FEASIBILITY STUDIES FOR BETTER FOODS AND FARMS

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Abbreviations

C:AVA – Cassava Adding Value for Africa

CRAN - Christian Rural Aid Network

CSIR – Council for Scientific and Industrial Research

FAOSTAT – Food and Agriculture Organisation Corporate Statistical Database

FRI – Food Research Institute

GDP – Gross Domestic Product

HQCF – High Quality Cassava Flour

IFAD – International Fund for Agricultural Development

IGCF – Industrial Grade Cassava Flour

Mt – Metric tonne

Executive summary

Better Foods is a prospective Agro processing company which is interested in processing cassava into HQCF, starch and other related cassava products for both local and international markets. The company contacted CSIR-Food Research Institute for technical advice as to how to go about setting up a processing facility as well as the technology transfer they may require as a company. A preliminary meeting was held between CSIR-Food Research Institute and the company, after which a contract was signed between Better Foods and CSIR-FRI for FRI to conduct feasibility studies in Jasikan district specifically Bodada and Akaa communities in the Volta Region. This would enable Better Foods to evaluate and ascertain the viability of its intended project . A two day feasibility studies was carried out by Food Research team led by a technical expert with assistance from representatives of Better foods. Prior to conducting the feasibility studies, Better Foods indicated that, it had already acquired a 50 acre farmland and planning to link about 50 cassava out-growers to its farm. Enquiries from the communities visited revealed contrary but the intent of Better Foods was established.

This feasibility study was conducted to determine the viability of a cassava processing facility to be located either at Bodada or Akaa. The proposed facility was assessed in four core areas namely: Market and Financial Feasibility, Technical Feasibility, Resource and Environmental Feasibility as well as Social and Institutional Feasibility.

By identifying and understanding the above listed scope of studies, one can determine whether or not to venture into the proposed project or investment. It would give an insight into which gap needs to be filled and which area needs more attention to succeed.

1.0 Introduction

Cassava is the largest staple crop in Ghana with an estimated production of over 10 million MT a year and it constitutes about 22% of the country's agricultural GDP. About 83% of farming households in Ghana are involved in the production of cassava which translates to about 1.8 million smallholder farmers. Ghana is the third largest producer of cassava in Africa after Nigeria and the Democratic Republic of Congo (IFAD 2005).

Cassava is the leading agricultural product by quantity. However, in terms of production value, it is the second most important agricultural produce in Ghana after yams with a production value estimated at about $1.5 billion in 2012 (FAOSTAT).
It is mostly grown by smallholder farmers and it is commonly considered to provide only carbohydrates with low protein, but cassava also contains significant rich minerals including micronutrients, calcium thiamine, riboflavin, niacin and high pro-vitamin A cultivars. Its leaves (7% protein) are consumed as a nutritious vegetable in some parts of the country. Cassava is an annual crop that plays a vital role in rural economies of Ghana due to its resilience and tolerance to many biotic and abiotic stresses such as diseases, flood, drought, and low-fertility soils, and it can be left un-harvested until needed. The short shelf-life of cassava requires efficient marketing, fresh consumption or processing by adding value to it to give higher remuneration.

CSIR- Food Research Institute, is mandated to manage post-harvest losses of crops, food processing and preservation, food marketing, distribution and utilization to support national food and nutritional security. One of CSIR-FRI's flagship projects, Cassava Adding Value for Africa (C:AVA) in collaboration with University of Greenwich – Natural Resources Institute is to develop sustainable cassava value chain to increase incomes of smallholder farmers , reduce poverty, ensure food security and boost the economy by saving some foreign exchange from some imported raw materials for production.

Cassava was chosen because it performs different roles for different people in Ghana and Africa as a whole and there has been a significant global market for dehydrated cassava that is boosting production with new market opportunities. It serves as the basis for development of small industries providing jobs and wealth in the rural communities; it also serves as reserve crop, rural staple food, convenient food for urban dwellers, an industrial raw material, cash crop, and foreign exchange earner. This is why Governments of some cassava-growing nations including Ghana, are making efforts to promote competitive production and processing of cassava into industrial raw materials for import substitution and foreign exchange earnings.

To achieve this, efforts in increasing cassava production are being made concurrently with increasing value addition, market diversification; trade in high-value and shelf-stable cassava products such as High Quality Cassava Flour (HQCF) and industrial flour such as Industrial Grade Cassava Flour (IGCF), cassava starch and dried cassava chips.

HQCF has been found to be suitable for several applications both at household and industrial level for baking bread, making varieties of pastries, convenient foods at urban centers, confectionaries, glucose syrup, ethanol and beer production. However, IGCF, Starch and now cassava chips have also become acceptable raw materials for manufacturing of industrial items such as sizing in textiles, adhessives in plywood and paperboard, spray starch, paint , poultry and animal feed. Processing of cassava roots as a primary raw material has the potential to jump-start rural industrialization ,increase market value of cassava and improve farmer's income and livelihoods.

Processing of cassava is very critical because of its perishability. That is, it deteriorates within 2-3 days after uprooting. Although cassava could also be preserved by storing it underground, it ties up useful land; roots get over matured and become fibrous and woody. Therefore the sure way of preventing post harvest losses and ensuring storage as well as breaking of its cyanide content is to process it. Cassava processing method involves peeling, washing, grating, pressing, sifting, drying and milling. This method could be manipulated depending on what cassava product one is processing. HQCF is mainly for food and it goes through the highest quality and safety processing to prevent fermentation and toxins.

Cassava processing is very important because it extends the shelf life of the product. For example HQCF can be stored for a maximum of one year. Its extended use includes production of composite flour, manufacturing of biscuits, noodles, baby foods, alcoholic drinks, thickening agent in stews and soups, sizing in textiles, manufacturing of gum, meat sausages and many more.

Basic equipments needed for processing cassava include grater, press, mill, sifter and drier. All these equipments come in different capacities of production per hour or day, and this depends on the producer's investment level.

2.0 Visits to Akaa and Bodada by FRI team

The FRI team first visited Akaa on the 5th of May, 2014 and was met on arrival by Mr Oduro and Abrokwa who were representatives of Better Foods. FRI team was to get first-hand information about the area, the potential of growing cassava in the area and any further information necessary to decide on setting up a cassava processing facility. The team after discussions, was taken to five locations all along the major road from Akaa to Abotoase (a big marketing town in the area) to observe their cassava farms. The team then visited the second identified location, Bodada with the same mission. Information about the area was also sought; studies were done on the potential of growing cassava in the area. Further studies on the potential for setting up cassava processing facility were also carried out. Here, they indicated that they have vast land for cassava farming or cassava processing facility. However the acquisition of land was either through land lease or outright sale. The team was then taken to three different locations at different parts of the community. These tours at (AKAA and BODADA) were to demonstrate that they had enough land for cassava cultivation and potential to support cassava processing facility.

The team after the expedition and discussions noted the following observations about the area in terms of having potentials for growing cassava and having the potential for cassava processing facility;

2.1 Market and Financial Feasibility

a) Competition

There is no direct competition within the proposed location, though the staple food of the indigenes happens to be "Banku" which competes with the raw material access. The consumption level as compared to their production level is very insignificant, hence one can say that competition is not so keen within the area or market.

b) Major crops grown

The major crop grown at Akaa is Maize and Bodada is cocoa, an indication that cassava can be grown in large volumes as a new industrial crop. Cassava can also be intercropped amongst the existing maize/ cocoa crops as a boost of income for the farmers in the community. The elders of the communities visited are willing to grow cassava as a result of the excitement created by the establishment of the processing facility in the area.

c) Distribution

The study revealed that the location of Akaa is ideally suitable for the establishment of a processing facility. This is because its flat nature of land and it is reasonably well located with regards to resources input supplies and access to distribution channels. The existing infrastructure at Akaa is also of a relatively high standard and could easily accommodate a processing facility.

d) Clientele

The clientele of the proposed processing facility were identified and segmented into rural bakeries, restaurants and second cycle institutions in and around the area. However the urban markets should be targeted as the main clients thus the Flourmills, biscuits manufacturers, confectioneries and the breweries.

f) Finance

There are no established financial institutions in the area. However, its district capital (Jasikan),and neighbouring town like Hohoe have rural banks and micro finance enterprises where financial transactions can be undertaken.

2.2 *Technical Feasibility*

a) Access to electricity/ Energy

In both Akaa and Bodada, with respect to electricity, power (national grid) is available and accessed by most community members. This means siting of a processing facility would be well-situated with access to electricity. An alternative source of energy in the form of firewood could be explored. The area is endowed with forest resources characterized by mixed savanna dotted with giant tree vegetation. Likewise, biogas generated from waste could be another source of energy.

b) Access to portable water :

Both communities have (Bore holes) available for use. The folded and fractured rocks allow formation of ground water . The ground water tables are generally high with an average water table ranging between 6 meters to 30meters. This is an indication that wells and boreholes could be constructed on the farmlands and the processing facility for use. It is however recommended that well digging should be preceded by sufficient geophysical test to determine the resistance of the layers.

c) Processing equipment/ capacity

Cost of equipment for cassava processing

Bin drying	USD $	GHC using 2.6 exchange rate	units	lifespan	Mentainance	Annual depreciation in USD $
Bin drier	10,000.00	26,000.00	1	10	10%	1,000.00
spare parts	2,500.00	6,500.00	1	10	10%	250.00
grater	1,100.00	2,860.00	3	3	5%	55.00
harmer mill	3,000.00	7,800.00	1	10	5%	150.00
sifter	2,000.00	5,200.00	1	5	5%	100.00
hydraulic press	800.00	2,080.00	2	5	10%	80.00
Truck (optional)		-	1	5	5%	-
Slicer/ Chipper	1,500.00	3,900.00	3	3	5%	75.00
Total	20,900.00	54,340.00				1,710.00

please note that Truck is $15,000

Sun drying	USD $	GHC using 2.6 exchange rate	units	lifespan	mentainance	Annual depreciation in USD $
Sun drying tracks	450.00	1,170.00	5	3	5%	22.50
spare parts		-				-
grater	1,100.00	2,860.00	3	3	5%	55.00
harmer mill	3,000.00	7,800.00	1	10	5%	150.00
sifter	2,000.00	5,200.00	1	5	5%	100.00
hydraulic press	800.00	2,080.00	2	5	10%	80.00
Truck (optional)		-	1	5	5%	-
		-				
Total	7,350.00	19,110.00				

Flash drying	USD $	GHC using 2.6 exchange rate	units	lifespan	mentainance	Annual depreciation in USD $
Six – Cyclone Flash Dryer (Coupled with Hammer Mill)	60,000.00	156,000.00	1	10	10%	6,000.00
spare parts and installation	20,000.00	52,000.00	1	10	10%	2,000.00
stainless grater	1,100.00	2,860.00	3	3	5%	55.00
sifter	2,000.00	5,200.00	1	5	5%	100.00
hydraulic press	800.00	2,080.00	2	5	10%	80.00
Truck (optional)		-	1	5	5%	-
		-				
Total	83,900.00	218,140.00				8,235.00

Please not that you can either upscale with both bin drier and sun drier. In that sence you just have to add the cost of the drying track to the total cost of drying. Or alternatively you choose flash drying soley.

Clayuca seperater	USD $	GHC using 2.6 exchange rate	units	lifespan	mentainance	Annual depreciation in USD $
Clayuca cassava precessing machine	60,000.00	156,000.00	1	10	10%	6,000.00
spare parts and installation	30,000.00	78,000.00	1		10%	3,000.00
bin drier (2)	20,000.00	52,000.00	2	3	10%	2,000.00
		-				
Total	110,000.00	286,000.00				11,000.00

d) Planting material

The farmland would be able to support the cultivation of improved varieties which has already been accepted and requested for by the farmers of the area. There is a district assembly office located at the Jasikan district and can be used as a centre to distribute planting materials to farmers. Also there is a CAVA service provider at the Hohoe district (CRAN) who can also assist in the distribution of improved planting materials.

2.3 Resource and Environmental Feasibility

a) Farm Land

There is vast land available for growing more cassava at both Akaa and Bodada though the first crop of their choice was maize and cocoa respectively. The Chief and community elders were willing to lease farm land for growing cassava and also land for building a processing facility. The land at Akaa is flat and very conducive for cultivating cassava and most farmlands are along the roads making farm accessible. On the other hand, Though Bodada is quiet hilly and sloppy, it has also got some flat farmlands which could be explored. Land on Bodada is for lease or outright sale.

For the location of a processing facility, Akaa is preferred due to its flat nature and being free from environmental pollution and any other industrial activities that could pose as a serious threat in the form of food contamination or air pollution to the facility and the community.

i) Location & Size

The District has a total land area of 1.244.75 sq. km., representing about 6.8% of the fifteen districts in the Volta Region (18.093.27sq krn.). Jasikan, the district capital, lies 260 km North-East of Accra, the national capital. It is strategically located as it provides a good linkage between the South -Eastern part of the country to the Northern Region.

ii*) Topography & Drainage*

The topography of the district is hilly and undulating becoming almost flat in certain areas like Akaa. The district is almost surrounded by mountain ranges; typically are the Buem-Togo Ranges which is an extension of the Akwapim Ranges. The eastern parts are relatively higher with occasional heights ranging between 750ft - 2000ft above sea level. Some communities like Baglo(1650ft), Teteman (1450ft) and Kute (1300ft) are on steep ranges. The district is well drained by several rivers. Some of the important ones are Konsu, Bompa, Kabo, Kute, Dayi, Dfuo, Odome, Asukawkaw and part of the Volta Lake. Almost all of these rivers are seasonal with most of them overflowing their banks during the rainy season and drying up during the dry season.

Generally, the whole eastern part of the district is hilly- (Bodada), while the western end is flat and undulating (Akaa).

iii) Climate & Vegetation

The district falls within the wet equatorial zone. It experiences a double maxima rainfall regime in May-July and September-November with peaks in June and October. The rainfall

pattern averages between 1,250mm to 1,750mm per annum in the mountainous areas. The dry season is mostly manifested between December and February and it is generally characterized by cool and dry wind. The average temperature varies between 22° and 34°. The vegetation is generally depicted by moist deciduous forest. Due to the relatively high rainfall experienced annually in the eastern parts, the vegetation is thicker and more luxuriant

iv) Waste disposal

The proposed location will be far from the residential area where odour emitted from production could be controlled through the construction of a disposable drainage system for environmental and safety reasons.

b) The raw material: (cassava)

i) Access to raw materials

The identified area especially Akaa which has flat land and also already has a number of cassava growers can be tipped for the supply of raw materials. The short distance between Akaa to Jasikan and Hohoe which happens to be the hub of cassava growers in Volta region makes it easier for any facility sited around the area to access cassava easily. Hence with a backup farm by the company coupled with out-growers in its catchment area and the other cassava farmers around the environs or neighboring communities will ensure regular supply of roots to feed the processing facility.

Currently the major varieties of cassava available at Akaa and Bodada are *Biafra* which is suitable for *Gari* and cassava dough production, *Etikor* for *fufu, Obatampa* for both *fufu* and *gari*. However the farmers are enthusiastic about growing the improved varieties such as ampong, sika bankye, and bankye hemaa etc. which would give higher yields and steady income.

ii) Share of local production

Although there were community processing units or community cassava processors, cassava grown in the area was in surplus since these community processors couldn't process in large quantities due to financial constraints. The proposed project will be able to absorb a huge share of cassava produced in the proposed location and surrounding villages.

c) Labour:

The level and availability of human resources and skills to fulfill the requirements of the processing facility at Akaa and Bodada are currently available considering the fact that these locations had a youthful population. The current level of unemployment leaves the youth and women in the area no alternative than working to survive the growing economic hardship. Therefore accessing labour would not be a problem for the facility.

d) Road network:

There is a good road linking Akaa to Jasikan and Abotoase and also Bodada to Jasikan and Kute which have very popular market centres There is also a smooth road from the community to the farmlands and the proposed facility site in Akaa , whilst road to farmland in Bodada is hilly and undulating. However, roads to both farms are accessible. Any form of

transport ie, motor, bicycle, tricycle or Kia tuck can access them. This will make conveying of raw materials or finished product to its destinations easier.

2.4 Social and Institutional Feasibility

a) Social Benefit

The assessment of the social and institutional feasibility of the proposed facility revealed that the Akaa and Bodada population is predominantly a poor rural population characterized, by amongst others, poor socio-economic characteristics (life expectancy, infant mortality and population distribution). The social and institutional feasibility assessment of a cassava processing facility at Akaa or Bodada revealed that the surrounding communities would benefit in a number of ways from the establishment of the proposed facility. The direct benefits of the establishment of the cassava processing facility include the creation of employment opportunities as well as the creation of a "market" for the current under-utilized cassava roots. The indirect benefits include an anticipated decrease in the number of households living under the poverty and ultra poverty line, a decrease in malnutrition and an increase in incomes for communities, especially for the women in the communities.

b) Company benefit

Nevertheless, irrespective of the immense benefits that the surrounding communities would derive from the cassava processing facility, the company in itself stands to gain a lot from establishing the facility in the said area. Noted among the gains include;

a) Tax exemptions / tax rebates as a result of producing with between 80- 100% locally sourced raw materials and enjoying 5 year moratorium for agro processing.
b) Alternative energy sources I.e Company can make use of firewood from the forest near the community or biogas from the waste generated from processing.
c) Easy access to cheap labour thereby reducing its cost of production.
d) Equipments / up scaling / funding benefits from any cassava related project.
e) Enjoying social recognition as a result of performing its social responsibility in the area of employment, poverty reduction, gender engagement etc.

c) Gender impact of the processing facility

Women are bound to benefit the most from the establishment of such processing facility. Although both men and women will be free to participate directly and indirectly in the processing facility, women in the area are more likely to be the main participants as a result of the current stages of processing which involves more peeling and washing.

d) Readiness of the community

Both communities are ready to produce cassava to feed a cassava processing centre from indication of few community processors the FRI team interacted with. The community elders were also willing to lease or sell land for building a processing plant and farming land for growing cassava. Farmers around the area were willing to be linked to investor as out-growers.

3.0 Conclusion

The CSIR-FRI team after the two day visits to Akaa and Bodada in the Volta region concluded that it is feasible to site a processing facility within the identified areas (Akaa& Bodada) due to their proximity to good road networks , potable water , market centres and availability of power (national grid). The enthusiastic nature of the elders of the community coupled with the availability of land for growing cassava and the readiness of the farmers to grow cassava to feed the processing facility makes it conducive to site the processing facility at the said location.

Taking the net social benefit of the proposed processing facility into consideration, it can be concluded that the processing facility is anticipated to be socially, economically and institutionally feasible.

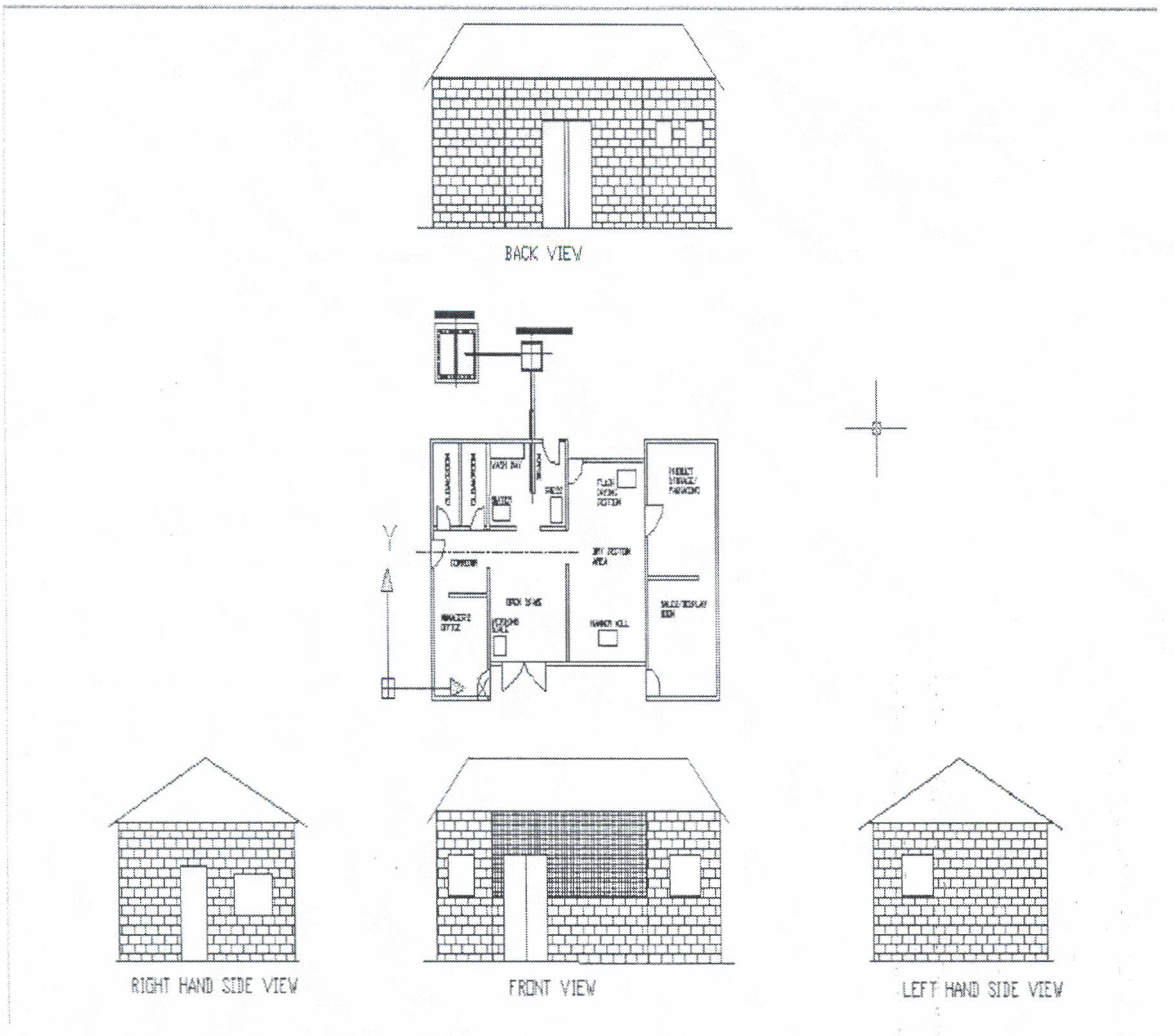
4.0 Recommendations

Based on the feasibility studies carried out, the following could be considered as a recommendation to aid Better Foods achieve its aim.

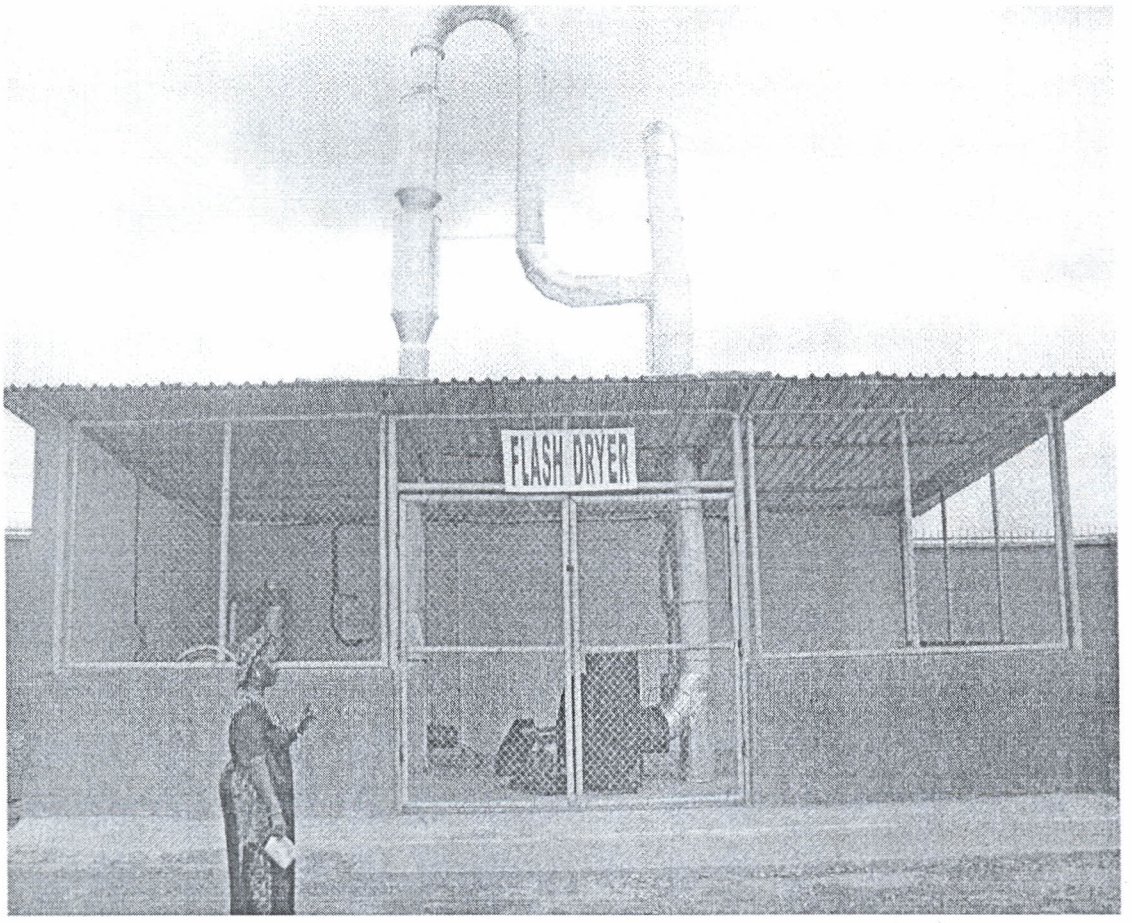
1. Better Foods needs to acquire a minimum of 100 acres for the cultivation of cassava to serve as a backup farm to supply raw materials to feed its facility in times of shortage. This is important as the raw materials (cassava roots) constitute about 50% of the cost of operating a cassava processing facility.
2. Better Foods should start planting alongside putting up the structures to ensure that as the facility gets ready, there would be enough roots to feed its plant.
3. Organization and registration of outgrower farmers needs to be carried out so as to ensure commitment on the part of the out-growers for regular supply of roots.
4. Construction on the proposed location for the processing facility needs to be commenced as soon as possible to enable early commencement of operations.
5. Better Foods needs to develop a business plan to suit its model of operation for easy access of credit facilities.
6. Better Foods should start designing methods of keeping records for consistency and aid in providing information to the project office.

5.0 Appendices

Appendix 1 IDEAL DESIGN OF A PROCESSING FACILITY



Appendix 2 *PICTURE OF A FLASH DRIER*



Appendix 3 IDEAL AFFLUENT DISPOSAL DESIGN