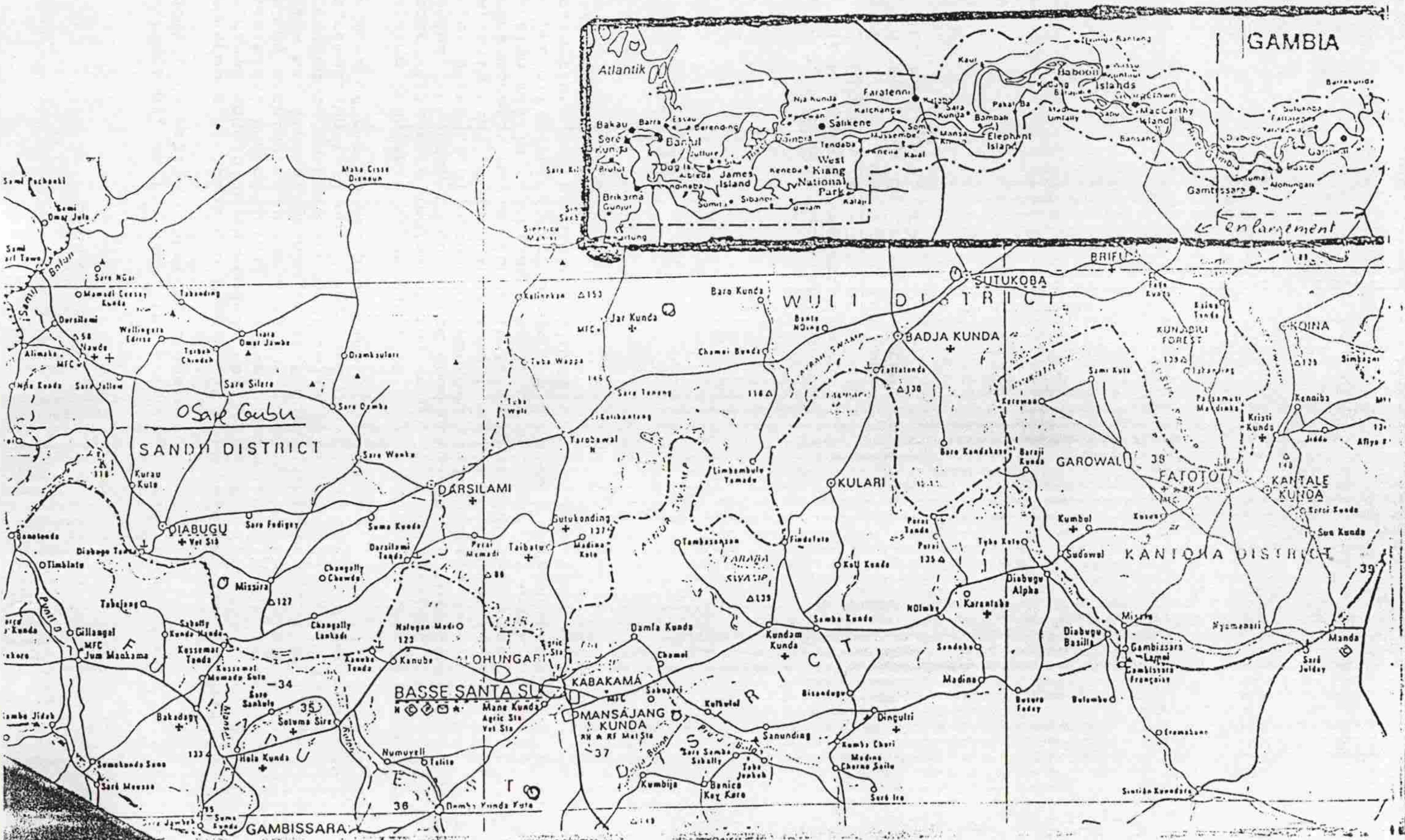
insufficient, as for weeks the telephone does not work and urgent information cannot be transferred.

Furthermore at least one female extension worker from the FFHC programme should be suspended from parts of her normal activities, and officially charged to implement and monitor the milling machine programme. As WAP extension worker Isatou Jallow has already gained experiences in this area, it is suggested to entrust her officially with the milling machine programme. Up till now, she could only visit the villages, when the work of the normal programme allowed it.

Learning from this experience, it is advisable, to search for a closer village to implement the animal traction milling machine, in order to guarantee good guidance. In this case, a larger presence of extension workers is necessary, for up till now, this kind of technique is not common in the Gambia. Furthermore it may be convenient, to implement two animal-traction milling machines instead of only one, in order to compare different performances and to have a wider range of explanations for possible failures.

cc: K.J. Samateh, Secretary General
J. Neidhardt, Project Leader
M. Richter, WAP-Officer
I. Jallow, WAP-Extension Worker
M. Sanyang, Cereal Bank Extension Worker
E. Marischen, GAA

Annex 1: Map of The Gambia and of the Project Area



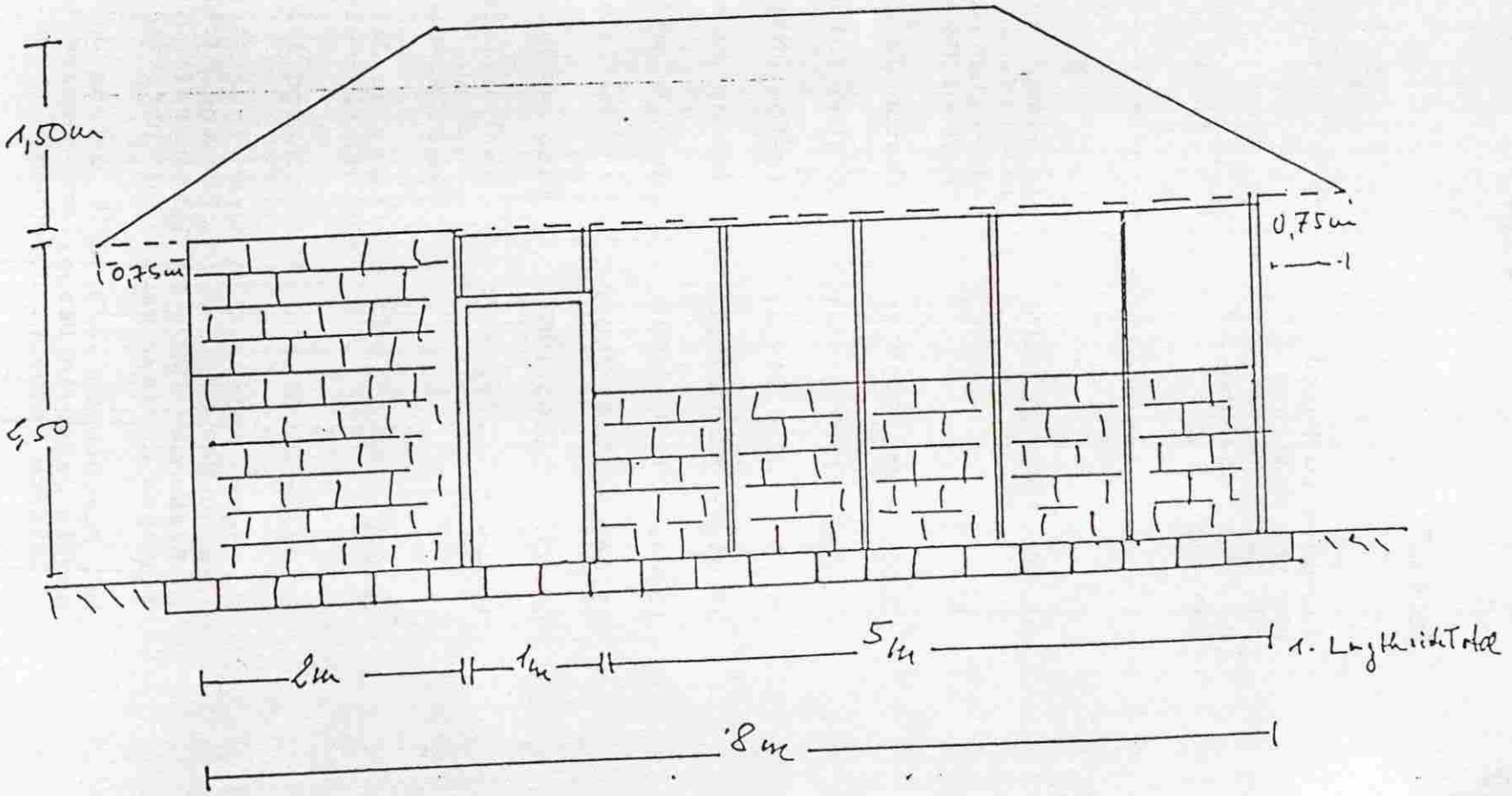
Annex 2

Journeys to Basse and the villages (Banjul - Mansakonko - Basse - Mansakonko - Banjul)	participants
06.02. - 08.02.1987:	Secretary General, Mr. Samateh, WAP-Officer, Ms Marlene Richter, WAP-Extension-Officer, Ms Isatou Jallow, Ms Petra Mueller-Glodde,
12.02. - 15.02.1987:	Isatou Jallow, Petra Mueller-Glodde,
17.02. - 20.02.1987:	Isatou Jallow, Petra Mueller-Glodde
05.03. - 07.03.1987:	Isatou Jallow, Petra Mueller-Glodde
09.04. - 12.04.1987:	Isatou Jallow, Petra Mueller-Glodde
15.04. - 16.04.1987:	Isatou Jallow, Petra Mueller-Glodde
27.04. - 29.04.1987:	Isatou Jallow, Petra Mueller-Glodde
08.05. - 11.05.1987:	Isatou Jallow, Petra Mueller-Glodde
18.06. - 23.06.1987:	Isatou Jallow, Technical Adviser, Mr. Mustapha Ceesay, FFHC; Petra Mueller-Glodde
02.07. - 04.07.1987:	Isatou Jallow, Mustapha Ceesay, Petra Mueller-Glodde
27.07. - 29.07.1987:	Isatou Jallow, Petra Mueller-Glodde

During my holidays in March 1987, three additional visits were made by WAP-Officer, Ms Marlene Richter and Ms Isatou Jallow. In September 1987, Ms Isatou Jallow, accompanied by Mr. Mustapha Ceesay, made a further visits to the villages.

Mr. Momodou Sanyang, FFHC extension worker for cereal banks, who is based in Basse, accompanied the team on most of its visits to Demba Kunda and Sare Gubu.

Annex 3 : Design of the Milling Machine House (drawing by Marlene Richter and Christian Lempelius)



Annex 4

Costs of Construction of One Motor Milling Machine House (6x8m) in Dalasi

Item	D .
70 Bags of cement	2,450.00
6 Packets of corrugated iron sheets	1,770.00
Timber	1,540.00
Cutting and loading of timber	132.50
Wire mesh	800.00
50 Rhun palms	400.00
12 Kg of nails	160.00
BRC Mesh	135.00
Rods	88.50
Materials (rope, binding wire, padlocks, Hinges, etc.)	375.00
1 Bag of white lime	19.00
2 Brushes	70.00
Night allowances for mason and carpenter	370.00
Total Costs	8,210.00
Total Costs in DM	2.097.00

(Exchange Rate: DM 1 = D 3.915)

Annex- 5

Members of the Milling Committee in Demba Kunda

President	Aja Hamminata Sillar
Vice President	Jainaba Touray
Secretary	Sekumah Binta Camara
Cashier	Mariama Jallow
Treasurer	Bussu Dukareh
Adviser	Seibo Camara
Auditor	Fatou Sanneh
Miller	Fatoumata Dampha
Miller	.....

Members of the Milling Committee in Saro Gubu

President	Dado Sowe
Vice President	Mata Jallow
Secretary	Alhaji Bah
Cashier	Hawa Bah
Treasurer	Kumba Bah
Adviser	Foday Bah
Auditor	Mamadi Sowe
Miller	Marisay Sabaly
Miller	Demba Bah

Annex 6: Forms for the Accounting System

Income-Sheet

Expenditure-Sheet

Cash-Account-Sheet

INCOME - SHEET

Milling Machine:.....

Month:..... Year:.....

Date	Amount per cup	Number of cups			Amount paid			Observations
		morning	evening	total	morning	evening	total	
TOTAL								

EXPENDITURE - SHEET

Milling Machine:.....

Month:.....

Year:.....

EXPENDITURE

Date	Gas oil	Engine oil	Transport	Miller	Spareparts	Repairs	Others	Total
TOTAL								

ANNEX 9

THE REPUBLIC OF THE GAMBIA

P R O G R A M M E

WORKSHOP ON LOCAL GRAIN PROMOTION

S U B - P R O G R A M M E

DIFFUSION OF SMALL SCALE GRAIN
PROCESSING UNITS IN THE RURAL AREAS

D A T E

MAY 3-4 1988

PREPARED AND PRESENTED BY

FAKEBBA DARBOE
A.T.U. DEPARTMENT OF
COMMUNITY DEVELOPMENT

ANNEX 9

THE REPUBLIC OF THE GAMBIA
LOCAL GRAIN PROMOTION
DIFFUSION OF SMALL SCALE GRAIN PROCESSING
UNITS IN RURAL AREAS

BACKGROUND

Almost the entire length and breadth of the country is favourable for the grains production and therefore provide the basis for operation of small scale grain processing machines especially in rural areas where production is higher.

Most local processing methods are slow and involve a lot of wastage. With some methods the nutritive value of the grain is well reduced at the end of the process. A lot has been achieved in the area of grain production which include both machines and animal traction, but the processing aspect requires more attention to upgrade the efficiency of grain farmers.

Presently there are some amount of processing machines in both urban and rural areas but the concentration in the urban area is higher due to the availability of electricity which facilitate the convenient use of the machines, but yet the production in the rural areas is much higher. The results is our grain farmers in the rural areas get less from their product. Hence the grains are either sold unprocessed at a low price or consumed through the poor traditional method of processing. So they lost both income and nutritional wise. This has a negative effect on their productions capacity. They do not have the courage to produce more above their consumption and even where as they want, they do not have the means to do it. Eventually those who depend on their surplus would also suffer. Some times some of them would even produce below their own requirements when they are trying to keep their produotion to their consumption level.

Most of the prësent processing machines are milling machines mainly for millet, sorghum and in some cases corn (maize) is incorporated. More than half of these milling machines are community own given by Governmental and non-Governmental agencies. The machines are operated with diesel the supply of which becomes a problem at one time or the other due to the distance of fuel stations.

Other processing machines include rice threshers and polishers, groundnut-butter machines, and C.R.S. sesame oil pressing machines. The recent field tested locally developed rice thresher come from the Appropriate Technology Unit of the Department of Community Development in collaboration with F.F.H.C. Some research is being made by C.R.S. on locally assembled milling machine in Brikama and Agric-Engineering was also trying to produce local made Palm Oil pressing machine. But results of these findings are not yet known to the public.

Most of the existing processing machines are either diesel operated or hand or leg operated ones. The electrical operated ones are found in urban and semi-urban areas. I have not yet seen or heard of any animal drawn type in the country, but they exist in some other countries.

OBJECTIVES

The objective of the programme is to investigate the possibility of promoting local grain production on a large scale at the same time reducing the malnutrition effect among our rural areas where the problem is more acute especially among children.

One way to achieve this is to provide to the potential grain growers especially in rural areas adequate grain processing equipments which would help them to make more use of their grain product.

This could be complemented by introducing an improved nutritional diets especially for children from the processed grain to reduce the malnutrition effect.

STRATEGY FOR IMPLEMENTATION

A.T.U. of the Department of Community Development has been engaged in the production and testing of weeders, horse or donkey carts, and rice threshing machines. All these are produced from local available materials. Mostly from metal scrapes which are commonly found in Public Works Department and in other major workshops.

For the rice threshers are began with modifying the imported old chinese pedal types which were out of function into hand operated ones. The supper structure holding the rotor is made from the local available metal rods usually use in building, and the rotor is modified to use more wood than metal. The threshing rods are made from the bicycle spokes.

Both the rice threshers and the weeders, could be produced in the local blacksmith's workshop with welding facilities.

Other equipments produced are hand tools for gardening activities and improved metal cooking stoves.

Plans are being made to introduce millet threshing machine, but this is yet to be implemented.

There should be a national coordinating committee on local grain processing machines. The functions of the committee would be as follows:

(a) To coordinate the activities of all agencies engaged in the provision of grain processing machines.

(b) To advice and provide information on new developments in grains processing and on the type of foods that could be prepared from the processed grains especially for babies. Medical and Health should be part of the committee to fulfil this function.

(c) To continuously monitor the performance of various grain processing machines given by different agencies and recommend any required necessary modification.

(d) To periodically organise training workshops on:

i. Operation and maintenance of the grain processing machines and

ii. The type of food especially for babies that could be prepared from the processed grains.

(e) All the major technical workshops that are out to promote agricultural production should be part of the committee to advise on maintenance and management of the machines and production of spare parts.

Government should well participates in this effort either directly or in directly.

1. Directly by providing through its recurrent budget for purchasing, testing and developing of simple grain processing machines, that could be adopted without an intensive support requirement from outside the country.

2. Indirectly by giving incentives or subsidy to the private sector to take up these functions so that the cost of the machines will not be above the purchasing power of the grains farmers.

JUSTIFICATION

The diffusion of small scale grain processing machines supports other efforts in improving food production through provision of milling machines to various women groups, and developing and testing of other grains processing machines by some agencies.

It also support our primary health care programme. If more and better foods are obtained from our own local grains, our children would be free from malnutrition. This would also save our foreign exchange reserves because there would be less importation of food items.

By processing our local grains to more stages, we eventially increase its value added which would mean more benefit.

Infact it will not be fair that the vast reservoir of knowledge and wealth which exist in the world is not being used to improve the lot of many who are desparately in need of it. Among several wants of man, food is primary. Therefore, hunger and malnutrition resulting from poor production and processing techniques could impede the progress of nations. Freedom from hunger is man's first fundamental right.

Therefore the need to diffuse more small scale grain processing machines is of vital importance and should be treated seriously. This would improve the living condition of our rural mass.

CONSTRAINTS TO THE IMPLEMENTATION AND STRATEGY ADOPTED

The major constraint to the implementation of the programme would be finance. If finance is available many agencies as well as individual private sector will participate well in the programme, because it seems to be viable enough to effect progressive changes within our society.

To get Governments commitment could be problematic, with its present Economic Recovery Programme (E.R.P.) it would be difficult to confirm that Government can make provision through its recurrent budget, or provide incentives or subsidy to private sector.

Other charity organisations could be involved, but the question now is would these organisations be able to have enough fund to sustain the programme in terms of provision, servicing and production of spare parts.

Private local manufacturing industries could do the purchasing, developing and testing of the processing machines even without incentives or subsidy, but the cost of this would be higher than the rural grain farmer's purchasing power. Eventually they would prefer to be without the machines.

Fuel would be another constraint which might be looked into. As many parts of the rural areas are not having electricity neither a fuel station, this might cause a serious impact on the operation and maintenance of the machines.

RECOMMENDATIONS

There must be first Governments' strong commitment. The existing workshops under various government Departments should be well equipped to be able to develop or produce some spare parts. This would also require training of personnel to acquire necessary skills and techniques.

A way should be opened to private local manufacturing industries by providing them subsidy or incentives to purchase or produce the grain processing machines and their spare parts.

If charity organisations should be involved, their efforts should be supplemented by Government in terms of human resources and provision of subsidy to their import duties.

Sensitization of farmers should be carried out by the Ministry of Agriculture and other necessary agencies on the adoption of the grain processing machines.

More fuel stations should be built to provide regular supply of fuel for the operation of the machines, hence electricity facility is not available in most part of rural areas.

Attention is required as introduction of manual hand or leg operated grain processing machines to reduce the demand on fuel energy.

Mobile workshop would be required to ensure the smooth operation of the machines.

A village-based survey would be required to find out the culture of the people which include their attitude especially towards changes, their beliefs, and their values, how these are transfer to their children. This would enable the programme to determine types of food are to be prepared from the processed grains for either babies or adults. The types of processing machines to be used or food to be prepare should be culturally accepted. They should have no conflict with the existing norms and values.

The types of food to be recommended from the processed grains should be nutritionally examined and scientifically accepted before popularising it.

Sources of edible protein, quantity available, and chemical evaluation of quality and quantity of different components. A test to determine its freedom from toxicity, and assurance that the grain processing machines comply with hygienic requirements.

Village technicians, example blacksmiths should not be neglected as they could help in adoption of the technology.

Once the programme started there should be a continuous monitoring and evaluation of technical, economical and sociological result with subsequent modification and adoption of the machines.

SUMMARY OF THE LEVEL OF INVESTMENT REQUIRED

(a) GOVERNMENT's PARTICIPATION:

i. Improving the existing workshops .....

ii. Provision of incentive or subsidy to the private sector .....

iii. Provision of personnel to charity organisations .....

iii. Training of personnels to acquire the necessary basis skill and techniques .....

(b) Farmers sensitization programme .....

(c) A village base survey on the people's culture and level of skill .....

(d) Building of fuel stations .....

(e) Mobile workshop .....

(f) ..... training workshop .....

(g) Upgrading of local technicians workshops .....

(h) Lab. testing of nutritive value of recommended baby foods .....

(i) Monitoring and evaluation exercise .....

Fakebba Darboe
A.T.U. Dept. of Comm. Dev.

ANNEX 10

DEHULLER PROJECT

The chief locally grown food crop of The Gambia and most of West Africa is millet, and the traditional way of processing millet between threshing and cooking is both inefficient and time consuming. First the grain has to be made damp by sprinkling water on it. Only a small batch (3-4kg) can be put into a mortar at a time. It is lightly pounded to remove the skin of the grain. This is called dehulling the grain. This batch is then poured into a pan and immersed in water to wash off the bran, and the cleaned grain spread out to dry. It is then pounded to flour using the mortar and pestle.

Using the CRS mini-dehuller the process will also be in batches as the dehuller can only process a batch of three to seven kilograms. With this process the grain should not be wetted, hence dry dehulling. Because the grain is dehulled dry it is possible to blow away and separate the bran from the grain. The clean grain can then be milled, either by hand or by machine.

Traditionally the process will take ten to fifteen minutes to dehull, five minutes to wash and, after drying, about fifteen minutes to pound to flour. But with the dehuller, twice the quantity takes three to four minutes to dehull, about a minute to winnow and about five minutes to mill by machine. That is a saving of one hour for 7kg. The traditional way also only gives 75-80% grain recovery by weight compared to the dehuller which gives about 90% grain recovery by weight. The necessity to wet the grain in the former process starts fermentation in the grain, it therefore must be cooked within 48 hours or it starts to go bad. Machine dehulled grain however can be milled and stored for up to a month. This means that the machines can benefit the surrounding villages too far away for walking every day to the mill.

The dehuller consists of a pulley driven shaft which carries eight abrasive discs (250 mm dia). These are enclosed in a close fitting, grain tight drum which can be rotated to unload.

The original machine was designed and manufactured in Canada for the International Development Research Centre as a prototype and sent to the Gambia for trials. The principles were found very acceptable but the machine itself was too complicated and too weak to be made and used in Africa. CRS sponsored a redesigned prototype made upriver (370 kg) in Basse. The present project has developed this into a reliable machine with four in constant use - one near Basse, one 90 km from Banjul in Sibanor, one 48 km from Banjul in Basouri and one electric powered, commercially operated, centre at Brikama (35 km).

The second phase of the project is more laboratory work. This consists of modifying the internal design to achieve maximum disc life, the major running cost problem of the dehuller, and also to reduce process time. Reliability testing will also continue.

COST ANALYSIS FOR DEHULLER ATTACHED TO EXISTING DIESEL POWERED MILL

This costing is for a Mini-CRS dehuller installed in an existing village service milling centre by extending the frame of the existing mill and by fitting a stepped pulley to the mills existing diesel so that both machines can be driven and operated simultaneously by the same single engine.

The performance figures are averaged and rounded from existing dehuller/mill installations, while the capital costs are also from existing centres or present prices (including profit) for local manufacture.

The analysis assumes that capital has to be borrowed, or could otherwise be invested at profit (Opportunity Cost).

All costs in Gambian Dalasis (D) (US $1 = D7.00, CAN $1 = D5.25)

CAPITAL COSTS

	D	D
Dehuller, including clutch and pulley	5,000	
Alterations to mill frame and new engine pulley	1,170	
Hand powered winnower	1,000	
Initial fuel reserve (approx 40 litres)	140	
Sundries (pans, measuring cup, timer, etc.)	150	7,460.00
Building - ¼ share (does not include village free labour and materials)		1,365.00
TOTAL CAPITAL REQUIRED		8,825.00

Daily Cash Flow

Average daily grain dehulled = 130kg: centre open 270 days/year

		D
Price charged D0.15/cup, 1 cup =0.9kg		
Hence - Daily Income from charges = 130 x 0.15/0.9	+	21.67
Plus - Sale of Bran as animal food (=D0.02/kg processed) = D0.02 x 130	+	2.60
Less - Diesel fuel @ D0.033/kg = D0.033 x 130	-	4.29
Less - REplacement Discs @ D256/set per 15 tonnes = D0.017 x 130	-	2.21
Less - Wages ½ share operator + clerk @ D150 the two = D150/2/25 days	-	3.00
Less - Repairs and sundries (dehuller only - no motor)	-	1.00
GROSS DAILY PROFIT		13.77

Thus -	Gross Annual Profit = D13.77 x 270	D 3,717.90
Less -	Depreciation (10% on equipment, 5% on buildings)	D 814.25
Less -	Interest (Opportunity Cost) @ 18% averaged over reducing balance	D 794.25
	NET ANNUAL PROFIT	D 2,109.40

Thus capital outlay can be recovered in 51 months

ANNEX 11

WORKSHOP ON LOCAL GRAIN PROMOTION

"INFANT (BABY) FOOD PRODUCTION FROM LOCAL GRAIN"

TOPIC:

DIFFUSION OF LOCAL BABY FOOD

Seedy Taal
Health and Nutrition Coordinator
Catholic Relief Services
Banjul, The Gambia
May '88

INTRODUCTION

The search is on for low-cost weaning and young toddler foods that would combine at least some fo the desired characteristics of high nutrient density. Low bulk properties, utilization of low-cost and widely used cereals, pulses and oilseeds' and traditional processing methods that have a potential of being easily adopted at home or village level.

In The Gambia, all evidence shows that the following are basic problems with our home made weaning porridges.

1. High dietary bulk / low nutrient density
2. Average energy density is about 0.40 kcal/g
3. High bacterial contamination
4. Poor storage conditions

What approaches do we have to take to develop home-made low-cost weaning foods?

Due to the high watery consistency of introductory cereal weaning foods and the swelling properties (paste viscosity) of cereal starches means to modify such properties at village level will be necessary. Such means are:

1. Physical means - parboiling, extrusion, puffing or flaking and roasting.
2. Chemical means - enzymic digestion (fermentation, malting or germination) and acid hydrolysis)(ph4),
3. The presence of other substances in the medium (e.g. sugar, fats, etc.) in which gelatinisation occur.

In the light of this we need here in The Gambia to modify our starch based cereal weanings that:

1. Could be stored in a dry state
2. Could be reconstituted instantly in potable water or milk
3. Had a lower paste viscosity on reconstitution.

There is recent evidence to show that malted ready-to-eat mixes have an over-riding advantage over proces ing methods such as flaking, puffing, parboiling or roasting in that malting greatly reduces the viscosity of the product thereby leading to increased nutrient or calorie-dense per unit volume ingested. Young toddlers who have a severe intake constraint are able to consume relatively more of the malted food product at a sitting. Ad added

advantage of malting is that starch is partially predigested to dextrins which would help a weaning infant to adjust more easily from a lactose based milk diet to a starch base cereal diet.

Malting has other beneficial effects e.g. enhances other nutrients (e.g. B and C vitamins, iron and folic acid): it also reduces anti-nutritional factors and increases amylase and diastase activity.

Roasting, which is a more common household and village technology, pre-cooks the ingredients used in a cereal - legume - oilseed multi mix and increases shelf life and acceptability. It also improvesthe flavour, texture and nutritive value of the grain.

FORMULATIONS

Formulations must incorporate low cost and widely used cereals, pulses and oilseeds. This means for us rice, millet, maize, sorghum and fonio; and groundnuts, cowpeas and Benni seeds.

The proportion of cereal to pulse or of cereal to pulse to oilseed must be kept simple as the ultimate purpose is to transfer the technology to the household and village level. The growth promoting effect of cereal and pulse in the ration of 4:1 or 8:1 was not found to be markedly different. This will help to reduce formulation cost. The inclusion of oilseeds is to have a more energy-dense formulation - their omission will of course reduce cost.

MALTED MULTIMIXES

The main steps in malting are steeping, germination, roasting and milling and packaging.

1. Steeping: Seeds give best results when soaked in an equal volume of water at room temperature (25^{o} - 30^{o}) for 12 hours.
2. Germination: Seeds can be wrapped in damp cloth for germination and arresting germination at 24 or 48 hours.
3. Roasting and Milling: Roasting and milling are common practices at village level. The entire malted grains (seed and vegetative part should be mailed.)

PRODUCTION OF MACRO QUANTITIES

In a typical village situation 90 kg. of multi mix per week would be required to feed 100 infants/toddlers per an average sized rural community or village (total population of 1000). There will be a need to fabricate simple trays for uniform steeping and germination and simple temperature controlled roasters to produce approximately 2000 kg. of mix per batch.

PROSPECTS AND PROBLEMS

Several studies have established the superiority of malted cereal pulse-oilseed formulations over their roasted counter-parts in terms of:

- nutrient composition
- viscosity properties
- costs per kilogram (about D2.92 in 1982)
- organoleptic properties
- acceptability by children and
- growth and protein qualities.

CILSS DOCUMENTATION

Although the prospects for malted multi mix are bright, there are two major stumbling blocks which must be overcome before one can consider malting as an appropriate village level technology. The first concerns it's poor shelf life, especially so when oilseeds are incorporated. The second concerns the rather lengthy and labourious steps in processing namely - steeping, germination, roasting and milling. An average village is not likely to have the utensils involved. Hence even if one overcomes the keepability problem, one will yet have to decide where, how, in what manner, by whom and at what cost? These multi mixes can be produced on a scale to feed at least 100 children (0 to 3 years old) day in and day out in an average Gambian village. Common sense suggests that it would have to be a centrally operated village block or district facility - (CRS/Gambia is now thinking in this direction). There is therefore an urgent need to develop simple inexpensive equipment for processing malted multi mixes at the village level a kind of village cottage industry could be attached to already existing CRS oil milling centres.

In conclusion, I see far more prospects for, than problems with, malted multi mixes.