



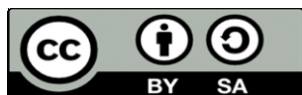
# Role of Groundnut Decorticator in the Upliftment of Social and Economic Status of Rural Women in Nalanda district of Bihar

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## ABSTRACT

Four groups of forty women between the age of 30 to 50 yrs participated in Frontline Demonstration on manually operated groundnut decorticator (CIAE, Bhopal model) conducted by Krishi Vigyan Kendra, Nalanda. Groundnut being the vital kharif crop in the selected village Sarilchak of Nalanda district where the post harvested shelling is done exclusively by women with hand. It is a tedious and time taking job with shelling capacity of 1.2-1.4 kg/ha which is considered as low performance. Whereas, hand-operated groundnut decorticator shelled an average of 32.4kg in one hour with 66.4% efficiency. Adoption of this technology showed an increase in productivity in terms of money by also selling deshelled kernels which helped in improving benefit-cost ratio. Other benefits were drudgery reduction and time-saving, which may be better utilized in performing other household or farm activities.

## KEYWORDS

Decorticator, Efficiency, Kernels, drudgery, women farmer

## INTRODUCTION

Groundnut is a valuable source of edible oil (43-55%) and protein (25-28%) for human beings, and of fodder for livestock (Singh *et al.*, 2015). Groundnut seed is inside the underground pods. Shelling is an essential step in groundnut processing and is necessary as it allows the kernels and hull to be used as well as other post-harvesting technologies to take place such as oil extraction or in hull briquetting generally (Annonymus, 2015 and Srinath *et al.*, 2010). Shelling is carried out by hand or machines. In hand shelling, the pod is pressed between the thumb and first finger so that the kernel is released. It is the preferred method by the groundnut farmers of India. The kernel breakage is low in hand shelling, but is labour intensive, energy demanding and leads to "sore thumb syndrome" when bulk quantities are handled (Annonymus, 2015). In traditional method, a person decorticate 2-4kg of groundnut per hour, but the average rate of production reduces with the number of increasing hour (Ghodkhande *et al.*, 2015).

Production of groundnut in Bihar was 0.8 thousand tonnes in 2015-16 (data.gov.in, Rajyasabha session 239). It is estimated that required consumption demand of groundnut by the end of 2020 would be 14 million tons, so there is an ample scope of production of groundnut in the eastern region including Bihar (Bhattacharyya and Mitra, 2016). Groundnut is produced in four major blocks in Nalanda district. Saril Chak in Silao block has groundnut as a major kharif oilseed cultivated by women farmers. Not being a major crop of the district, the limited area covered solely by women including processing and post-harvesting activities. Traditionally groundnuts are separated from its shells by hands. The output from this method is very low and it cannot fulfil the market demand as it is a very time-consuming process. The average kernel price is approximately twice the price of the pod. Thus the need for an affordable equipment was felt which can minimize drudgery as well as time.

Hence demonstration of groundnut decorticator was carried out with farmers. A decorticator is a machine for stripping the husk off kernels for further processing. The machine reduces the labour costs associated with decortications, cleaning and preparing groundnuts for further processing. Decorticators are basically classified as manual or motorized (Annonymus, 2015). Manual decorticators are powered by human hand while motorized decorticators are powered by a motor or an engine. Introduction to a low-cost machine used by women group converted their produce into finished product (shelled peanut) and satisfied the need to fetch more money.

## MATERIALS AND METHODS

The study was conducted by Krishi Vigyan Kendra, Nalanda with four

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Mahila Krishak Hit Samuh comprising ten women farmers in each group. The women farmers were indulged in groundnut farming local variety and its processing in Sarilchak village of Silao block of Nalanda. In total 20 demonstrations conducted among four Mahila Krishak Hit Samuh namely *JivanJyoti Mahila Krishak Hit Samuh*, *Utthan Mahila Krishak Hit Samuh*, *Radha Rani Mahila Krishak Hit Samuh* and *Santhoshi Mahila Krishak Hit Samuh*. Before conducting FLD, the list was prepared after the survey and farmer's meeting and specific skill training was imparted in the form of practising farmer's training at farmer's field and at KVK campus regarding different aspects. According to the survey, it was found that women are still using the traditional method that is "by hand" and doing laborious work over a long time period. The traditional practices were maintained in case of local checks. The data were collected from both, FLD practices as well as



**Fig.1:** Groundnut decorticator being operated by women at KVK, Nalanda, Bihar, India

check activities and finally, the benefit-cost ratio was worked out (Samui *et al.*, 2000).

### Description of Unit

Twenty demonstrations in all four groups were given. Five units of hand-operated groundnut decorticator were provided to the groups (Fig.1). The groundnut decorticator is an oscillatory type device with cast iron shoes having projections for decortications of groundnut pods. It consisted of frame, handle, oscillating arm and sieve with an oblong hole. Woman operated it working in sitting or standing posture as per convenience. The pods were fed in batches of nearly 1.5-2.0 Kg or up to half of its hopper capacity, so that oscillating arm can easily be operated (Annonymus, 2015).

For proper decortications the shoes mounted on oscillating arm needed to be adjusted. For demonstration in each batch, 2.0 Kg. of groundnut pods were fed. Observation recorded were time taken in shelling weight of shelled groundnut and weight of broken kernels. The shelling efficiency and kernel damage were calculated using the following formula:

Shelling efficiency (%),  $S_e = W_k / W_i \times 100$  (Gitau *et al.*, 2013)

Where:  $k$  = Weight of kernels shelled including broken kernels;

$W_i$  = Total weight of kernels fed into the decorticator;

$W_b$  = Weight of broken kernels.

For each run of shelling, clearance, shelling efficiency in percent was recorded. The quantity of shells winnowed out and those collected with the seeds were noted. The performance of the groundnut decorticators was determined in terms of shelling efficiency and kernel damage. According to the total output of shelled peanut within recorded time, output in Kg per hour was calculated. Thus the output of both manual, as well as decorticator machine, were calculated in terms of gross cost and gross returns and BC ratio was calculated.

## RESULTS AND DISCUSSION

### Evaluation of traditional groundnut shelling

The results obtained during each batch of deshelling are presented in Table 1. It is evident from the findings that the increase in finished products over traditional practices was observed. The recorded data of traditional check activities of shelling peanuts by hand showed average mean of 1.44 kg shelled peanuts per hour with 62.17% efficiency. Observation was found lower than quoted by Ghodkhande *et al.* (2015) that one person can decorticate 2 to 4kg of groundnut per hour but coincide that the average rate of production reduces with the number of increasing hours. The average percentage of peeled roasted groundnut seed during manual operation was 52.3%, as stated by Ogunwole (2013). The mean time was observed 51.65 minutes to deshell for 2 kg of groundnuts. It was also observed that though groundnut shelling by hands results in poor quantity of finished products it contributes to minimum breakage of kernels. In this study only 6.43% broken kernels out of total shelled peanuts was recorded.

**Table 1:** Performance of the traditional method of groundnut shelling used in village

Demonstrations (No.)	Weight of groundnut seeds (Kg)	Weight of peeled groundnut seeds (kg)	Weight of broken groundnut seeds (kg)	Effective time of peeling (min.)	Peeling Efficiency (%)	Production (Kg /hr)
1	2.00	1.25	0.07	51	62.50	1.47
2	2.00	1.23	0.11	52	61.50	1.41
3	2.00	1.24	0.08	50	62.00	1.48
4	2.00	1.23	0.07	50	61.50	1.47
5	2.00	1.27	0.11	52	63.50	1.46
6	2.00	1.28	0.10	54	64.00	1.42
7	2.00	1.25	0.06	49	62.50	1.53
8	2.00	1.28	0.09	54	64.00	1.42
9	2.00	1.27	0.12	49	63.50	1.55
10	2.00	1.18	0.08	48	59.00	1.47
11	2.00	1.23	0.06	52	61.50	1.41
12	2.00	1.23	0.06	50	61.50	1.47
13	2.00	1.18	0.10	49	59.00	1.44
14	2.00	1.25	0.08	52	62.50	1.44
15	2.00	1.24	0.10	54	62.00	1.37
16	2.00	1.25	0.09	53	62.50	1.41
17	2.00	1.21	0.07	53	60.50	1.36
18	2.00	1.24	0.11	52	62.00	1.43
19	2.00	1.3	0.075	55	65.00	1.41
20	2.00	1.26	0.10	54	63.00	1.4
Mean		1.24	0.08	51.65	62.17	1.44
CV - 0.047						

#### Evaluation of groundnut decorticator

Data recorded in [Table 2](#) reveals that the average production of shelled peanuts by hand-operated manual groundnut decorticator was 32.43kg per hour with decorticator efficiency at 66.4 percent. CIAE Bhopal, manufacturer of the same model suggested 30 kg/hr output. According to [Mohammed and Hasan \(2012\)](#), manually operated Sheller has 5kg of groundnut sample and performed at 65% shelling efficiency with mechanical damage of 2.8%. [Ogunwole \(2013\)](#) mentioned the manually operated Sheller with roasted

groundnut sample performed at 55% shelling efficiency. If we put input in large amount then we got the more output from machine with a minimum wastage ([Raghtate and Handa, 2014](#)). The broken kernel rate was 11.27% which was higher than 6.43%, in the traditional method. But the total output of finished kernels was 22.5 times more than traditional method per hour. Time taken to deshell groundnuts was only 2.46 minutes per 2.00 kg thus saving of time, safety and drudgery became major benefits ([Srinath et al., 2010](#)).

**Table 2:** Evaluation of Hand Operated Groundnut Decorticator

Demonstrations (No.)	Weight of groundnut seeds (Kg)	Weight of peeled groundnut seeds (kg)	Weight of broken groundnut seeds (kg)	Effective time of Peeling (min.)	Peeling Efficiency (%)	Production (kg/hr)
1	2.00	1.36	0.16	2.50	68.00	32.64
2	2.00	1.32	0.15	2.50	66.00	31.68
3	2.00	1.34	0.12	2.40	67.00	33.50
4	2.00	1.34	0.13	2.40	67.00	33.50
5	2.00	1.32	0.15	2.40	66.00	33.00
6	2.00	1.31	0.15	2.50	65.50	31.44
7	2.00	1.31	0.16	2.40	65.50	32.75
8	2.00	1.32	0.16	2.40	66.00	33.00
9	2.00	1.31	0.14	2.45	65.50	32.08
10	2.00	1.37	0.15	2.40	68.50	34.25
11	2.00	1.31	0.15	2.50	65.50	31.44
12	2.00	1.3	0.14	2.45	65.00	31.84
13	2.00	1.36	0.16	2.50	68.00	32.64

14	2.00	1.32	0.15	2.5	66.00	31.68
15	2.00	1.33	0.16	2.5	66.50	31.92
16	2.00	1.31	0.14	2.45	65.50	32.08
17	2.00	1.33	0.16	2.5	66.00	31.92
18	2.00	1.35	0.15	2.5	67.00	32.400
19	2.00	1.32	0.16	2.5	66.0	31.68
20	2.00	1.36	0.18	2.45	68.00	33.30
<b>Mean</b>		<b>1.33</b>	<b>0.15</b>	<b>2.46</b>	<b>66.42</b>	<b>32.43</b>
CV= 0.79						

### Economics of Groundnut decorticator

Under economic parameter of frontline demonstration for traditional check and demonstration data for gross cost and gross return also has been calculated. Traditional check output recorded 1.2 kg per batch and 1.44 kg /hour. The gross cost calculated for a day was Rs. 624 including labour charges for winnowing, cleaning and storage material whereas gross return was observed as Rs. 654.00 for total 5.45 finished kernels @ Rs 120/kg. Thus BC ratio was noted 1: 0.95 only. Whereas the decorticator produced 32.4 kg/hr with gross costing Rs. 20100/- for semiskilled labour, storage materials, raw materials with machine working for 6 hrs/day. The gross return calculated Rs. 23200 for total 193 kg @ Rs120 added with cost of broken kernels @ Rs. 60/kg. Hence BC ratio calculated was 1:1.15.

**Table 3:** Economics of Groundnut Decorticator

Method of Peeling	Gross Cost (Rs/day)	Gross Return (Rs/day)	Profit (Rs/day)
Manual	624	654	30
Groundnut decorticator	20,100	23,200	3100

\* Seasonal occupation

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### CONCLUSION

Through the FLD programmes, the new technologies like the use of high yielding varieties, new methods of planting, balanced doses of nutrients and practices were demonstrated to the farmers. The productivity gain under demonstrations practices over conventional practices created awareness and motivated the other women farmers to adopt appropriate recent practices and integrated technologies in the district. The important implication of the results of these practices was that the groundnut decorticator can effectively be used to shell groundnut in less time and labour. Saving of time with less tiresome practices could be utilized by women farmers for other additional farm activities, taking care of children and households or investing to self-health as benefits as taking rest. Economic profit enhanced through decorticator has raised economic and social stability and also enhanced decision making power among rural women of selected blocks. It was also noticed that increased consumption of shelled peanut also increased food and nutritional security.

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