GARI PROJECT REPORT

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SUMMARY

Commercial factories have been designed in Ghana which are claimed capable of processing gari economically. All the machinery can be locally manufactured in Accra. A plant to process 8—10 tons of cassava per day working for 250 days a year, and another to process 2—3 tons of cassava per day are costed in detail. They give net returns (over 250 days) of ₵62,817 (53% capital cost and ₵11,625 (36% of capita cost) respectively. Plant is available from Agricultural Engineers Ltd., Accra, Ghana.

RESUME

Au Ghana, ont été installées des usines qui, pense-t-on, fourniront du gari rentable économiquement. Toutes les machines peuvent être fabriquées sur place à Accra. Une usine pouvant transformer 8 à 10 tonnes de manioc par jour de travail pendant 250 jours l'année, et une autre pouvant transformer 2a 3 tonnes de manioc par jour ont été chiffrées en détail avec des bénéfices (pendant plus 250 hours) de₵62,817 (53% du capital) et de₵11,625 (36% du capital) respectivement. Le matériel pour l'installation de l'usine peut être obtenus auprès de la société "Agricultural Engineers Ltd", Accra, Ghana.

RESUMEN

Se han diseñado fábricas comerciales en Ghana de las que se dice procesarán gari económicamente. Toda la maquinaria puede ser manufacturada localmente en Accra. Se describen los costos de detalle y se dan las tazas de retorno neto de dos plantas; una para procesar de 8—10 toneladas de yuca por día trabajando 250 días al año y otra para procesar 2—3 ton. de yuca por día. Las tazas de retorno (sobre esos 250 días) son₵62,817 (53% del costa del capital) para la primera planta y₵11,625 (36% del costo del capital) para la segunda. La planta se encuentra disponible en Ingenieros Agrícolas Ltd., Accra, Ghana.

INTRODUCTION

It is estimated that Ghana produces nearly 1,350,000 tons of cassava roots per year from an area of 400,000 acres. Cassava root is consumed as human food, after it has been cooked, fried or processed. There are many uses of cassava in the world, but we in Ghana are interested in gari,.kokonte (cassava chips) and cassava starch. Gari is one of the staple foods in Ghana, and in recent years has also become an export item.

The traditional methods of hand-grating, fermenting dough in sacks, pressing under stones and roasting in small frying pans are labour and time consuming, and the end product is not very attractive either for export or for the domestic market. The production capacity using the traditional method is inadequate to make it a profitable rural industry.

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THE PRODUCTION PROCESS

Agricultural Engineers Limited, Accra, have been able to develop machines and techniques locally which make gari production a profitable rural industry. The 'Agrico' process for gari production involves weighing cassava, and then washing and peeling by the use of a rotating type of machine fitted with a pump and jet mechanism. Removal of outer cork and inner layer is done by hand.

Cassava is grated using a Wadhwa Cassava Grater which has a circular grating disc and grates nearly one ton of prepared cassava roots per hour.

Fermentation of the dough takes place in wooden tanks. In order to accelerate the bacterial action, some old dough is mixed with the fresh dough and this reduces the fermentation period by at least 24 hours.

The fermented dough is then pressed in an 'Agrico' cassava press to extract the water.

After the dough has been pressed, it is sieved and sifted using the 'Agrico' sieving and sifting machine before roasting.

The dough, after pressing and sieving, contains nearly 20-25% moisture. This moisture is taken off by roasting on a rotating pan.

The resulting gari is then graded, to obtain the uniform granules, using the 'Agrico' gari grader.

During the process of roasting, the cassava congeals into small lumps which are sorted by the grading machine and ground by a grinder or grinding mill.

At the end of the processing, gari is obtained of uniform size and of golden colour, and possesses the characteristic flavour of gari. The product is then weighed, packed and labelled.

LOCATION

A gari industry needs to be established in or near a cassava growing area of sufficient size as cassava root perishes quickly once out of the soil. It is estimated that a plant would work 250 days in a year, and hence that a plant of capacity to process 8—10 tons of cassava a day would need 2,000 to 2,500 tons of cassava per year which should be obtainable from 400—500 acres. A gari plant of 2—3 tons/day capacity is available which needs both less investment and is suitable for handling production from 100—125 acres.

In choosing a location preference should be given to the area where water and electricity is reliably available. The small plant can be run with a diesel engine; but for the large plant a generating set would be required if electricity is not already available.

RAW MATERIAL

The current cassava price is ₵35.00 per ton at the factory gate or ₵30.00 ex-farm.

MARKET

Gari is presently selling at 25 Ghana pesewas per pound in the retail stores. However, in this project we have based our ex-factory price on 12 pesewas a pound or ₵275.00 per ton. Schools, college hospitals, army-messes, departmental stores and local markets are the main marketing outlets.

EMPLOYMENT

A minimum of 79 workers, 2 supervisors and one manager are required to man the 8—10 ton capacity factory. The smaller unit needs more workers per ton as less operations are mechanized.

ECONOMIC ANALYSIS

A. Factory of 8—10 tons of cassava processing capacity a day

Capital costs of the project

(a)	Building (120 x 60 ft)	₵ 43,200.00
(b)	Machinery, installation, commissioning	29,940.00
(c)	Furniture and fittings	7,500.00
(d)	Vehicle	5,000.00
(e)	Tractor and trailer	8,900.00
(f)	Other expenses — water supply, electricity	9,000.00
(g)	Working capital	15,000.00
	Total cost of the project	₵ 118,540.00

(In case electricity is not available at site, a provision of 1 60KVA generating set may be made which may cost nearly ₵17,500.00)

Labour requirements.

Recurrent costs (per day)	No. of workers	Cost per day
(a) Receiving and weighing	4	₵ 4.00
(b) Peeling and washing	36	36.00
(c) Grating and fermenting	10	10.00
(d) Pressing of cassava dough	6	6.00
(e) Sieving and sifting	2	2.00
(f) Roasting	12	12.00
(g) Sieving and grading	2	2.00
(h) Grinding	1	1.00
(h) Packing, labelling	6	6.00
Total	79	₵ 79.00

Direct costs per day

(a)	*Raw material (₵35.00 per ton)	₵ 350.00
(b)	Labour (without manager), including social security	89.00
(c)	Cost of running the machines (fuel and oil)	10.00
(d)	Firewood	15.00
(e)	Repairs and spares, servicing of machines	9.00
(f)	Running vehicle (car)	2.00
(g)	Wages of tractor operator	1.75
(h)	Maintenance of building etc.	3.00
	Total	₵ 479.75

Indirect cost per operational day

(a)	Manager's and supervisor's salary	₵ 16.00
(b)	Interest on ₵120,000 @ 6% per annum	28.00
(c)	Insurance (1% on fixed assets)	4.00
(d)	Depreciation of building (20 yr life)	11.20
(e)	Depreciation of machines (10 yr life)	18.00
(f)	Vehicle and tractor trailer (5 yr life)	11.00
(g)	Contingencies (and watchman etc.)	5.00
Cost of production per day	Total	₵ 573.75

* The cost of raw material has been taken at ₵35.00 per ton. If the factory tractor operator is used for carting, the cost of raw material should be based on ₵30.00 a ton. The difference in two costs (₵5.00) per ton would take care of maintenance and running of the tractor; only the tractor operator's wages have been taken into account.

RETURN

Gari from 10 tons of fresh cassava based on 25–33% recovery is equal to 2.5–3.3 tons. Basing average of 3 tons of gari from 10 tons cassava and minimum wholesale price of

₵ 275 per ton., ...	₵ 825.00
Net return per day (₵825–₵573.73)	251.27
Net return in 250 days (₵251.27 x 250)	62817.00

(or 52% of capital costs)

NOTES

1. If cassava is available throughout the year and the plant can work 365 days, this would reduce the cost of production and further increase profitability. Working hours in this costing have been at 8 hours per day, but in peak season, the machines could also work much longer hours.

2. The return from the investment after paying interest is 52% per annum. Manufacturing of this plant in Ghana would create employment of 2500 man days.

3. Investment per direct worker is ₵1,400.00 and the project would employ nearly 85 persons.

4. The general economy and standard of living of the area would benefit as more than ₵100,000.00 would be injected by way of wage, salary and raw material costs per day.

5. The farming community would be assisted, as this project would assure farmers of sales of perishable fresh cassava roots.

B. **Factory of 2–3 tons of cassava processing capacity per day**

Capital costs of the project

		Qty	Cost(₵)
(a)	Weighing machine		975.00
(b)	Wadhwa cassava grater	1	905.00
(c)	Wooden tanks	3	450.00
(d)	Cassava press	1	1,250.00
(e)	Sieving and sifting machine	1	1,350.00
(f)	Rectangular frying pan	5	1,000.00
(g)	Chimneys for smokeless over	5	300.00
(h)	Gari grinder	1	1,100.00
(i)	Misc. tools: wheelbarrows 2)		
	bag carts, 1)		
	shovels 2)		
	rakes 2)		
	hand trowel, etc.		220.00
(j)	Packing, handling, insurance transport to site		250.00
(k)	Supervision of installation, commissioning, (inc. of provision of mechanical staff)		950.00
		Total	₵ 8,750.00

Cost of project

Building cost 90 x 30 ft.	₵16,200.00
Machinery	8,750.00
Furniture and fittings	500.00
Other expenses (water supply etc.)	2,000.00
Working capital	5,000.00
Total	₵32,450.00

Labor requirement.
Recurrent cost (per day)

		Qty	Cost
(a)	Receiving and weighing	4	4.00
(b)	Peeling and washing	12	12.00
(c)	Grating and fermentation	4	4.00
(d)	Pressing of dough	3	3.00
(e)	Sieving, sifting and grading	4	4.00
(f)	Frying	10	10.00
(g)	Bagging	2	2.00
		Total	₵ 39.00

Direct costs per day

(a)	Raw material (35.00/ton), 3 tons		105.00
(b)	Labour (without manager) but including social security		44.00
(c)	Cost of running machines		6.00
(d)	Firewood		10.00
(e)	Repairs and spare parts for machines		4.00
(f)	Maintenance of building		1.50
	Total	₵	170.50

Indirect cost per day

(a)	Manager and supervisor's salary		10.00
(b)	Interest on ₵32,450.00		7.80
(c)	Insurance		1.00
(d)	Depreciation on building (20 yr life)		3.30
(e)	Depreciation on machine (10 yr life)		3.40
(f)	Contingencies (watchman etc.)		5.00
	Total		30.50

Total cost of production per day ..... ₵ 201.00

RETURN

Return from 3 tons of fresh cassava on 30% recovery is equal to 9 tons of gari and wholesale price of ₵275.00 per ton per day ..... ₵ 247.40

Net return (247.50 – 201.00) 46.50

Net return in 250 days ₵11,625.00