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ASSISTANCE TO RURAL WOMEN IN GARI-PROCESSING

TF/RAF/87/906

AFRICA REGION

Terminal report*

Prepared for the Government of Nigeria, Enugu State
by the United Nations Industrial Development Organization

Based on the work of A.A. Adeagbo, national expert in gari processing
and O.A. Koleoso, national project co-ordinator

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* This document has not been edited.

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The Consultants also wish to express their gratitude to the two officers, Mrs. P.O. Okafor and Mrs. Pat Ugwu both of the State Commission for Women and to Miss Linda Doran (a Canadian on Mission in Nigeria) for their supportive role during the execution of the project. Their various contributions are very much appreciated. Even though the newly appointed Director-General, Mrs. V.L. Okoko, started work towards the end of the project, we are nevertheless pleased to note her enthusiasm, interest and determination to see the project to a successful completion. We also wish to thank the Head of Personnel Management in Udi Local Government, Mr. G.N. Ufio and his staff for their supportive role at the later part of the project execution.

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S U M M A R Y

The implementation of the project commenced from the 26th July 1993 with the signing of the contract agreement between UNIDO and the three local consultants - Mr. A A Adeagbo, the project engineer; Ms. O Banjo, the training consultant and Dr. O A Koleoso, the project Coordinator. The project which was originally planned to last four months took six months because of political problem in the country. The project essentially consisted of the provision of a suitable building with water and electricity supply in any of the local government in Enugu State by the State Commission for Women on the one hand and the supply, installation and commissioning of a gari processing plant as well as provision of training of the women group on both the management and use of the gari processing plant by UNIDO, on the other hand.

The project is hosted in Udi town which is the Headquarters of Udi local government area of Enugu State where a suitable building with needed facilities has been provided. The gari - processing plant earlier contracted to the Federal Institute of Industrial Research, Oshodi (FIIRO) by the United Nation Industrial Development Organisation (UNIDO) was delivered on site in December 1993. Unfortunately, thieves raided the building shortly after the installation of the equipment and went away with the diesel engine (the heart of the plant) and the weighing scale. To avoid a long delay in the implementation of the project, the consultants loaned another engine from FIIRO and bought a new weighing scale to carry out the training of the participants in January 1994. The training consultant unfortunately did not turn up for the exercise and hence the training had to be conducted by Mr. A A Adeagbo - the project engineer and Dr. O A Koleoso - the project Coordinator.

Post - training debriefing was held with the State Commission for Women on the progress made so far and the needed follow-up actions expected of both the Commission and UNIDO.

1.0 INTRODUCTION

Gari is one of the staple foods of, not only Nigerians, but West Africans. It is manufactured from cassava through a process of peeling, fermentation, garifying and drying using strenuous enervating traditional methods at cottage or village levels. Even though large mechanised processing equipment have been introduced into the country, it is still believed that well over 90% of gari produced in the country come from the cottage or village production by the women. Indeed, the three large-scale mechanised plants introduced into the country have ceased to function because of management problem. Hence the country now relies entirely on village production by the women. However, the low scale of production coupled with increasing demand for gari owing to the uncontrolled rural to urban migration has led to high prices of the gari product - to the extent that price of gari is now regarded as moving beyond the reach of poor man.

Sequence to the ever-increasing demand for this food product, the Better Life Programme for Rural Women established in 1987, has since been encouraging rural women to form Co-operatives to mechanised the production of gari using locally fabricated machines.

Within the frame-work of the National Better Life Programme, the then Anambra State branch was launched in February 1988 in 29 Local Government areas. However the then Anambra State has now been politically split into two autonomous states - Anambra State (New) with the capital at Awka and Enugu State with the capital at Enugu.

These co-operative societies are mainly (over 90%) engaged in Agricultural pursuits which include:

- (i) Crop farming e.g. traditional cultivation of crops such as cassava, maize, yam, coco-yam, rice, vegetables etc.

- (ii) Livestock farming, such as pigs, goats and sheep as well as fish and snail farming and
- (iii) Food processing such as gari, palm fruit, rice and corn.

Studies carried out, however, revealed that these cooperative societies have common constraints, the major one of which is the lack of appropriate equipment and/or processing equipment to remove or ameliorate the drudgery in their work. According to the needs assessment for rural women which was conducted in 1988 by the Questionnaire Administration Sub-committee of the Advisory, Planning and Implementation Committee of WOMEN IN Rural Development, 83.5% of the women inquired thought that the lack of machinery for processing agricultural product makes life difficult for the rural women. Furthermore in response to the question of which machinery for food processing could best remove the drudgery of the rural women, the majority of the women put gari and palm oil (87.4%) processing machines on their priority. Hence the decision of UNIDO to search for, instal and train some of the women in rural areas of Enugu State on the use of a low-cost, low technology mechanised equipment for gari processing.

Earlier on in 1987, UNIDO has commissioned the Federal Institute of Industrial Research Oshodi (FIIRO) to design and build a low-cost, low-technology mechanised gari-processing machine capable of being used in the rural areas. The equipment has since been developed while five of these equipment have been built by FIIRO for UNIDO and have been installed in 5 African countries of Togo, Cameroun, Ghana, Sierra Leone and Zaire while the rural women were trained on their use. Consequently under this project, UNIDO also commissioned FIIRO to build and install a gari processing in Enugu State.

2.0 OBJECTIVES:-

2.1 Immediate

The immediate objectives of the project are the provision and installation of an appropriate gari-processing equipment and provision of necessary services, including training and advice on the operation, maintenance and management of gari processing activities.

2.2 LONG - TERM

The long - term objective of the project is to upgrade the standard of living of rural population (particularly, women) through the introduction of appropriate and improved gari processing technology.

3.0 IMPLEMENTATION STRATEGY

In order to fulfil the above objectives, the United Nations Industrial Development Organisation (UNIDO), commissioned FIIRO to build one of the gari processing plants earlier developed for its Organisation while requesting the Women Commission in Enugu to identify an appropriate building in any of the rural areas of the state where the gari processing machine could be installed. In addition UNIDO appointed three local consultants - Mr. A A Adeagbo - project engineer; Ms O Banjo - training consultant and Dr. O A Koleoso to coordinate the activities while Ms Rose Onyia - the Director-Director, State Commission for Women in Enugu, was to be the contact person in Enugu. The project which was planned to last for 4 months, commenced July 26 1993.

4.0 PROJECT IMPLEMENTATION

4.1 MEETING WITH DIRECTOR-GENERAL, STATE COMMISSION FOR WOMEN ENUGU AND THE CHAIRMAN, UDI LOCAL GOVERNMENT

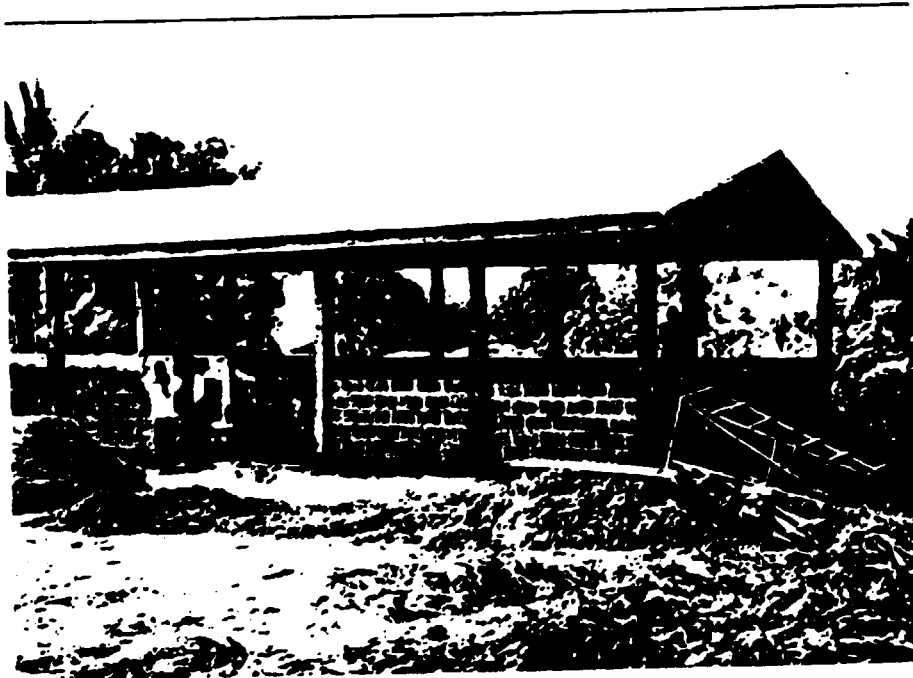
Soon after signing the contract agreement the three local consultants paid a visit to the Director-General, State Commission for Women in Enugu to discuss the implementation strategy which included

- i. Search for a suitable site in any of the local governments in the state with the needed infrastructural facilities such as appropriate building size, water and electricity.
- ii. Selection of participants - operatives and technician,
- iii. Raw materials availability and product marketing
- iv. Packaging design, and
- v. The organisation of the women cooperative into a viable commercial enterprise.

At the end of the meeting with the Director-General, the team proceeded to the Chairman, Udi Local Government - Nze S.N Agu who had been earlier briefed on the project by the Director-General, particularly on the requirement of a suitable building and site. He took us to the site he had in mind which though it was near the road and had provision of electricity and water, the building was found inadequate for the gari plant.

4.2 SEARCH FOR A SUITABLE SITE

One of the criteria set in the search for a suitable site was that the local government area to be used must not be too far from Enugu city because of implementation logistics. Preliminary investigations conducted showed that Udi Local Government area would be most ideal because of its closeness to Enugu City (30 minutes drive), ready availability of cassava root resulting from the farming community and the ready in-



FACTORY BUILDING UNDER CONSTRUCTION

terest shown by the people in the area. Besides, Udi town has water and electricity supply. Earlier it was felt that the local government be brought into the project through donation of land and building. This idea, however, had to be shelved after 2 months in that though a piece of land was provided by the Local Government for the project, the council was unable to put up the building owing to poor finances. Next we approached the traditional ruler of Udi township - Igwe G.O.D. Eneh, the Okwuloha I of Udi who not only provided the land but went ahead to complete the half - built building on the land and provided the building with electricity. There is public water tap near the building from where water is supplied in to a galvanised tank besides the factory building. We were informed of plans to connect the factory directly to public water supply at a latter date.

4.3 SELECTION OF TRAINEE

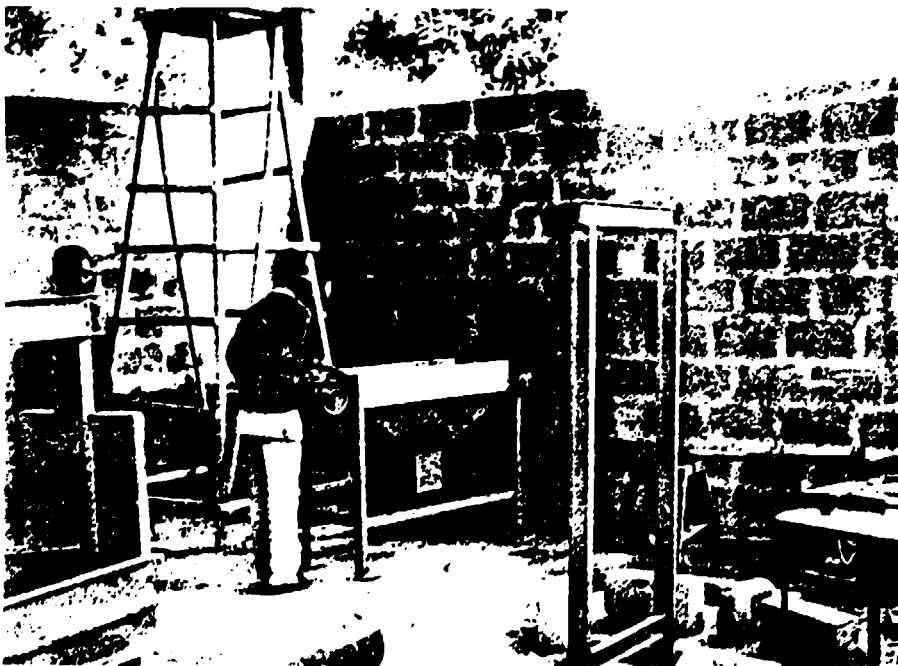
Information from the State Commission for Women through the Coordinator for the better Life Programme in Udi was earlier circulated to all the wards in Udi local government on the gari plant being donated by UNIDO to the local government. All women were invited to attend a meeting at Udi for the selection of those to be trained on the operation of the machine.

The meeting for the selection was scheduled for the 15th December at Udi Local Government Headquarters in Udi. The selection team consisted of --

1. Representative from State Commission for Women, Enugu - Mrs. P O Okafor
2. Representative of the Udi Local Government - Mrs. Anieke
3. The coordinator, Better Life Programme in Udi Local Government area - Mrs. Jane Nweze



MESRS. MUELLER, DALLALAH, BOTH FROM UNIDO AND MS. ROSE ONYA, FORMER DIRECTOR-GENERAL STATE COMMISSION FOR WOMEN; ENUGU, AT THE FACTORY SITE.



EQUIPMENT BEING MOVED INTO POSITION

4. The consultant trainer - Ms. O. Banjo and
5. The project coordinator - Dr. O A Koleoso

The criteria used for the selection were

1. Basic Education e.g. Primary school education and hence ability to understand english language.
2. Preparedness to attend the two-week training course on a continuous basis.

In all about thirty-two women came for this meeting which we regarded as too low when compared to about eighty expected. Nevertheless, the women were briefed on the concept of this co-operative society - stating the aim and objectives of the society and the role its members are expected to play. Some expressed interest to join the society but not to take part in the training because of time constraint while others expressed the desire to be members and to take part in the training. At the end of this meeting only eleven women could be selected for training as per our criteria.

Sequence to the low turn out, another meeting was scheduled for the 20th December for those who could not attend the 15th December meeting. The coordinator, Better Life Programme in the Local Government was advised to intensify efforts to get more women to attend. However, the attendance at this second meeting was still not impressive as some of those who attended the first meeting also came. At the end of the second meeting, the list of trainees increased to eighteen.

We found that the reason for the poor attendance was the inability of the coordinator, Better Life Programme, to visit all the 25 wards under the local government owing to lack of transport. Consequently it was decided to fix the next meeting to co-incide with the monthly general meeting of the women involved in Better Life Programme in the Local

Government area - which is the second Tuesday in the month (i.e. January 11 1994). The meeting agreed to use this occasion to launch the cooperative society, elect their officers - who will be given management training, and make the final selection of those to be trained on the use of the processing equipment. This, we also hoped, will result in a geographically wider spread of the participants.

The only person sent in for consideration as the technician was found not suitable and the women Commission was advised to intensify their search. Meanwhile the list of the eighteen participants so far selected is given below - see Annex 1.

4.4 FORMATION OF THE COOPERATIVE SOCIETY

The meeting earlier scheduled for January 11, 1994 for the purpose of inaugurating the cooperative society could not take place as the annual report on activities of the Better Life Programme for the year 1993 took over the day. Consequently another meeting was scheduled for January 19, 1994 for the purpose of inaugurating the society and election of the executive members. In attendance at this meeting were the following --

1. The Representatives of the Director-General, State Commission for Women: Mrs. P O Okafor and Mrs. Pat Ugwu.
2. The Coordinator, Better Life Programme in Udi Local Government Area - Mrs. Jane Nweze and
3. The project Coordinator - Dr O A Koleoso.

The women were again briefed by the project coordinator on the aims and objectives of the project as well as on our expectations. This was followed by the inauguration of the society by the representative of the Director-General - Mrs. P O Okafor and the election of the executive members of the society. The meeting was further told that the membership of the society is open to all women in the local government area with the payment of 50k per share and a minimum of 200 shares (this was later raised to a minimum of 500 shares) per person.

The following people were elected into the executive posts.

1. President - Mrs. Jane Nweze
2. Secretary - Mrs. Gloria Agu
3. Treasurer - Mrs. Mercy Alio
4. Financial Secretary - Mrs. Florence Eneiga
5. Public Relations Officer - Mrs. Chike Onoh

After the election the officers were recognised and congratulated by members. The following resolutions were adopted before the meeting rose:

1. That an account be opened at the Cooperative and Commerce Bank Plc at Udi branch office.
2. That the signatories to the account are the President, the Secretary and the treasurer.
3. That any two of the three signatories which must include the treasurer can operate the account.

The bank account has since been opened at the Cooperative and Commerce Bank in Udi while over N11,000.00 (Eleven thousand Naira) have been collected from members before our departure on the 1st February 1994. In addition identity cards with passport photographs of each member was issued out to every member.

4.5 PROCUREMENT OF GARI PROCESSING EQUIPMENT

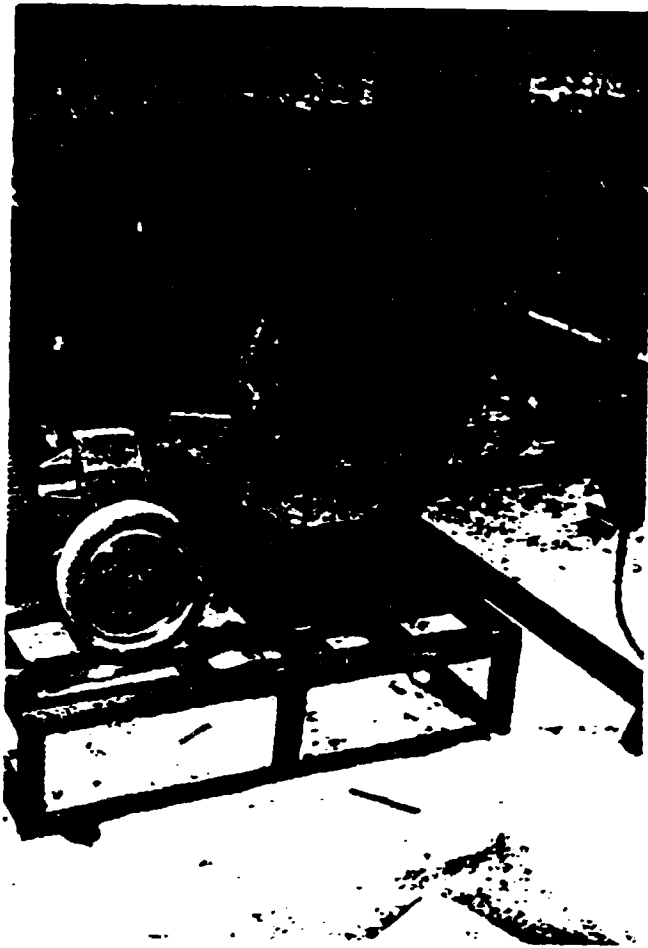
4.5.1 EQUIPMENT SURVEY

Many types of equipments are available for gari processing from cassava in Nigeria. Most of the equipment can be classified into categories such as cottage scale, small scale, medium and large scales. The cottage scale facility is very common these days among rural dwellers, particularly the rural women. This entails the semi-mechanised system which is a little higher in the level of technology than the traditional one. The operation of the cassava grating is mechanised while all the other operations are manual. The small, medium and large scale facilities are of course highly mechanised in varying degrees. However, local survey reveals that, the facility of the type already developed by FIRO under the auspices of UNIDO for some rural places in Five African countries would be most appropriate for the Enugu State rural women.

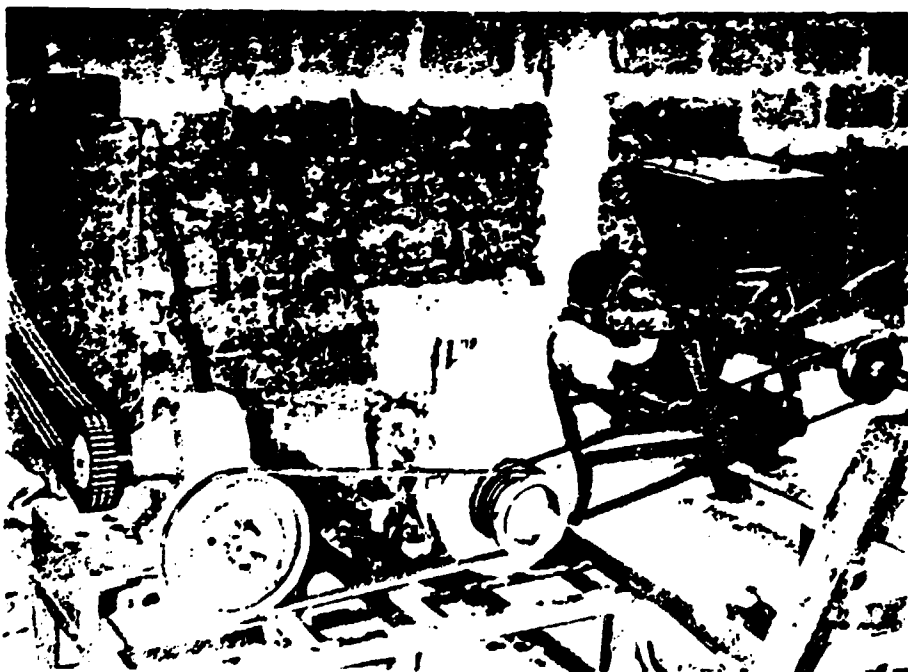
4.5.2 EQUIPMENT SELECTION:

The selection which was carried out by the consultant engineer on the project was based on the production of 500kg of gari per 8-hour day. The unit operations were almost like the ones originally developed by FIRO for UNIDO with some few modifications. These were:

- (a) The rasper type cassava grater, r.p.m. 1500kg per hour;
- (b) Mechanised type screw dewatering press of capacity 300kg per batch;
- (c) Vibrating sifter of capacity 250kg/hour;
- (d) Disc attrition mill of capacity 250kg/hr;
- (e) Fryer-dryer, gas-fired, of capacity 75kg per hour, with improved paddling and coupling arrangement;



MOUNTED GEAR BOX SHOWING THE PLATFORM FROM WHERE THE STOLEN DIESEL ENGINE WAS REMOVED



THE MOUNTED GEAR BOX ALONG WITH THE BORROWED FIRO DIESEL ENGINE

- (f) Other facilities innovated were screw conveyor feeder to the dryer, a 6h.p. air-cooled engine coupled to a speed reduction gear box, sprocket-chain drive on the dryer and speed transmission/distribution shafting arrangement to the grater, sifter and the mill;
- (g) Ancillary equipment such as the weighing scale and the heat sealing machine for product packaging;
- (h) Utilities such as butane gas cylinder with regulators and diesel fuel storage tank capacity 1000 litres.

4.5.3 MODE OF PROCUREMENT:

The entire plant with all the unit operations, prime mover, couplings and modified devices was purchased directly from FIIRO. It took the Institute over three months to deliver the plant (owing to political problem), the fabrication of which was supervised by the consultant engineer on the project.

The diesel oil storage tank with stand and the heat sealing machine were purchased from a local company by name Messrs Starron Nigeria Limited. Also the gas cylinder, hoses and gas regulators were purchased from a local shop in Lagos.

All the procured facilities were conveyed to Udi village near Enugu in a vehicle provided by FIIRO.

5.0 INSTALLATION AND COMMISSIONING OF THE EQUIPMENT:

5.1 THE PROJECT SITE:

The counterpart support facility provided at Udi town in Enugu State included a factory building having a floor space of 20 x 10m and wall height of 5m completed at the top with a 1m high wire gauge round

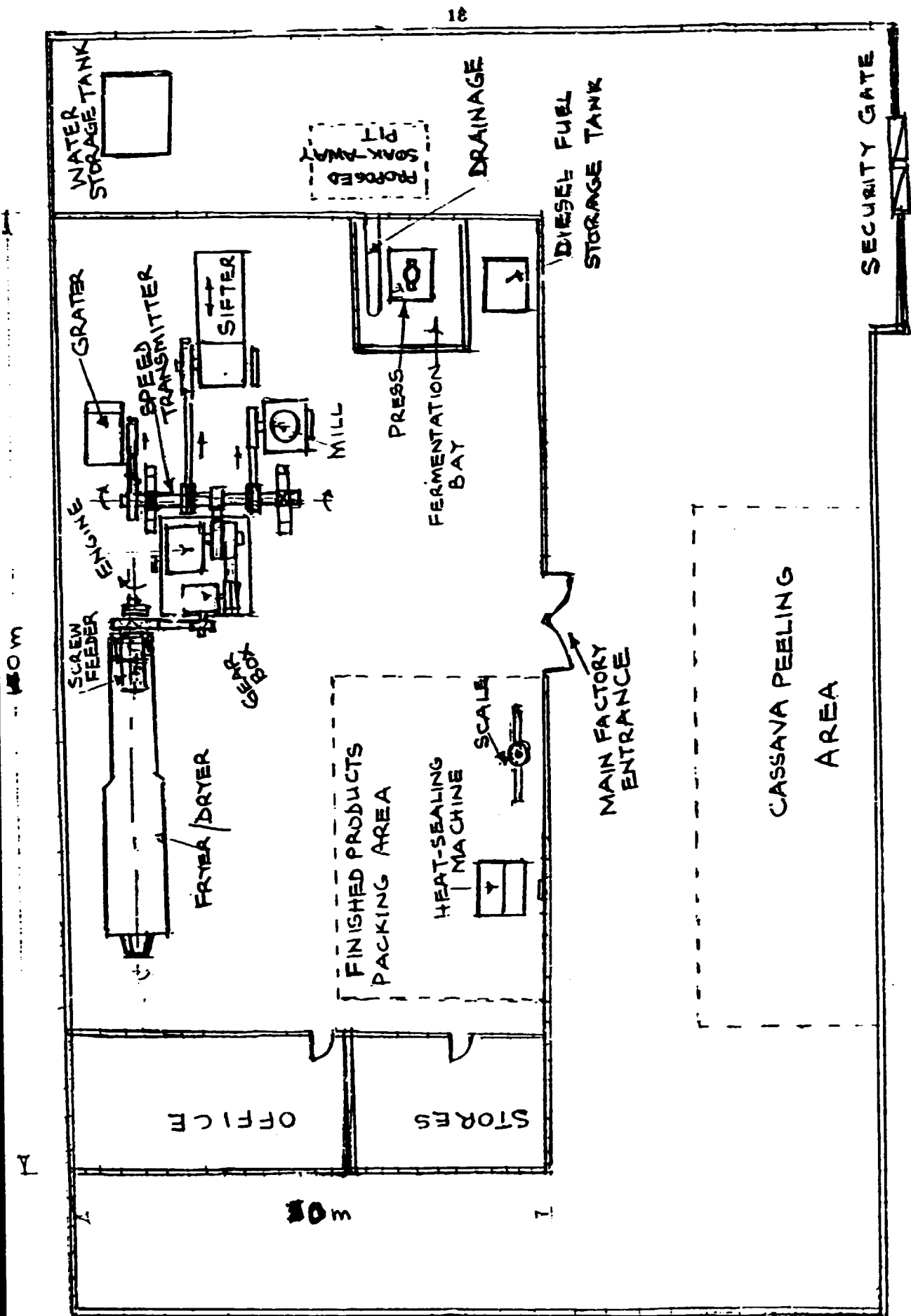


FIG. 1. SCHEMATIC DIAGRAM OF GARI PRODUCTION FACTORY SITE AT UDI, ENUGU

the entire wall tops to serve as ventilation (fig. 1). The building was roofed of galvanised sheets. The factory was fenced round with adequate open space and security gate.

5.2 INSTALLATIONS:

Concrete foundations were made for all the machines put together for the gari plant in line with all the specifications provided by the consultant engineer. Erection of the machines on the foundation was also carried out as specified. A single phase supply of electricity was provided to connect a 15 Amp. socket necessary to run the heat sealing machine for packaging gari products. The screw press was positioned in a bay within the factory. This bay was marked round with a 30cm high concrete wall which also served as fermentation bay for grated cassava. The floor was provided with a drainage channel leading to the proposed soak-away pit outside the building. The diesel fuel storage tank was situated at the corner near the fermentation bay.

Within the open space in the factory premises was positioned the storage tank for water from which plumbing works could be carried out to supply water points into the factory.

Right in the factory, by the finished product bay, two rooms were partitioned to serve as stores and administration office. The schematic plan of the factory site and facilities is as shown in fig. 1.

6.0 COMMISSIONING:

6.1 Preliminary checks were carried out on each unit operations as follows:-

6.2 **FRYER-DRYER:** The foundation bolts were properly secured. Then the paddle arms were adjusted just to touch the periphery of the main bowl and also at 10° angle of inclination to the horizontal. All the fasteners were properly secured.



THE GARIFYER|DRIER BEING INSTALLED INSULATED WITH BRICKS



EQUIPMENT UNDER INSTALLATION SHOWING THE STOLEN DIESEL ENGINE

The screw feeder was mounted in position with the belts and pulleys securely fitted. The sprocket to the dryer main shaft was also fastened properly.

- 6.3 DRIVE UNITS: The speed reduction gear box was properly mounted with the sprocket and pulley well aligned with the dryer chain drive and engine base. The speed transmission shaft with all the pulleys properly keyed was checked for symmetry on its supporting bearings which were mounted on structural steel frames.
- 6.4 GRATER: The base structure of this machine was checked to ensure secure fastening to the foundation. The pulleys were also checked to ensure they were properly secured in positions. The rasper was rotated manually to ensure it was freely supported on two bearings without jamming the housing. The belt tensioner was finally operated to check for functionality.
- 6.5 SIFTER: Checks were carried out on the fastening of the machine to the foundation, security of the drive pulleys, eccentric rotor, bearings, spring loadings and sieve tray. The belt tensioner was also checked to be operational.
- 6.6. HEAT-SEALING MACHINE: This equipment was checked to ensure that there was no open circuit in its system. It was also checked for electrical earth leakages to guarantee its operational safety.
- 6.7 MILL: The security of the machine to the foundation was checked. The pulley was observed for proper fastening to the main shaft. The grinding discs were checked for smooth rotation and lateral adjustability. The belt tensioner was finally checked to be functional.

- 6.8 PRESS: This was positioned where drainage facility was provided. The rotor was manually operated to ensure free movement of the pressing plate. Check was also conducted to ensure the drainage gutter on the stationary ram was not blocked. Finally, the fastening of the structural steel frame around the machine was checked.
- 6.9 SCALE: The equipment was checked to ensure that the hook was properly fitted and the deflection of the dial pointer was sensitive.
- 6.10 LUBRICATIONS: These were carried out on every unit as described below:
- 6.10.1 FRYER-DRYER: The three supporting bearings on the main shaft were oiled while the chain and sprockets were greased.
- 6.10.2 OTHER UNITS: The bearings of the cassava grater, sifter, mill and the square threaded screw of the press were all lubricated with grease.
- 6.10.3 DRIVE UNITS: The speed reduction gear box was filled to the required gauge with SAE 90 lubricating oil.
- The lister air-cooled engine was serviced by changing the fuel and oil filters followed by the renewing of the oil in the sump with SAE 40 lubricating oil.
- The speed distribution shafting support bearings were lubricated with grease.
- 6.11 COMMISSIONING TESTS: This involved the operation of all the machines in the plant without and with feed stock.
- The dry operation was carried out to test for functionality and carry out necessary adjustments for smooth operations.
- After this the units were operated with feed which was mainly cassava. The grating was done and demonstrated to the technician and women trainees. So also were the operations on the screw press, granulator,

sifter and mill. Finally, the dryer was operated by ensuring a well regulated feeding method and firing flame intensity appropriate for gelatinisation and drying of cassava mash to produce good gari products.

7.0 RECRUITMENT AND TRAINING OF TECHNICIAN:

7.1 RECRUITMENT OF TECHNICIAN:

The women cooperative members were duly involved in this exercise. They assisted in looking round Udi Villages and locality for men with experience in the operation and maintenance of diesel engines. The applicants were put to test on the proficiency of their craftsmanship within the new gari factory floor, particularly the operation and maintenance of the air-cooled engine. Consequently, one technician was successfully recruited for the training.

7.2 TRAINING:

The training given to the technician covered the areas of installation, commissioning and running of the factory.

7.2.1 INSTALLATION COURSE:

This covered all the procedures employed in the erection of the gari plant on the concrete foundation and the assembly of the unit operations with all the technical details involved.

7.2.2 PRE-COMMISSIONING:

Necessary methods of checking alignments, belt tension, rigidity of clamps tightening of bolts, nuts and screws and all other assembly fixture details were parts of the exercises the technician went through on the factory floor.

7.2.3 LUBRICATION PROCEDURES:

Apart from lengthy discussions on this, the technician had the opportunity of taking part directly in all the lubrication services carried out on the gari plant before and after commissioning.

7.2.4 COMMISSIONING:

This was done by involving the technician in the procedures for running all the processing units including the methods of adjustments of mechanisms during operations.

7.2.5 METHOD OF REPAIRS:

The technician was instructed on various trouble shootings and how to tackle them during production operations.



PARTICIPANTS PEELING CASSAVA



PARTICIPANTS WASHING PEELED CASSAVA

8.0 TRAINING OF THE WOMEN PROCESSORS:

8.1 ON THE GARI PLANT

The training of the processors started on the 20th January and went through to 31st January, Saturdays and Sundays inclusive. The initial figure of 18 swelled to 29 at the start of the training. In view of the absence of the training consultant - Ms. O. Banjo at Udi, the training programme had to be conducted by both the coordinator - Dr. O A Koleoso and the project engineer - Mr. A A Adeagbo.

The women were briefed on the operation of each equipment and the safety precautions needed on each of them. The women were then divided into two groups - A and B (see Annex 2) for practical purposes. The cassava tubers purchased by the women cooperatives, was split into two and were peeled, grated, and bagged for fermentation by each group.

Everyone in each group was given a chance to grate the cassava in -turns. The pulp was allowed to ferment for three days after which the fluid was pressed out using the screw press. The pressed cake was again disintegrated in the grater then sifted to remove the fibres. Again every person in each group was given the opportunity of using the grater and the sifter. The sifted semi-dried cassava marsh was then gelatinised and dried using the fryer and dryer, fired by gas supplied. This process was considered the most critical step as the feeding of the marsh and the control of the gas have to be properly adjusted to either prevent burning or producing dried cassava flour. Consequently each participant was taught how to feed the garifyer while the technician controlled the gas. The participant were further taught on how to sift the gari, bag and seal the polyethelene packaging. At the end of training the



PARTICIPANTS USING THE GRATER

women participants were provided with cassava tubers which they processed on their own, while the consultants watched. The gari produced were bagged and sealed by them.

8.2 ON MANAGEMENT AND COSTING OF PRODUCTS:

Some aspects of management training were discussed shortly after the inauguration of the Society. The executive members were briefed on how to organise themselves, handle membership drive, and how much to be paid by each member and the minimum number of shares per person, how to open their account and the signatories to their accounts. Identification of members was also discussed and this led to the printing of identity cards containing passport photographs of each member. The Annual General Meeting which would be fixed in January of each year during which new executive members would be voted in, was also discussed.

At a latter meeting with the executive members, the consultants, assisted by Miss Linda Doran (a Business Administration Graduate from Canada), the number of person to be employed in the factory was discussed and this was limited to 1 supervisor (who should have some management experience), two women processors (to be appointed from the list of the best ten participants provided) and two technicians (the technician already trained and an assistant to understudy him). In addition, the possibility of appointing board members at a later date, was discussed. This arose from the fear expressed by those who want to invest fairly bigger amounts - e.g. Local Government and some individuals as regards protection of their investment. Towards the end of the meeting, the parameters that need to go into costing were discussed and weighted. Miss Linda Doran was asked to work out the costing of the product. At a reconvened meeting of the group, both Miss Doran and the consultants,

the latter working on modified parameters, submitted two proposals (Annexes 3 and 4) which could not be considered in details because of time factor. Hence the State Commission for Women was advised to link up with Miss Doran and the executive to get some more realistic figures. However, it can be seen from the Annexes that both figures were close and this compared favourably with that of the traditionally made gari sold at the rate of N8.00/kg even though the one produced by the machine has a swelling properties which double that on the open market. It is therefore expected that the Co-operative gari will be more attractive to purchasers than the traditionally prepared one.



PARTICIPANTS SIFTING DESINTEGRATED CASSAVA MARSH TO REMOVE FIBRE

9.0 EVALUATION OF THE TRAINING BY PARTICIPANT:

Two prepared questionnaires - one set for the women processors and the other for the technician - were distributed to the participants to find out the extent of their understanding of the use of each equipment. The average of the evaluation by the women processors is shown in Annex 5 while that from the only technician is shown in Annex 6. The results showed a good understanding of the use of the equipment by the women while the technician showed a thorough understanding of the operation and maintainance of the various equipment in the plant.

10.0 GENERAL COMMENT:

There is no doubt that the implementation of the project has been a tough one for all concerned for reasons of political problems encountered shortly after the project started. This also affected the delay in completion of the equipment fabrication and that of the building at Udi. Consequently a project that was scheduled for completion in four months lasted six months.

The efforts of Igwe G.O. Eneh, the Okwuloha I of Udi in the housing of the project in Udi, have to be appreciated and recognised as he single-handedly put up, on loan to the State Commission for Women, the required building at a time the project would have been transferred to another local government area. Again the Igwe came to the rescue of the project when he loaned out N120,000 to the State Commission for Women for the replacement of the stolen diesel engine. The cheque was later returned by UNIDO.

The women participants were all too enthusiastic to learn and eager to work in the factory for the Cooperative Society. However only two of the ten best participants can be employed. The remaining eight very good participants were recommended to be put on waiting list.

The technician brought in by one of the women participants, as the State Commission for Women could not provide one, is a well experienced mechanic who has worked in a construction company before he joined the society. We hope the Women Commission will be able to retain him in the employment of the Society and, as recommended to them, provide an assistant who can understudy him.

The theft of the diesel engine and the weighing scale could have been avoided if the State Commission for Women had recruited Security Staff as earlier advised by the Co-ordinator. It is worth noting that up to the end of the training activities, the Security Staff have still not been appointed by the State Commission for Women. Shortly after the theft in the factory in December, the local government sent three civil defence unarmed members to look after the site; and what is more these men were not paid at the time we started the training. In order to gain their loyalty the coordinator promised and did give each of them a sum of N500.00 for the two-week period. As stated in the report we did recommend to the State Commission to retain them and arrange regular payment of salary to them in order to avoid any further theft and the concomitant financial burden of replacing any stolen item. We have recommended that the State Commission for Women take up an insurance against theft and fire on the entire plant with a reputable insurance company.

None of the gari produced was sold, rather, they were used for public relations in the area - such as the Igwe, police and staff of the local government, the State Commission for Women, the processors and the technician and to UNIDO.

11.0 POST-TRAINING DEBRIEFING WITH STATE COMMISSION FOR WOMEN:

The former and current Director-General State Commission for Women - Ms Rose Onyia and Mrs. V.L. Okolo, accompanied by their Directors had paid a visit to the site on the 31st January 1994 and hence had the opportunity to see the women at work and to take home some samples of the gari prepared by the women. The meeting with the Director-General and her Directors took place on the 1st February in her office. The meeting gave Mr. Adeagbo - project engineer and me - the coordinator, the opportunity to discuss the project and what was expected of the Commission.

The coordinator pointed out that though the Society has been inaugurated, their executive elected, and their bank account opened with the membership proceeds, he said a lot still needed to be done. He requested the Commission's assistance for the formal registration of the society, the preparation and issuance of share certificates to members of the society, and the erection of two sign posts - one by the road side pointing to the factory site while the other is positioned on the facing board in front of the factory.

The coordinator further stressed the need for the Commission to assist the young society - particularly in the management area as well as the costing of the gari to be produced for market, pointing out that Miss Linda Doran will be interested in liaising with the Commission on it. He further informed the meeting that while Igwe G O Eneh was prepared to loan the Commission a sum of N120,000 (One hundred and twenty thousand Naira) for the purchase of a new 6H.p air-cooled diesel engine, the Commission must be prepared to take an insurance policy of not less than N500,000 (five hundred thousand Naira) on the whole plant. Of immediate

importance, he continued, is how to maintain continuity on Security of the factory by absorbing the security staff (Civil defence corps) into their employment or of the local government as well as absorbing the technician trained so as not to lose him to other job. He stressed the need to second another technician to work with the trained one as a precaution. He recommended the employment of one Supervisor, two processors and two technicians for the factory and to maintain the employment of three security staff who worked with us.

On membership drive he suggested the possibility of extending this to all local government areas in the state.

The coordinator suggested a meeting between the Commission and the Igwe of Udi to discuss the repayment for the factory building erected on loan to the Commission by the latter. These, the Igwe did to keep the project at Udi and to ensure its success.

On the date for the handing over of the project by UNIDO to the Commission, the coordinator informed the meeting that the Commission will be contacted by UNIDO. The Director-General however pleaded that the date be shifted to end of March or early April as the first lady has just put to bed and will not return to work until the end of March 1994.

The Director-General noted the various points mentioned above and promised that the Commission will do its best. She however hinted that the Commission had no money and will depend on UNIDO for the replacement of the weighing balance and the engine lost to thieves. She hoped UNIDO will not abandon the project after handing-over ceremonies but will continue to monitor the performance of the factory for some period and to render any assistance that may be needed - particularly in the area of spare parts.

12.0 RECOMMENDATIONS:

The following recommendations are presented for consideration:

1. That UNIDO finds some money to replace the stolen diesel engine or refund the money loaned by Igwe Eneh to the State Commission for Women which is still searching for funds on the building.
2. That the State Commission for Women should take an insurance policy on the entire gari plant to protect the women cooperatives against further theft or fire. In addition the Commission should beef up the security of the factory without further delay.
3. That the Women Commission in conjunction with Udi Local Government should ensure the retention of the trained staff - particularly the technician through the payment of salaries of the staff employed by the Cooperative Society for a period of one year. Such action will assist the Cooperative Society during this weaning period. As a matter of urgency the State Commission should recruit another technician to work with and understudy the trained one.
4. That the State Commission for Women should continue to give management assistance to the Young Society and, in particular, the registration of the Society as a company, the preparation of the share certificates, and the broadening of the membership to include as many women in the entire state as possible. In so doing the State Commission for Women should avoid the temptation of converting the Cooperative Society into a parastatal of the Commission.
5. That UNIDO should, through one of its local staff or any of the consultants, continue to monitor periodically, the performance of the Young Society and be prepared to help it when such is needed.

6. That UNIDO take into consideration the suggestion from the D.G., State Commission for Women, on the post-ponement of the handing over ceremony to early April 1994. This will also enable UNIDO to evaluate the performance of the Cooperative Society at that time.

13.0 CONCLUSION:

The fact is well known that most, if not all, of our traditional foods are produced by women. It is also well known that gari, sometimes known as common man's food, constitute the main staple of the foods in Africa generally, and Nigeria in particular. It is therefore obvious that the efforts of UNIDO to focus on mechanising gari production through low-technology and low-cost equipment, is not misplaced at all. It is a step in the right direction.

The women in Enugu State will ever be grateful to UNIDO in considering their State as the first one in Nigeria to enjoy this opportunity - to the envy of others. UNIDO should therefore be prepared to offer similar assistance to women in other States of Nigeria where gari or cassava flour production by women constitutes their main occupation. Nigeria is a big country and hence requires more than one of these plants to make the desired impact. This project offers a technology that can easily be assimilated by the recipients and hence contributes meaningfully to the improved quality of life of the beneficiaries while making more food available to the people. UNIDO is congratulated for taking such a step which has a direct impact on the quality of life of the people.

ANNEX 1

LIST OF QUALIFIED TRAINEES [GARI PROCESSING]

(1)	Jane Nweze	Coordinator (Better Life Programme, Udi Local Government)
(2)	Helen Agu	Retd. Civil Servant
(3)	Josephine Eze	Trader
(4)	Maria Ude	Seamstress
(5)	Elizabeth Onuigbe	Housewife
(6)	Florence Eze	Housewife
(7)	Gloria Agu	Seamstress
(8)	Chike Onoh	Housewife
(9)	Angelina Okwoh	Trader
(10)	Irene Ezeara	Trader Housewife
(11)	Regina Eneh	Teacher
(12)	Florence Ezeigbe	Farmer
(13)	Roseline Ezenwah	Farmer
(14)	Imelda Udeh	Trader
(15)	Josephine Eneh	Housewife
(16)	Florence Uzoegbu	Farmer
(17)	Theresa Agu	Housewife
(18)	Grace Ike	Retired Teacher

ANNEX 2

LIST OF WOMEN PARTICIPANT

Group A participant consist of the following:

- | | |
|-----------------------|------------------------|
| (1) Jane Nwaeze | (8) Roseline Enenwali |
| (2) Grace Ike | (9) Ann Eneh |
| (3) Theresa Agu | (10) Nkechi Chiwetalu |
| (4) Elizabeth Oneigbo | (11) Josephine Offoelu |
| (5) Monica Ude | (12) Emelda Ude |
| (6) Gloria Agu | (13) Justina Aneke |
| (7) Veronica Areke | |

Group B participant consist of the following:

- | | |
|---------------------|-----------------------|
| (1) Mercy Alio | (9) Beatrice Onyiauko |
| (2) Florence Eze | (10) Cecilia Onyia |
| (3) Chika Onoh | (11) Helen Oke |
| (4) Violet Aguogbuo | (12) Mabel Agu |
| (5) Florence Eneiga | (13) Cecilia Chime |
| (6) Gladys Okonkwo | (14) Caroline Ano |
| (7) Fany Alio | (15) Reginah Agu O. |
| (8) Virginia Agu | (16) Eucharria Eneze |

ANNEX 3

FINANCIAL ISSUES

- 1) Transportation of the finished product has not been included.
- 2) Equipment has been donated. It will be depreciated as though it had been purchased. Entry to record equipment donation.

Equipment	Dr	360,000
Donation	Cr	360,000

The exact value of the donated equipment should be verified. The above entry and the monthly depreciation should be adjusted accordingly.

- 3) It has been recommended by the consultants that money be set aside on a regular basis to provide funding for equipment replacement. This should be a board decision.
- 4) Determine selling price based on breakeven point and competitors' prices. Based on a 117,000 Naira monthly cost to produce 5,000 bags of gari the following product prices give differing breakeven and profit levels.

Price (N)	Breakeven Quantity (packets)	Profit (N)
-----	-----	-----
23	5000	0
24	4250	5000
25	3400	10000
26	2833	15000
27	2470	20000
28	2125	15000
29	1889	30000
30	1700	35000

Breakeven quantity = Indirect Costs + (Price - Direct cost per unit)

For the above calculation, direct cost was rounded up to 20 Naira per bag.

Outstanding Tasks

Determine rent
 Arrange insurance
 Purchase of office supplies
 Hire staff (will they work without kpay until
 Company is established?)
 Incorporate company
 Investigate local gari pricing
 Finalize sources for input products
 Banking?
 Auditing?

INDIRECT MONTHLY COSTS (N)

Salaries Expenses:

Security Staff

(1 day guard: 500	
2 night guards: 600 each)	1700
Equipment Technician	1500
Plant Operators	
(2 staff: 900 each)	1800
Supervisor	2000

Equipment Expenses:

Lubricants	1000
Gas	1000
Diesel	
(5 litres daily for 30 days at N3 per litre)	450
Parts	500

Depreciation

(360,000 initial value life of 10 years;

360,000 - 10 - 12 = 3000) 3000

General Expenses:

Rent (must be negotiated) 200

Water 100

Electricity 60

Insurance

(theft & fire coverage of 500,000) 1250

Stationary and Office Supplies

(estimated at 500-600 annually) 60

Processing Utensils/Materials

(estimated at 7000-7200 annually) 600

Provision for equipment replacement

(200,000 - 10 years - 12 = 1666) 1700

Contingency

100

Total Monthly Indirect Costs

17010

Indirect cost per 2kg bag

(17010 - 250 bags x 20 days) 3.4

Direct cost per 2kg bag

19.58

Total Cost

22.98

approximately 23 Naira/2kg gari.

SAMPLE COSTING INFORMATION

Direct Costs vary in direct proportion to the volume of gari produced.

Indirect Costs are incurred each month regardless of production level.

Cost per unit of gari produced = direct cost per unit
 + (monthly indirect costs/number of
 units produced monthly).

Direct Costs

Cassava

assume: 1) transportation to site is included in cost of cassava

2) cost is 2000 per ton, on average

3) 2 tons of cassava are used daily, (20 days per month)

4) 2 tons of cassava produce 500 kg or 250 bags containing 2kg

gari

Daily cost: $2000 \times 2 = 4000$

Cost per bag: $4000 - 250 = 16$

Peeling

assume: 1) rate of pay is N25 daily

2) 1 person peels 300kg in 8 hours

3) 2 tons peeled daily (yielding 500kg or
 250 kg bags of gari)

4) peelers are casual labour not salaried employees.

Daily Cost: $2000 - 300 \times 25 = 167$

approximately 170

Cost per bag: $170 - 250 \text{ bags} = .58$

ANNEX 4

GUIDE-LINES USED FOR THE COSTING OF GARI PRODUCTS IN UDI FACTORY

- 1.0 Peeling cost - based on 300kg per person on N40.00 daily pay.
- 2.0 Cassava cost - based on N2,000.00 per ton at 2 tons per day
- 3.0 Work-force cost - based on
 - (a) 2 factory operatives each on total pay of N40.00 per day (i.e. N30.00 basic and N10.00 transport allowance)
 - (b) 2 technicians each on total pay of N50.00 per day (N40.00 basic and N10.00 transport allowance).
 - (c) One factory supervisor on total pay of N55.00 per day (N45.00 basic and N10.00 transport allowance)
 - (d) 3 security personnel (one on day watch and 2 on night watch) each on total pay of N30.00 per day.
- 4.0 Rent on building and premises - based on chargeable amount of N18,000.00 p.a. i.e. N50.00 per day.
- 5.0 Electricity consumption - assumes that the consumption cost on lightings and 13A socket supply to heat-sealer is N3.00 per day.
- 6.0 Water - assumes water consumption of 100 litres per day for cassava washing etc. at N0.50 per litre.
- 7.0 Fuel - considers consumption of 5 litres of diesel fuel by the engine per day at N2.75 per litre.
- 8.0 Butane gas - based on daily consumption of 50kg at N2.00 per kg.
- 9.0 Lubricant - based on average expenditure of N5.00 per day.
- 10.0 Spare parts - based on average expenditure of N10.00 per day.
- 11.0 Insurance - based on insured value of N500,000 at N12.500 p.a. (i.e 2.5% or N34.00 per day).
- 12.0 Amotisation - based on a saving of N36,500 p.a. over 14 years period.
- 13.0 Stationery - assumes expenditure of about N300.00 per annum.
- 14.0 Contingencies - based on assumption of N700.00 p.a. expenditure on unforeseeable matters.
- 15.0 Packaging - assumes that the cost is (2kg bags) N3.00 per bag.

Packaging

- assume: 1) all gari produced will be packaged
 2) bags cost three [3] Naira each
 3) each bag will contain 2kg of gari
 4) 250 bags are produced daily

$$\text{Daily Cost: } 250 \times 3 = 750 = 3$$

Total Direct Cost per 2kg bag of gari 19.58

Approximately N20 per bag

At 5000 bags monthly, direct costs are approximately N100,000.00

PRELIMINARY COSTING ON UDI GARI PRODUCTION FACTORY

1.	Peeling cost	-	N280.00	per day
2.	Cassava cost	-	N4,000.00	" "
3.	Work force cost	-	325.00	" "
4.	Rent	-	50.00	" "
5.	Electricity	-	3.00	" "
6.	Water	-	5.00	" "
7.	Fuel	-	14.00	" "
8.	Gas	-	100.00	" "
9.	Lubricant	-	5.00	" "
10.	Spare parts	-	10.00	" "
11.	Insurance	-	34.00	" "
12.	Amotisation	-	100.00	" "
13.	Stationery	-	1.00	" "
14.	Contingencies	-	2.00	" "
15.	Packaging (2kg bags)	-	750.00	" "
	Production cost (with packaging)	-	5,679.00	" "
	Production cost (without packaging)	-	4,929.00	" "
	Production cost per 2kg pack (with packaging)		22.72	
	Production cost per 2 kg pack (without packaging)	-	19.72	
	Selling price ex-factory per 2kg	-	25.00 (with packaging)	
	" " " " "	-	22.00 " "	
	Suggested super-market price per 2kg bag	-	26.00	

ANNEX 5

UNIDO PROJECT NO. TF/RAF/87/906

EVALUATION OF CASSAVA PROCESSING LECTURE/DEMONSTRATION/PRACTICALS
FOR GARI

UDI, ENUGU - NIGERIA

31ST JANUARY, 1994

TOPICS	C O L U M N S					
	EXCELLENT	VERY GOOD	GOOD	FAIRLY GOOD	POOR	VERY POOR
1. Use and processing with grating machine	x					
2. Use and processing with screw press		x				
3. Use and processing with garifryer/dryer			x			
4. Use and processing with the sifter		x				
5. Use and kprocessing with milling machine				x		
6. Discussion and practice of gari processing		x				
7. Safety precautions for staff				x		
8. Assessment of the gari produced		x				
9. Score your ability to operate the cassava processing equipment		x				
10. Your Over-all assessment of the training		x				

ANNEX 6

UNIDO PROJECT NO. TF/RAF/87/906

CASSAVA PROCESSING EQUIPMENT

EVALUATION OF ENGINEERING LECTURES/DEMONSTRATIONS

UDI - ENUGU STATE
NIGERIA.

31ST JANUARY, 1994

TOPICS	APPRAISAL (Mark 'X' at appropriate column)					
	EXCELLENT	VERY GOOD	GOOD	FAIRLY GOOD	POOR	VERY POOR
1. Installation methods for the gari processing machines	x					
2. Operating procedures for the equipment	x					
3. Discussions on how to carry out routine maintenance of the equipment		x				
4. How to run and maintain the diesel engine	x					
5. Discussions on major spare parts required and how to keep them			x			
6. Trouble-shooting likely when running the equipment and how to tackle them	x					
7. Overall assessment.			x			