

CORRIGENDUM No: 1

to the

TENDER DOSSIER

Publication Ref: EuropeAid/135517/IH/WKS/NG

Subject: Construction of Basic Rural Infrastructure in the Nine Niger Delta States (NDSP 4)

The tender dossier is corrected or modified as follows:

Point n°1: COVER PAGE

Instead of:



NIGERIA – EUROPEAN UNION COOPERATION



FEDERAL REPUBLIC OF NIGERIA
NATIONAL PLANNING COMMISSION
INTERNATIONAL COOPERATION DEPARTMENT

CONSTRUCTION OF BASIC RURAL INFRASTRUCTURES IN THE NINE NIGER DELTA STATES OF NIGERIA

TENDER DOSSIER OPEN PROCEDURE

LETTER OF INVITATION TO TENDER

VOLUME 1 – SECTION 1 - 5

Publication reference: EuropeAid/135517/IH/WKS/NG

Financing: European Development Fund
Financing Agreement: N° NG/FED/022-910)

JUNE, 2015

Read:



NIGERIA – EUROPEAN UNION COOPERATION



FEDERAL REPUBLIC OF NIGERIA
MINISTRY OF BUDGET & NATIONAL PLANNING
INTERNATIONAL COOPERATION DEPARTMENT

CONSTRUCTION OF BASIC RURAL INFRASTRUCTURE IN THE NINE NIGER DELTA STATES OF NIGERIA

TENDER DOSSIER OPEN PROCEDURE

LETTER OF INVITATION TO TENDER

VOLUME 1 – SECTION 1 - 5

Publication reference: EuropeAid/135517/IH/WKS/NG

Financing: European Development Fund
Financing Agreement: N° NG/FED/022-910)

JUNE, 2015

Point n°2: INSTRUCTIONS TO TENDERERS

Instead of:

1. GENERAL INSTRUCTIONS

1.2 Timetable:

	DATE	TIME*
Clarification meeting	August 11, 2015	10:00 a.m.
Site visit	August 12-13, 2015	09:00 a.m.
Deadline for requesting any additional information from the Contracting Authority	January 26, 2016	4:00 p.m.
Last date on which additional information are issued by the Contracting Authority	February 05, 2016	-
Deadline for submitting of tenders	February 16, 2016	09:00 a.m.
Tender opening session	February 16, 2016	10:00 a.m.
Notification of award to the successful tenderer	April 05, 2016^³	-
Signature of the contract	May 5, 2016^³	-

* All times are in the time zone of the Federal Republic of Nigeria

^³ Provisional date

Read:

1.2 Timetable:

	DATE	TIME*
Clarification meeting	August 11, 2015	10:00 a.m.
Site visit	August 12-13, 2015	09:00 a.m.
Deadline for requesting any additional information from the Contracting Authority	March 14, 2016	4:00 p.m.
Last date on which additional information are issued by the Contracting Authority	March 24, 2016	-
Deadline for submitting of tenders	April 4, 2016	10:00 a.m.
Tender opening session	April 4, 2016	11:00 a.m.
Notification of award to the successful tenderer	May 13, 2016^³	-
Signature of the contract	June 4, 2016^³	-

* All times are in the time zone of the Federal Republic of Nigeria

^³ Provisional date

Point n°3: EXPLANATIONS CONCERNING TENDER DOCUMENTS

Instead of:

- 8.1. Tenderers may submit questions in writing up to 21 days before the deadline for submission of tenders, specifying the publication reference and the contract title to:

Mr. O. T. Shogbuyi
Director International Cooperation Department
National Planning Commission (NPC); 2nd floor; Room 202
Plot 421, Constitution Avenue, Central Business District,
Abuja, Nigeria

olashogbuyi@yahoo.co.uk, oladi.shogbuyi@nationalplanning.gov.ng,
ijebusomma35@yahoo.com

And a copy sent to:

The Head of Delegation
Delegation of the European Union to Nigeria
21st Crescent, off Constitution Avenue
Central business District
Abuja, Nigeria

Attn: Mr Klaus GAUTSCH/Mr Temitayo OMOLE
delegation-nigeria@ec.europa.eu

Read:

- 8.1. Tenderers may submit questions in writing up to 21 days before the deadline for submission of tenders, specifying the publication reference and the contract title to:

Mr. Samuel Eloho
Director International Cooperation Department
Ministry of Budget and National Planning (MBNP); 2nd floor; Room 202
Plot 421, Constitution Avenue, Central Business District,
Abuja, Nigeria

Sam_uye@yahoo.com; ijebusomma35@yahoo.com, opa.lanre@gmail.com

And a copy sent to:

The Head of Delegation
Delegation of the European Union to Nigeria
21st Crescent, off Constitution Avenue
Central business District
Abuja, Nigeria

Attn: Mr Jens HOEGEL/Mr Temitayo OMOLE
delegation-nigeria@ec.europa.eu

Point n°4: SUBMISSION OF TENDERS

Instead of:

- 17.1. All tenders must be received by the Contracting Authority before the deadline set in point 19 of the Contract Notice, by registered letter with acknowledgement of receipt or hand-delivered against receipt signed by the Director or its representative.

The tender must be sent to the following address:
Director International Cooperation Department
National Planning Commission (NPC)
2nd Floor, Room 202
Plot 421, Constitution Avenue,
Central Business District,
Abuja, Nigeria

If tenders are hand delivered they should be delivered to the same address as above.

The **National Planning** Commission is open from 8.30am – 4 pm Monday to Friday, except on National Public holidays.

Read:

- 17.1. All tenders must be received by the Contracting Authority before the deadline set in point 19 of the Contract Notice, by registered letter with acknowledgement of receipt or hand-delivered against receipt signed by the Director or its representative.

The tender must be sent to the following address:
Director International Cooperation Department

Ministry of Budget and National Planning (MBNP)
2nd Floor, Room 202
Plot 421, Constitution Avenue,
Central Business District,
Abuja, Nigeria

If tenders are hand delivered they should be delivered to the same address as above.

The **Ministry of Budget and National Planning** is open from 8.30am – 4 pm Monday to Friday, except on National Public holidays.

Point n°5: APPENDIX TO TENDER FOR A WORKS CONTRACT

Instead of:

	Subclauses of General Conditions or Special Conditions	
Name and address of the Contracting Authority.	To be completed by the Contracting Authority	National Authorising Officer Hon. Minister for National Planning Commission, Ministry of National Planning Commission 4 th Floor, Plot 421, Constitution Avenue Central Business District Abuja FCT Nigeria
Name and address of the tenderer	To be completed by the tenderer	

Name and address of the representative of the Contracting Authority.	To be completed by the Contracting Authority	Director, International Cooperation Department, Room 202 Second floor, National Planning Commission , Plot 421, Constitution Avenue, Central Business District, Abuja, Nigeria
Financing authority	To be completed by the Contracting Authority	The Head of Delegation, Delegation of the European Union to Nigeria, 21 st Crescent, off Constitution Avenue, Central business District Abuja, Nigeria
Deadline for notice to commence	Article 33.2	Not later than 180 days following notification of award
Period of Implementation	Article 34	15 Months
Currency	Article 44.1	The currency of tender and payment is Naira
Law of the contract	Article 2.1	Law of Nigeria
Language of the contract	Article 2.3	English
	Subclauses of General Conditions or Special Conditions	
Language for communication	Article 2.3	English
Period of access to the site	Article 9.1	For the period of performance
Amount of performance guarantee	Article 15.1	10% of the amount of the contract
Deadline for submitting of programme	Article 17.1	Within 30 days of the notification of the award of contract
Normal working hours	Article 14.2	Law of Nigeria
Period after the effective date during which the Contracting Authority's representative must issue notice to commence the works	Article 33.12	Not later than 180 days following notification of award

Liquidated damages for the works	Article 36.1	0.1% of the contract price per day
Limit of liquidated damages for delays	Article 36.1	10% of the contract price
Percentage of retention monies	Article 47.1 & 2	10% of the amount due on interim payments, to a maximum of 10% of the contract price or an acceptable retention guarantee.
Minimum amount of interim payment certificates	Article 50.7	No minimum amount but frequency limited to one per month
Percentage for adjustment of provisional sums	Not Applicable	Not Applicable
Amount of insurance for design	Not Applicable	Not Applicable
Amount of third-party insurance	Article 16.4	₦1,000,000 per accident with the number of occurrences unlimited
Periods for submitting of insurance	Article 16.5	Within 30 days of the notification of award of contract

Read:

	Subclauses of General Conditions or Special Conditions	
Name and address of the Contracting Authority.	To be completed by the Contracting Authority	National Authorising Officer Hon. Minister for Budget and National Planning, Ministry of Budget and National Planning 4 th Floor, Plot 421, Constitution Avenue Central Business District Abuja FCT Nigeria
Name and address of the tenderer	To be completed by the tenderer	
Name and address of the representative of the Contracting Authority.	To be completed by the Contracting Authority	Director, International Cooperation Department, Room 202 Second floor, Ministry of Budget and National Planning , Plot 421, Constitution Avenue, Central Business District, Abuja, Nigeria

Financing authority	To be completed by the Contracting Authority	The Head of Delegation, Delegation of the European Union to Nigeria, 21 st Crescent, off Constitution Avenue, Central business District Abuja, Nigeria
Deadline for notice to commence	Article 33.2	Not later than 180 days following notification of award
Period of Implementation	Article 34	15 Months
Currency	Article 44.1	The currency of tender and payment is Naira
Law of the contract	Article 2.1	Law of Nigeria
Language of the contract	Article 2.3	English
	Subclauses of General Conditions or Special Conditions	
Language for communication	Article 2.3	English
Period of access to the site	Article 9.1	For the period of performance
Amount of performance guarantee	Article 15.1	10% of the amount of the contract
Deadline for submitting of programme	Article 17.1	Within 30 days of the notification of the award of contract
Normal working hours	Article 14.2	Law of Nigeria
Period after the effective date during which the Contracting Authority's representative must issue notice to commence the works	Article 33.12	Not later than 180 days following notification of award
Liquidated damages for the works	Article 36.1	0.1% of the contract price per day
Limit of liquidated damages for delays	Article 36.1	10% of the contract price

Percentage of retention monies	Article 47.1 & 2	10% of the amount due on interim payments, to a maximum of 10% of the contract price <u>or</u> an acceptable retention guarantee.
Minimum amount of interim payment certificates	Article 50.7	No minimum amount but frequency limited to one per month
Percentage for adjustment of provisional sums	Not Applicable	Not Applicable
Amount of insurance for design	Not Applicable	Not Applicable
Amount of third-party insurance	Article 16.4	₦1,000,000 per accident with the number of occurrences unlimited
Periods for submitting of insurance	Article 16.5	Within 30 days of the notification of award of contract

Point n^o6: TENDER GUARANTEE FORM

Instead of:

For the attention of:

**National Authorizing Officer/Hon. Minister of National Planning Commission (NPC)
Plot 421, Constitution Avenue, Central Business District,
Abuja, Nigeria**

Read:

For the attention of:

**National Authorizing Officer/Hon. Minister of Budget and National Planning
Plot 421, Constitution Avenue, Central Business District,
Abuja, Nigeria**

Point n^o7: VOLUME 3: TECHNICAL SPECIFICATION

Instead of:

SECTION 13: AGRO-PROCESSING EQUIPMENT

The contractor handling this lot shall be responsible for the supply and installation of Agro Processing Equipment. This includes all unidentified items necessary for complete installation and functioning of the equipment.

The price includes the machines and other accessories that are required for functional installation that is not mention in the technical specification.

Price is per unit set of equipments installed.

1 13.1 CASSAVA MILL PROCESSING

The cassava processing mill shall consist of the following machines;

13.1.1 Cassava Grater

Stainless steel grater machine carried on steel frame to give clearance from the ground to enhance collection of grated cassava.

Characteristics:

Capacity: 1000kg of tubers/hour
Power Source: 5 HP Electric motor
Installation: requires concrete base of 100mm thickness, 200cm x 100cm wide.
Size/Dimension: 140cm x 76cm
Weight: 75kg
Status: Non moveable
Make: NOVA Technologies (Nig) Ltd or similar

13.1.2 Screw Press

Hand operated heavy duty mild steel construction. Dewatering drum with water tray complete with standard accessories

Characteristics:

Capacity: 100kgs/ batch
Installation: place on the floor, no special requirement for the machine
Status: moveable machine
Make: NOVA Technologies (Nig) or similar

13.1.3 Hydraulic press

Hydraulic/ manual pump operated machine for dewatering of Cassava pulp, complete with water tray and accessories.

Characteristics:

Capacity: 100 – 250kg/batch
Installation: requires a concrete base of 100mm thickness, 240cm by 170cm wide.
Size/dimension: 200cm x 150cm x 100cm
Weight: 120kg
Status: non moveable machine
Make: NOVA Technologies (Nig) Ltd or similar

13.1.4 Fryers

2mm thick stainless steel frying pan, suitable for manual fire wood/gas use with long frying spoon of same quality of material and properties.

Characteristics:

Capacity: 50kg/hour
Fryer Size: 120cm x 180cm x 10cm
Weight: 7.5 kg
Power source: Charcoal or Agro waste
Make: NOVA Technologies (Nig) Ltd or similar

Frying oven

U-shape structure with the open end left for firing the oven built to the exact size of the frying pan. The oven shall be constructed as follows;

- Full masonry cement stabilized laterite blocks of 150mm x 300mm x 150mm
- Cement stabilized lateritic morta for block work
- Flooring in smoothened with a curveture to hold fire ambres

- Finishing with cement stabilized lateritic plaster externally
- Installation of heat vent of 150mm cement fibre pipe and chimney from oven to above roof top.

13.1.5 Sifter

Device for sifting of grated Cassava before frying.

Characteristics:

Capacity: 50kg/hour
 Size/dimension: 200cm x 200cm x 200cm
 Weight: 25kg
 Status: movable machine
 Power source: 3 HP Electric motor
 Make: NOVA Technologies (Nig) Ltd or similar

13.1.6 Power Engine

Generator to supply Electric power to grater and sifter motors.

Power source: Diesel powered
 Capacity: 8 HP
 Make: Lister engine or similar
 Installation shall be on 100mm thick reinforced concrete base of 1200mm x 1200mm dimension.

2 13.2 OIL MILL PROCESSING

The Palm oil processing mill shall consist of the following machines;

13.2.1 Bunch Stripper

Steel constructed machine used for removal of palm fruits from bunches and operated by electric motor and carried on steel frame or legs.

Characteristics:

Capacity: 500kg of bunches/hour
 Installation: Requires 100mm reinforced concrete base to the size of machine base and clearance of 300mm around machine base
 Size/dimension: 180cm x 180cm x 140cm
 Weight: 130kg
 Status: non movable machine
 Power source: 7.5 Electric motor
 Make: NOVA Technologies (Nig) Ltd or similar

13.2.2 Steam Boiler

Steel constructed device for heating palm fruits soft for easy digesting.

Characteristics:

Capacity: 1000kg of fruits/batch
 Power source: Charcoal or Agro waste
 Size/dimension: 200cm x 120cm
 Weight: 10kg
 Installation: requires 100mm thick concrete base to size not less than 300 clearance of machine base
 Status: non moveable device
 Make: NOVA Technologies (Nig) Ltd or similar

13.2.3 Digester

Machine for releasing the palm oil in the fruit through the rupture or breaking down of the oil bearing cells. It consists of rotator beater arms that pound fruits' outer covering to release oil.

Characteristics:

Capacity:	1000kg of fresh fruits/hour
Installation:	requires 100mm reinforce concrete base to the size of machine base and with clearance of 300mm around machine.
Power source:	8 HP Electric motor
Size/dimension:	100cm x 160cm x 100cm
Weight:	125kg
Status:	Non moveable machine
Make:	NOVA Technologies (Nig) Ltd or similar

13.2.4 Screw Press

Steel constructed device (manually operated) for separation of fibre and kernel from the liquid sludge from the digester, consisting of perforated chamber and for retaining the solid waste and a pressure lid where pressure is applied.

Characteristics:

Capacity:	75 litres/batch
Installation:	no special requirements
Status:	movable machine
Make:	NOVA Technologies (Nig) Ltd or similar

13.2.5 Hydraulic Press

Steel constructed device (manually/hydraulic operated) for separation of fibre and kernel from the liquid sludge from the digester, consisting of perforated chamber and for retaining the solid waste and a pressure lid where pressure is applied.

Characteristics:

Capacity:	200 litres/batch
Size/dimension:	100cm x 160cm x 100cm
Weight:	125kg
Installation:	requires 100mm reinforced concrete base 200cm x 120cm size.
Status:	movable machine
Make:	NOVA Technologies (Nig) Ltd or similar

13.2.6 Oil Clarifier

Machine for separation of Palm Oil from the sludge which consists of palm oil, water, cell debris and non oil solids

Characteristics:

Capacity:	100 litres/batch of Palm Oil
Size/dimension:	100cm x 160cm x 100cm
Weight:	10kg
Installation:	no special requirements
Power Source:	Charcoal or Agro waste
Status:	Movable machine
Make:	NOVA Technologies (nig) Ltd or similar

13.2.7 Kernel Cracker/Separator

Machine for separation of kernel from fibre and other solid residues of the milling process. The machine is mounted on steel stands and powered by Petrol engine.

Characteristics:

Capacity: 100kg/hr
Power source: 5 HP Petrol Engine
Size/dimension: 100cm x 100cm
Weight: 7.5kg
Installation: no special requirement
Status: moveable machine
Make: NOVA Technologies (Nig) Ltd or similar

13.2.8 POWER ENGINE

Generator to supply Electric power to Bunch Stripper, Digester and Kernel Cracker motors.

Power source: Diesel powered
Capacity: 20HP
Make: Lister engine or similar

Installation shall be on 100mm thick reinforced concrete base of 1200 x 1200mm dimension

Read:

SECTION 13: AGRO-PROCESSING EQUIPMENT

The contractor handling this lot shall be responsible for the supply, delivery, installation and commissioning of Agro Processing Equipment. This includes at least a 2-year stock of fast moving spares as well as training of users and all other unidentified items necessary for complete installation and functioning of the equipment.

The tender price includes the machines and other accessories that are required for functional installation that is not mentioned in the technical specification.

General requirements

1. The machines have to be constructed in conformity with Nigerian safety standards and regulations or higher for mechanical and electric parts;
2. All hot surfaces must be insulated to avoid harming the operators;
3. Rotating parts must be protected accurately against accidental access;
4. Sharp edges have to be avoided;
5. It is a requirement for the Supplier to provide full technical documentation, including shop drawings of the equipment, detailed design of the fixing points to the basements if needed, user points for electric power, water, other auxiliaries where needed;
6. Complete manual handbook for machine operation and maintenance in English language;
7. The machine technical specifications describing the minimum quantity, and quality equipment requirements envisaged to achieve the required production of 500 kg per day of finished cassava Garri and 400 lt per day of Crude Palm Oil. The Supplier is fully responsible for all eventual improvements that might be needed. It is the Supplier's responsibility to provide the equipment suitable for the stated conditions both in technical and economical terms.

8. Some of the machines might be installed on existing concrete basements whose dimensions are indicated in the specifications. The Contractor will check the technical and dimensional suitability of the basements before installing the equipment and He is responsible for correct coupling and functioning of the equipment He has supplied.

13.1 CASSAVA PROCESSING MILL

The equipment described below and object of these works is aimed at producing 500 kg per day of cassava Gari, on a 8 hours basis.

Garri is a creamy-white, granular flour with a slightly fermented flavor and a slightly sour taste made from fermented, gelatinized fresh cassava tubers. It is commonly consumed either by being soaked in cold water with sugar, coconut, roasted groundnuts, dry fish, or boiled cowpea as complements or as a paste made with hot water and eaten with vegetable sauce. When properly stored, it has a shelf-life of six months or more.

Process description

The Cassava processing Mill is a discontinuous plant, manually operated with the use of motorised equipment.

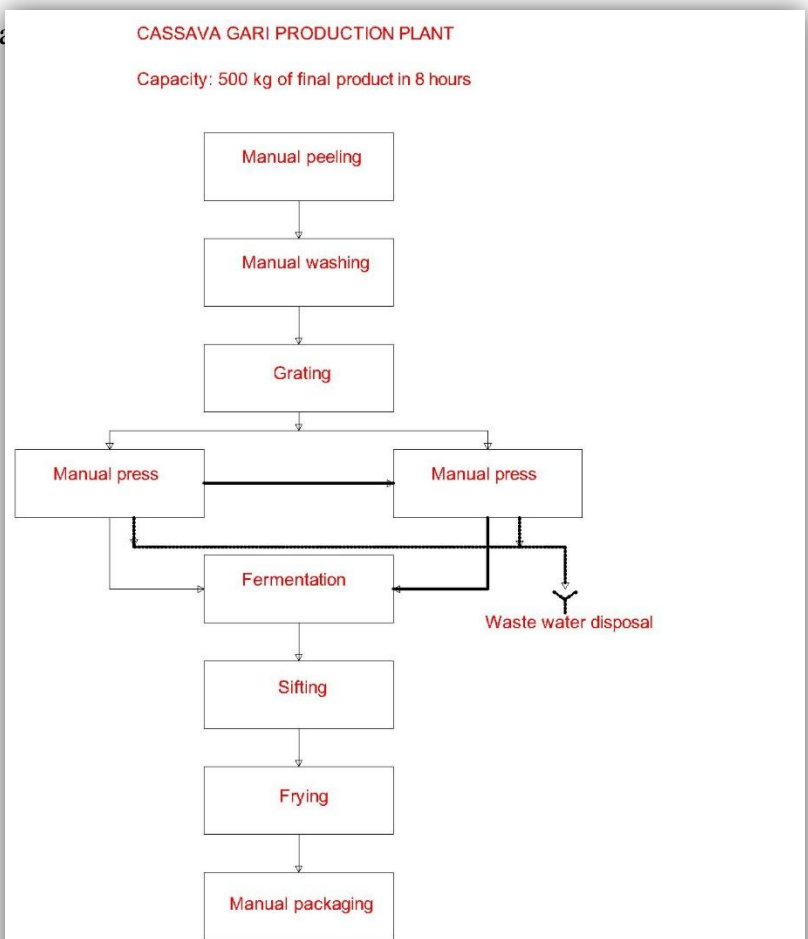
Principles of preservation and processing of cassava

Cassava is fermented to remove cyanide and produce the desirable flavors. It is then roasted, to destroy enzymes and microorganisms, to drive off cyanide gas, and to dry the product. Preservation is achieved

by heating during roasting. A low moisture content inhibits recontamination by bacteria. Proper packaging is needed, especially in areas of high humidity, to retain the low moisture content.

Raw material

Fresh cassava



deterioration and loss of quality in Garri.

Hygiene

Hygienic practices, should ensure minimal contamination. All waste materials from the process should be removed from the site as they are produced to avoid the risk of cross-contamination.

Process control

Normally, peeling and washing is

carried out manually by the family members at home who then take the peeled tubers (in batches) to the plant for further processing. These preparing operations should be carried out thoroughly to avoid contamination of the final product with peel, sand, and so on.

At the Mill the cassava is grated and dewatered through a press. The liquid pressed is controlled as too much liquid pressed will lead to gelatinization of starch during subsequent roasting. The ideal moisture content is 47-50 %, and this is assessed visually by experienced garri producers. The pressed cassava is then fermented in a dedicated area inside the Mill. Fermentation is monitored and properly controlled, as too short a period will result in incomplete detoxification and a bland product. Too long a period will give the product a strong sour taste. Both over- and underfermentation also badly affect the texture of the final garri.

Sieving is important to obtain a high-quality product, free of fibrous contaminants and with similar-sized granules. The granules are roasted to about 80 °C/175 °F to achieve partial gelatinization of the starch. If lower temperatures are used, the product simply dries and produces a dry white powder. Too high a temperature will cause charring of the product and make it stick to the roasting pan.

Packaging and storage

The product is hygroscopic (it absorbs moisture from the air) and should be packed in airtight and moisture-proof bags, especially in areas of high humidity, to prevent mold growth.

The equipment that this Tender is going to provide will be used by Nigerian communities in 8 states to enable the families to produce garri mostly for their consumption. The selection of the equipment has been made on the basis of several considerations:

- Provide the largest possible social impact within the limits of the available resources, to alleviate poverty of the local population;
- Increase the women participation to the economic development of the community by keeping a low degree of mechanisation;
- Supply the appropriate equipment in terms of technical available skills in order to ensure the sustainability of the plants.

In these Tender documents the required equipment will also take care of ensuring better performance when compared the existing cassava mills. These new advantages can be summed up as follows:

- Increased hygienic conditions obtained by making floors cleanable and washable;
- Increased safety for the operators by providing only electrical motors, imposing protection guards to mechanical parts that may be injurious to operators;
- Decreasing noise pollution by isolating the power generator and placing it in a separated room;
- Re-designing the machinery layout to keep the production flow linear from one end to the other, thus reducing potential contamination of finished product caused by the contact with raw tubers; and
- Reduce product contamination by restricting access to the production hall of the operators and providing means to clean hands, feet and shoes before entering the production hall

Some of the machines and in particular, the cassava grater, manual press, hydraulic press and power generator have to be installed on existing concrete basements whose dimensions are indicated in the specifications. The Contractor will check the technical and dimensional suitability of the basements for installed equipment and he is responsible for correct coupling and functioning of the equipment he has supplied.

The cassava processing mill shall consist of the machines described below.

13.1.1 N° 1 Cassava Grater

The grater grinds cassava tubers into pulp and granulates pressed lump material. The grater consists of a grating drum (an electric motor-driven steel granular cylinder), feeding hopper, drum housing with outlet for cassava, steel frame, and supporting legs for fixing to the floor. The outlet product height is approximately 300 mm to allow collection of grated product.

All parts in contact with the product have to be in stainless steel.

Specifications

Capacity: 500 kg/hour

Power Source: 5 kW Electric motor, 380 V, 50 Hz, 3 phases

Installation: It must fit on reinforced concrete base of 200 mm thickness, 200 cm x 100 cm wide.

13.1.2 N° 1 Screw Press (Manual Press)

This equipment is designed to extract water from a batch of fresh cassava by turning a screw rod manually and pressing. The machine is made of:

- Supporting structure of painted carbon steel provided of legs and supporting feet able to resist to a load of 20 metric tons (MT) with certification from an accredited laboratory. Test load 20 Tons.
- Water collecting tray, discharge height approx. 300 mm
- Reinforced pressing rod with crank
- Reinforced pressing plate

Specifications

Capacity: 100 / 150 kg/ batch

Installation: requires a reinforced concrete base of 200 mm thickness, 170 cm by 170 cm wide.

13. N° 1 Hydraulic press

The Hydraulic press is machine operated by a hydraulic/ manual pump for dewatering of Cassava pulp, complete with a water tray and accessories. This equipment is designed to extract water from a batch of fresh cassava by means of a manually actuated hydraulic jacket. The machine is made of:

- Supporting structure of painted carbon steel provided with legs and supporting feet able to resist to a load of 30 MT with certification from an accredited laboratory.
 - Operating load 30 Tons.
 - Test load 40 Tons.
- Hydraulic heavy duty cylinder manually actuated. The hydraulic device has to be able to provide the adequate load and stroke. It must be designed to resist to heavy duty and continuous operations.
- Water collecting pane, discharge height approx. 600 mm
- Reinforced pressing plate

Specifications

Capacity: 100 – 300 kg/batch

Installation: requires a reinforced concrete base of 200 mm thickness, 170 cm by 170 cm wide.

13.1.4 N° 2 Fryers

Stainless steel frying pans 3 mm thick, suitable for manual fire wood/gas use with long frying spoon of same quality of material and properties.

Main features:

Capacity: 50 kg /h, adequate to provide the desired capacity of the plant
Fryer Size: 120 cm x 180 cm x10 cm approximately
Power source: Charcoal or Agro waste

The equipment is made of the following components:

Frying oven

Appropriate structure with the open end left for firing the oven built to the size of the frying pan. The oven shall be constructed as follows;

- Full masonry cement stabilized laterite blocks of suitable dimensions or equivalent material
- Cement stabilized lateritic morta for block work
- Flooring in smoothened with a curveture to hold fire ambres
- Finising with cement stabilized lateritic plaster externally
- Installation of heat vent of 150 mm cement fibre pipe and chimney from oven to above roof top.

13.1.5 N° 1 Sifter

A sifter is a device for sifting of grated Cassava before frying. All parts in contact with the mill product in stainless steel. A Sifter is composed of:

- Main carbon steel frame
- Vibrating table
- Discharge hopper
- Electric motor

Specifications

Capacity: 50 kg /h, adequate to provide the desired capacity
Overall imensions: 200 cm x 200 cm x 100 cm approximately
Power source: On board electric motor 2,2 kW, 380 V, 50 Hz, 3 phases

13.1.6 Power Engine

Electric power generator able to supply the grater and sifter motors thorough a main panel switch board. It is complete of:

- Supporting structure with antivibration feet
- Diesel engine
- Alternator 380 V, 50 Hz, 3 phases

Power source: Diesel powered
Capacity: 20 HP minimum
Alternator size: 15 KVA

Installation shall be on 20 cm thick reinforced concrete base of 120 cm x 120 cm dimension. The generator has to be installed in a closed separate room to reduce the noise in the working area. The Contractor is fully responsible for the selection, supply, delivery and the installation of the power generator in accordance with the technical specifications of the equipment he is going to deliver.

13.1.7 Main switch board

Power switch board for the power supply of the electric motors of the equipment. The power can be provided through the national electric main line and/or the power generator.

Case of coated galvanised carbon steel, it is provided of:

- Main ON/OFF power switch

- Manual switch Main Line/Power generator
- Warning light
- Main START/STOP switches for the electric motors complete with STAR/TRIANGLE start sequence, motors protection, earthing line
- At least 3 more spare START/STOP switches for additional equipment maximum 10 kW load
- Supporting legs for placement on the floor
- Cables for the connection of the electric motors. The cables must be provided in accordance with existing Nigerian national regulations or higher, consistent with their use and functions. Their section and insulation power must be consistent with regulations. An earthing cable must also be provided.

13.2 OIL MILL PROCESSING

The equipment described below and objective of these works is aimed at producing 400 l per day of Crude Palm Oil (CPO) on a 8 hours basis. It is a discontinuous plant, manually operated with the use of motorised equipment.

General processing description

Research and development work in many disciplines - biochemistry, chemical and mechanical engineering - and the establishment of plantations, which provided the opportunity for large-scale fully mechanised processing, resulted in the evolution of a sequence of processing steps designed to extract, from a harvested oil palm bunch, a high yield of a product of acceptable quality for the international edible oil trade. The oil winning process, in summary, involves the reception of fresh fruit bunches from the plantations, sterilizing and threshing of the bunches to free the palm fruit, mashing the fruit and pressing out the crude palm oil. The crude oil is further treated to purify and dry it for storage and export.

Large-scale plants, featuring all stages required to produce palm oil to international standards, are generally handling from 3 to 60 tonnes of FFB/hr. The large installations have mechanical handling systems (bucket and screw conveyers, pumps and pipelines) and operate continuously, depending on the availability of FFB. Boilers, fuelled by fibre and shell, produce superheated steam, used to generate electricity through turbine generators. The lower pressure steam from the turbine is used for heating purposes throughout the factory. Most processing operations are automatically controlled and routine sampling and analysis by process control laboratories ensure smooth, efficient operation. Although such large installations are capital intensive, extraction rates of **23 - 24** percent palm oil per bunch can be achieved from good quality Tenera.

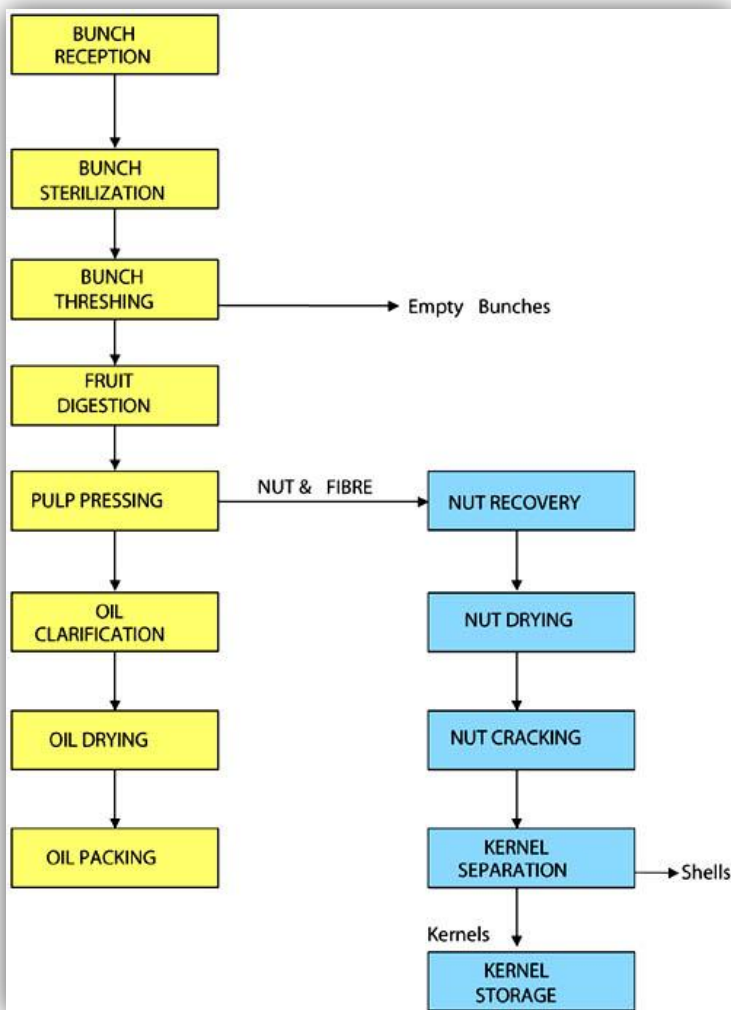
Conversion of crude palm oil to refined oil involves removal of the products of hydrolysis and oxidation, colour and flavour. After refining, the oil may be separated (fractionated) into liquid and solid phases by thermo-mechanical means (controlled cooling, crystallization, and filtering), and the liquid fraction (olein) is used extensively as a liquid cooking oil in tropical climates, competing successfully with the more expensive groundnut, corn, and sunflower oils.

Extraction of oil from the palm kernels is generally separate from palm oil extraction, and will often be carried out in mills that process other oilseeds (such as groundnuts, rapeseed, cottonseed, shea nuts or copra). The stages in this process comprise grinding the kernels into small particles, heating (cooking), and extracting the oil using an oilseed expeller or petroleum-derived solvent. The oil then requires clarification in a filter press or by sedimentation. Extraction is a well-established industry, with large numbers of international manufacturers able to offer equipment that can process from 10 kg to several tonnes per hour.

Alongside the development of these large-scale fully mechanised oil palm mills and their installation in plantations supplying the international edible oil refining industry, small-scale village and artisanal processing has continued in Africa. Ventures range in throughput from a few hundred kilograms up to 8 tonnes FFB per day and supply crude oil to the domestic market.

Efforts to mechanise and improve traditional manual procedures have been undertaken by research bodies, development agencies, and private sector engineering companies, but these activities have been piecemeal and uncoordinated¹. They have generally concentrated on removing the tedium and drudgery from the mashing or pounding stage (digestion), and improving the efficiency of oil extraction. Small mechanical, motorised digesters (mainly scaled-down but unheated versions of the large-scale units described above), have been developed in most oil palm cultivating African countries.

Palm oil processors of all sizes go through these unit operational stages. They differ in the level of mechanisation of each unit operation and the interconnecting materials transfer mechanisms that make the system batch or continuous. The scale of operations differs at the level of process and product quality control that may be achieved by the method of mechanisation adopted. The general flow diagram is represented in the figure aside.



Harvesting technique and handling effects

In the early stages of fruit formation, the oil content of the fruit is very low. As the fruit approaches maturity the formation of oil increases rapidly to about 50 percent of mesocarp weigh. In a fresh ripe, unbruised fruit the free fatty acid (FFA) content of the oil is below 0,3 percent. However, in the ripe fruit the exocarp becomes soft and is more easily attacked by lipolytic enzymes, especially at the base when the fruit becomes detached from the bunch. The enzymatic attack results in an increase in the FFA of the oil through hydrolysis. Research has shown that if the fruit is bruised, the FFA in the damaged part of the fruit increases rapidly to 60 percent in an hour. There is therefore great variation in the composition and quality within the bunch, depending on how much the bunch has been bruised.

Harvesting involves the cutting of the bunch from the tree and allowing it to fall to the ground by gravity. Fruits may be damaged in the process of pruning palm fronds to expose the bunch base to facilitate bunch cutting. As the bunch (weighing about 25 kg) falls to the ground

¹ Source: FAO

the impact bruises the fruit. During loading and unloading of bunches into and out of transport containers there are further opportunities for the fruit to be bruised.

In Africa most bunches are conveyed to the processing site in baskets carried on the head. To dismount the load, the tendency is to dump contents of the basket onto the ground. This results in more bruises. Sometimes trucks and push carts, unable to set bunch down gently, convey the cargo from the villages to the processing site. Again, tumbling the fruit bunches from the carriers is rough, resulting in bruising of the soft exocarp. In any case care should be exercised in handling the fruit to avoid excessive bruising.

One answer to the many ways in which harvesting, transportation and handling of bunches can cause fruit to be damaged is to process the fruit as early as possible after harvest, say within 48 hours.

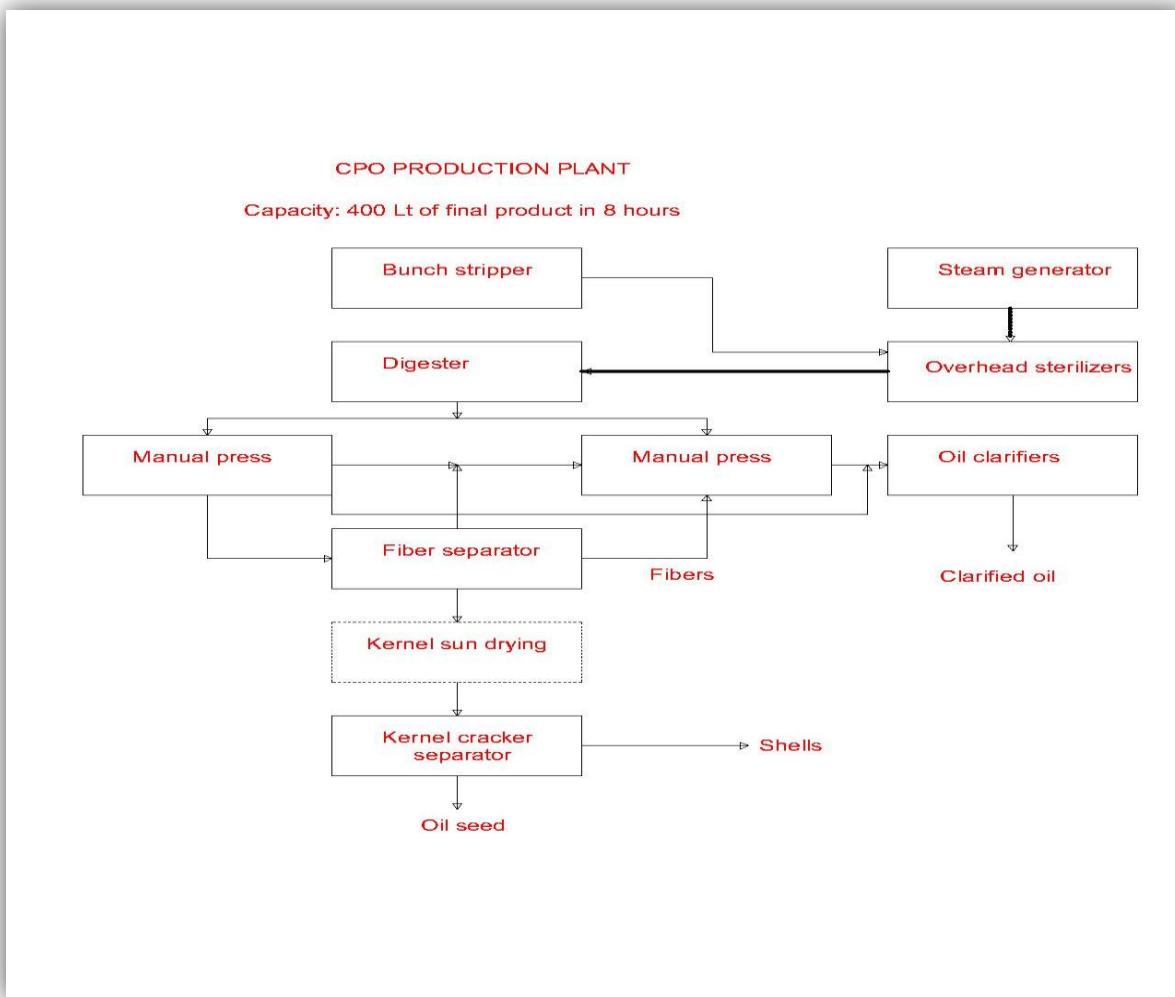
However the author believes it is better to leave the fruit to ferment for a few days before processing. Connoisseurs of good edible palm oil know that the increased FFA only adds 'bite' to the oil flavour. At worst, the high FFA content oil has good laxative effects. The free fatty acid content is not a quality issue for those who consume the crude oil directly, although it is for oil refiners, who have a problem with neutralization of high FFA content palm oil (Source: FAO <http://www.fao.org/docrep/005/y4355e/y4355e04.htm#bm04.1>)

The equipment that this Tender is going to provide will be used by Nigerian communities in 8 states to enable the families to produce CPO mostly for their consumption. The selection of the equipment has been made on the basis of several considerations:

- Provide the largest possible social impact within the limits of the available resources, to alleviate poverty of the local population
- Increase the women participation to the economic development of the community by keeping a low degree of mechanisation
- Supply the appropriate equipment in terms of technical available skills in order to ensure the sustainability of the plants

On the basis of the aforementioned criteria, the following self-explanatory production flow diagram has been selected.

Selected production flow diagram



In these Tender documents the required equipment

will also take care of ensuring better performance

when compared to the existing rural oil mills in Nigeria. These new advantages can be resumed as follows:

- Increased hygienic conditions obtained by making floors cleanable and washable, segregating devices which need to be heated with charcoal or agrowaste (steam generator and oil clarifiers) outside the production areas
- Increased safety for the operators by providing only electrical motors, imposing protection guards to injuring mechanical parts
- Decreasing noise pollution by placing the power generator in a separated room
- Re-designing the machinery layout to keep the production flow linear from one end to the other, thus reducing potential contamination of finished product caused by the contact with raw bunch fruits
- Reduce product contamination by restricting access to the production hall to the operators and providing means to clean hands and shoes before entering the production hall

Some of the machines could be installed on existing concrete basements whose dimensions are indicated in the specifications. The Contractor has to check the technical and dimensional suitability of the

basements for its own equipment and he is the only responsible for correct coupling and functioning of the equipment he has supplied.

The Palm oil processing mill shall consist of the following machines;

13.2.1 N. 1 Bunch Stripper

Steel constructed machine used for removal of palm fruits from bunches and operated by electric motor and carried on steel frame or legs.

Main features:

Capacity: 500 kg of bunches/hour
Installation: requires a concrete base of 200 mm thickness, 210 cm by 210 cm wide.
Power source: 7,5 kW Electric motor, 380 V, 50 Hz, 3 phases

13.2.2 N. 1 Steam Generator

Steel constructed device for softening palm fruits by heating easy digesting.

The steam generator is constituted by

- Cylindrical vertical or horizontal body
- steam generation chamber
- steam expansion and distributing chamber.

The steam generator has to be fully insulated with at least 10 cm of rock wool and lined up with aluminium or metal external sheet.

The supply is complete with insulated steam pipeline to the two heating tanks located over the digester.

Main features:

Capacity: 500 kg/h of steam at atmospheric pressure or higher
Power source: Charcoal or Agro waste
Installation: requires 200 mm thick reinforced concrete base to size

13.2.3 N. 1 Digester with overhead sterilizers

Machine for releasing the palm oil in the fruit through the rupture or breaking down of the oil bearing cells. It consists of

- Two 1 c.m. insulated overhead sterilizing tanks located over the digester itself. These two tanks are heated with steam coming from the steam generator and are provided with upper doors for feeding with product, lower doors for heated product download to the digester, hoppers for connection to the digester, condensate separator and condensate discharge pipes;
- One supporting carbon steel structure with four legs to be bolted to the floor;
- One access ladder;
- Digester, composed of:
 - Main carbon steel cylindrical body;
 - Rotator beater arms that break outer skin to release oil;
 - On-board electric motor;
 - Supporting feet.

Main features:

Capacity: 1000 kg of fresh fruits/hr

Installation: requires 200 mm reinforced concrete base to the size of machine base and with clearance of 300 mm around machine.

Power source: 7,5 kW Electric motor, 380 V, 50 Hz, 3 phases

Maximum height: 2 500 mm

Product discharge height, 600 mm

13.2.4 N° 1 Screw Press (Manual Press)

Carbon steel manually operated device for separation of fibre and kernel from the liquid sludge coming from the digester, consisting of perforated chamber for retaining the solid waste and a pressure lid where pressure is applied.

The machine is made of:

- Supporting structure of painted carbon steel provided of legs and supporting feet able to resist to a load of 20 Tons with certification from an accredited laboratory. Test load 20 Tons.
- Perforated extraction drum made of painted carbon steel capacity 75 - 90 kg
- Oil collecting tray, discharge height approx. 600 mm
- Reinforced pressing rod with crank
- Reinforced pressing plate

Main features:

Capacity: 75-90 kg/ batch

Installation: requires a reinforced concrete base of 200 mm thickness, 170 cm by 170 cm wide.

13.2.5 N° 1 Hydraulic press

Steel constructed device (manually/hydraulic operated) for separation of fibre and kernel from the liquid sludge from the digester, consisting of perforated chamber and for retaining the solid waste and a pressure plate where pressure is applied.

The machine is made of:

- Supporting structure of painted carbon steel provided of legs and supporting legs able to resist to a load of 30 Tons with certification from an accredited laboratory.
 - Operating load 30 Tons
 - Test load 40 Tons
- Hydraulic heavy duty cylinder manually actuated. The hydraulic device has to be able to provide the adequate load and stroke. It must be designed to resist to heavy duty and continuous operations.
- Perforated extraction drum made of painted carbon steel capacity 150 / 250 kg
- Oil collecting pane, discharge height approx. 600 mm
- Reinforced pressing plate

Main features:

Capacity: 150– 250 kg/batch

Installation: requires a reinforced concrete base of 200 mm thickness, 170 cm by 170 cm wide.

13.2.6 N. 2 Oil Clarifiers

Machine for separation of Palm Oil from the sludge which consists of palm oil, water, cell debris and non oil solids

Main features:

Capacity: 100 litres/batch of Palm Oil
Power Source: Charcoal or Agro waste

13.2.7 N. 1 Kernel Cracker/Separator

Machine for separation of kernel from fibre and other solid residues of the milling process. The machine is mounted on steel stands and powered by an electric motor.

Characteristics:

Capacity: 100 kg/hr
Power source: 5 kW electric motor, 380 V, 50 Hz, 3 phases

13.1.6 N.1 Power Generator

Electric power generator able to supply the bunch stripper, the digester and the kernel separator through a main panel switch board. It is complete of:

- Supporting structure with antivibration feet
- Diesel engine
- Alternator 380 V, 50 Hz, 3 phases

Power source: Diesel powered

Capacity: 40 HP

Alternator size: 30 KVA minimum

Installation shall be on 20 cm thick reinforced concrete base of 120 cm x 120 cm dimension. The generator has to be installed in a closed separate room to reduce the noise in the working area. The Contractor is fully responsible for the selection, the supply and the installation of the power generator in accordance with the technical specifications of the equipment he is going to deliver.

13.1.7 N.1 Main switch board

Power switch board for the power supply of the electric motors of the equipment. The power can be provided through the national electric main line and/or the power generator.

Case of coated galvanised carbon steel, it is provided of:

- Main ON/OFF power switch
- Manual switch Main Line/Power generator
- Warning light
- Main START/STOP switches for the electric motors complete with STAR/TRIANGLE start sequence, motors protection, earthing line
- At least 3 more spare START/STOP switches for additional equipment maximum 10 kW load
- Supporting legs for placement on the floor
- Cables for the connection of the electric motors. The cables must be provided in accordance with existing Nigerian national regulations or higher, consistent with their use and functions. Their section and insulation power must be consistent with regulations. An earthing cable must also be provided.

All other terms and conditions of the contract notice and tender dossier remain unchanged. The above alterations and /or corrections to the contract notice and tender dossier are integral part of the contract notice and tender dossier.