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Case study of groundnut decortication industry in Cuddalore district of Tamil Nadu

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Abstract
Groundnut is one of our country's most important cash crops. It is a low-cost but erratic source. Groundnut is the world's sixth most significant oil seed crop. It includes 48-50% oil, 26-28% protein, and is high in dietary fibers, minerals, and vitamins. Groundnuts are grown on 26.4 million hectares worldwide, with a total productivity of 1.4 metric tons per hectare. Over 100 countries grow groundnuts worldwide. Developing countries account for 97% of the global area and 94% of global agricultural production. Groundnut is widely grown in practically all tropical and subtropical countries across the world. India, China, Nigeria, Sweden, and the United States are the top groundnut producing countries. India has more land dedicated to groundnut agriculture than China. Because the crop is largely grown under rainfed circumstances, production is lower because yield is low. After China, India is the world's second largest producer of groundnuts. During 2020-2021, the country's major oilseed production will be groundnut. During 2020-2021, Gujarat is the leading producer, accounting for 25% of total production, followed by Tamil Nadu, Andhra Pradesh, Karnataka, and Maharashtra. The Case Study Concluded that the Benefit cost ratio (BCR) for the groundnut decorticating industry is 1.06, so it is profitable. A groundnut decorticating industry owner should process at least 144 tonnes groundnut in 1 year in order to get a no loss or no gain output. The margin of safety analysis, it could be interpreted that owner is having a 97 tonnes when compared in BEP in the output. In Balance Sheet analysis, all the ratios are greater than 1. Hence, the groundnut decorticating mill is going under profit condition.

Keywords: Groundnut, groundnut decorticating industry, benefit cost ratio, break even analysis and balance sheet

Introduction
Groundnut is one of our country's most important cash crops. It is a low-cost but erratic source. Groundnut is the world's sixth most significant oil seed crop. It includes 48-50% oil, 26-28% protein, and is high in dietary fibers, minerals, and vitamins. Groundnuts are grown on 26.4 million hectares worldwide, with a total productivity of 1.4 metric tons per hectare. Over 100 countries grow groundnuts worldwide. Developing countries account for 97% of the global area and 94% of global agricultural production.

Major groundnut producing countries
Groundnut is widely grown in practically all tropical and subtropical countries across the world. India, China, Nigeria, Sweden, and the United States are the top groundnut producing countries. It is planted on an area of 24.7 million hectares, with a total global production of 33 million tonnes. India ranks first in acreage and second in production. Groundnut is grown in over 60 countries throughout the world.

Groundnut Production in India
India has more land dedicated to groundnut agriculture than China. Because the crop is largely grown under rainfed circumstances, production is lower because yield is low. After China, India is the world's second largest producer of groundnuts. During 2020-2021, the country's major oilseed production will be groundnut. During 2020-2021, Gujarat is the leading producer, accounting for 25% of total production, followed by Tamil Nadu, Andhra Pradesh, Karnataka, and Maharashtra. Groundnut contains 40.10% fat and 25.30% protein on average, and it is high in calcium, iron, and vitamin B complexes such as thiamine, Riboflavin, Niacin, and Vitamin A. It has several stages. It is utilized not only as a primary cooking medium for a variety of dishes, but also in the production of soaps, cosmetics, creams, and lubricants.

Origin and uses of groundnut

It has been reported that groundnut cultivation originated in South America and extended to Brazil, southern Bolivia, and northwestern Argentina. In the 16th century, the Portuguese brought groundnut from Brazil to West Africa and eventually to south western India. Almost every component of the peanut is valuable commercially.

Uses

Groundnut Oil

Groundnut oil has a variety of applications, the most common of which is as a cooking oil. It is used in a variety of products such as soap producing fuel, cosmetics, shaving cream, leather dressing, furniture cream, lubricants, and so forth. Groundnut oil is also utilized in the production of vanaspathi ghee and fatty acids. It is also employed as a preservation medium in the making of pickles, chutney, and other condiments.

Kernels

Whole kernels are prepared for consumption by frying, soaking, roasting, and boiling, as well as in many varieties of namkens. The most common method of consumption is roasted groundnut.

Groundnut Cake

Because of its nutritional richness and palatability, it is an excellent feed for animals and poultry.

Groundnut Shell

Groundnut shell has a lot of commercial potential. It is used in livestock sheds as a fuel filter.

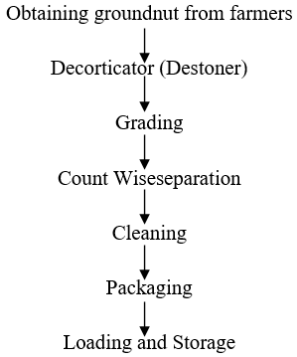
Groundnut Stalk/Hay

It is mostly used in feed for animals and compost preparation. The plant's green leaves and stems are used in animal feed.

History of Groundnut Decorticating Industry

Name of the Industry	: Groundnut Decorticating Firm [Praveen Traders]
Name of the Entrepreneur	: S. Manoharan
Address of the Enterprise	: Sapthagiri Nagar, Pachayankuppam, Cuddalore-607003.
Processing Commodity	: Groundnut
Enterprise Started Year	: 1995
Nature of Organisation	: Individual
Procurement	: Raw Materials are procured from the Farmers Cultivating Groundnut around that Region.

Processing



Decortication

Because of the brittle quality of the shell and the regularity and strength of the kernels, simple decortication of many species of groundnut is not generally difficult. Popular kinds with soft and uneven kernels, on the other hand, face significant challenges in maintaining adequate levels of decorticating efficiency.

In the most basic scenario, a drum with a little projection and rotating in a simple screened enclosure will be effective for many types with strong kernels. The strains created by this random decorticating process, on the other hand, can cause an excessive fraction of the total kernels to spell.

The kernel sizes are not proportional to the nut's exterior size. Irregularities in the supply of nuts can be addressed by previous size grading, but it may be difficult to develop a viable machine configuration for each size grade that will allow an acceptable balance between the production of broken and whole kernels to be established. In these cases, a more tolerant and gentler action can be achieved by lowering the projection's rotational speed and increasing the clearance between the projection and the screen.

Hand shelling, which produces low levels of cracked kernels, employs low-cost labor at the place of production, and is a realistic process where the crop is tiny but of extraordinary value. Small, manually controlled form level machines are utilized with cultivars with robust kernels to significantly increase productivity.

Typically, these are the reciprocating machines mentioned in section 2. The most typical machine that employs this technology is a bowl-shaped unit in which the upper assembly is operated to and fro by hand and the kernels and shell fragments fall through wholes in a sheet metal screen wire.

Simply said, the machine's decortication efficiency may not be particularly great, so enhancements have been implemented to limit the unneeded harm done to the kernels while they remain in the bowl. The rural technology guide number 4 outlines and illustrates a feeder unit that can be put into the machine's top to reduce the dwell time of the kernels, hence reducing breakages.

By buffering the majority of the nuts in the top hopper and giving only a limited flow, the number of nuts in the bowl is reduced to those that are now being shelled. As a result, manual labor is greatly reduced, and shelling is speedier and more efficient.

Types of Decorticator

1. **Hand operator**
2. **Power operator**

Hand Operator

The hand-operated groundnut decorticator is made up of an L-shaped angle frame and four legs.

A semi-circular perforated sieve is provided. In the oscillation sector, 7 cast iron leg assemblies are installed. The groundnut pods are shelled by passing them through an oscillating sector and a perforated concave sieve. The kernels and husk are collected at the unit's bottom. The clearance between the concave and oscillating sectors can be adjusted to decorate pods of various groundnut types. The sieve can also be replaced based on pods.

Power Operator

The unit is made up of a hopper, a double crank mechanism, an oscillating sector, and a sieve bottom assembly that is all

mounted on a frame. The oscillation sector unit is equipped with a number of cast iron peg assemblies. The groundnut pods are shelled between the oscillating sector and the decorticated shells, and the kernels fall down through the perforated concave sieve. The blower assists in separating the kernels and husk, and the kernels are gathered from the bottom spout. The shells are removed from the machine.

Feeder unit for groundnut decorticator

Manual shelling may be the best option in such isolated places. However, a device known as the sliding action groundnut decorticator, which has a similar mechanism to the reciprocating decorticator, has been created to alleviate the issues.

Sliding action groundnut decorticator

Carpenters in the area can build the device out of wood. The use of wood allows for more precise sculpting of the components, which contribute significantly to the machine's efficiency. Furthermore, the design allows the working portions to be more flexible, absorbing some of the mechanical forces that might otherwise damage the kernels.

There are several methods for increasing the speed of manual shelling.

Powered devices based on the stated disc principle can be employed on a small scale with sensitive nuts. Because this technology is sensitive to nut size, correct size grading is required, however by processing discrete size batches, better results can be produced than with simpler powered apparatus.

Economics of the Industry

Benefit Cost Ratio

Cost of Production for Groundnut Decorticating Industry

Land value of the groundnut Decorticating industry } = Rs 1000000

Machineries cost = Rs.1000000
Depreciation of the machineries = 12%
Interest rate of fixed capital = 12%
Cost of raw material (Groundnut) = Rs.50 / kg
Quantity of raw material = 1 tonnes/day
Quantity of raw material (For one season) = 180x1=180 tonnes/ season
Cost of material = 180x50x1000
= Rs 9000000/season
Value of groundnut husk = Rs. 2000 / ton
Labour cost = Rs.100/day/person
= 10 x 100 180
= Rs.180000/season/ person
Electricity cost = Rs. 50000
Interest on working capital = 12%

Fixed Cost

Land value = Rs. 1000000
Machineries cost = Rs. 1000000
Building cost = Rs.50000
Total = Rs. 2050000

Depreciation of machinery = Rs. 1000000 x 12/100
= Rs.120000
Interest on fixed cost @12% = 2050000 x 12/100
= Rs.246000
Total = Rs.366000

Variable Cost

Cost of raw material = Rs. 9000000
Labour cost = Rs.180000
Electricity = Rs.50000
Transport cost = Rs.20000
Total = Rs.9250000

Interest @ 12% = 9250000×12/100
= 1110000

Total Cost of Production = Fixed Cost+Variable Cost
=2050000+9250000
= Rs. 11300000

Total Income = Total Production of Nuts X Rate of Production

Kernel production /day = 800 kg/day
= 800x180
= 144000kg/season
Husk production/day = 200 kg/day
= 200x180
= 36000kg/season
Income from Kernel =144000x80 (SP of kernel = Rs.80/kg)
= 11520000
Income from Husk =36000x15
= 540000

Total Income = Cost of Produced Income + Cost of Husk
= 11520000+540000
Total Income = Rs.12060000
Net Profit = Total Income - Total Cost of Production
= 12060000-11300000
= 760000
Benefit Cost Ratio = Total Income / Total Cost of Production
= 12060000/11300000
= 1.06
Net Profit / Day = 760000 / 180
= Rs.4222/day
Cost of Processing/qt = Total Cost - Income from Husk / Total Kernel Production
= 11300000 – 540000/144000
= 74.72/kg
= Rs.7472/qt

Inference

The Benefit cost ratio (BCR) for the groundnut decorticating industryis 1.06, so it is profitable.
Net profit = Rs.760000
Total cost of production = Rs.11300000
Total income =Rs.12060000

Break Even Analysis

A groundnut decorticating mill process a 1 tonnes/day involving fixed cost of Rs.2050000 and variable cost of Rs.9250000 and selling price of Rs.80000/tonnes. Work out the BEP margin of safety percentage of margin of safety both in quality and in monetary value.

Fixed cost = Rs.2050000
Price / Tonnes = Rs.80000
Total production per year =144 tonnes/year
Variable cost = Rs.36600

BEP in Quantity =F/(p-V)
= 2050000/(80000- 36600)
= 6000000/43400
=47 tonnes /season

BEP in Monetary =F/(1-v/p)
= 2050000/(1-36600/80000)
=6000000/(1-0.5)
= 1025000

BEP in Monetary = Rs. 1025000

Margin of Safety = Total Out Put - Output at BEP
= 12060000-1025000
= Rs.11035000

Margin of Safety = 144 - 47
= 97 tonnes

Percentage of Margin of Safety = BEP Output/ Volume of Output X 100
=47/144 x 100
= 32.6%

Percentage of Margin of Safety = 32.6%

Inference

A groundnut decorticating industry owner should process at least 144 tonnes groundnut in 1 year in order to get a no loss or no gain output.

The margin of safety analysis, it could be interpreted that owner is having a 97 tonnes when compared in BEP in the output.

Table 1: Balance Sheet

Assets		**Liabilities**	
Current Assets		**Current Liabilities**	
Cash on Hand	= 1000000	Cost of Production	=11300000
Savings in Bank	=2000000	Maintanence	=60000
Ready for Disposal	= 1300000	Unsecured Loan	=50000
Shell for Disposal	= 150000	Total	=11410000
Raw Material Available	= 7600000		
Total	=12050000		
Intermediate Assets		**Intermediate Liabilities**	
Machineries	= 1000000	Machineries Loan	=1000000
Vehicle	= 1500000	Vehicle Loan	= 500000
Total	= 2500000	Unsecured Loan	=25000
		Total	=1525000
Long Term Assets		**Long Term Assets**	
Land Value	= 1000000	Building	=50000
Building	= 50000	Total	= 50000
Total	= 1050000		
Total Assets = 15600000		**Total Liabilities = 12985000**	

Financial Ratio

Current Ratio = Current Assets/Current Liabilities
= 12050000/11410000
=1.05

Working Ratio = Current Assets + Working Assets/ Current Liabilities +Working Liabilities
= 12050000+2500000/11410000+ 15250000
= 14550000/12935000
= 1.12

Net Capital Ratio = Total Assets / Total Liabilities
= 15600000/12985000
= 1.20

Net Worth = Total Assets - Total Liabilities
= 15600000-12985000
= 2615000

Inference

All the ratios are greater than 1. Hence the groundnut decorticating mill is going under profit condition.

Conclusion

The Benefit cost ratio (BCR) for the groundnut decorticating industry is 1.06, so it is profitable. A groundnut decorticating industry owner should process at least 144 tonnes groundnut in 1 year in order to get a no loss or no gain output. The margin of safety analysis, it could be interpreted that owner is having a 97 tonnes when compared in BEP in the output. In Balance Sheet analysis, all the ratios are greater than 1. Hence, the groundnut decorticating mill is going under profit condition.

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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