



Evaluation of Rural Entrepreneurship with Value Added Regram (*Cajanus cajan*) Using Mini Dal Mill

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Authors' contributions

This work was carried out in collaboration among all authors. Author AJ designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors AJ and RA managed the analyses of the study. Author AJ managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Pulses processing is a very huge business in India. In India, split of pulses are prepared called as "Dal" or "Dhal". Regdram cultivating farmers are demotivated as there net returns are low due to continuous market fluctuation in prices of Redgram and this is becoming the reason for decrease in area of cultivation under Redgram. Milling pulses improves bio-availability of nutrients and Partial or complete removal of antinutritional and toxic compounds making it nutritive for human consumption. Mini dal mill is low investment enterprise to improve the net income of farmers. The present study concluded that the average gross income through sale of Redgram is Rs 41.3/KG without processing and Rs 63/KG with processing. The profitability is more with the processing of Redgram. The cost benefit ratio is 1:1.18 without processing and 1:1.80 with processing. Hence farmers must be educated to develop entrepreneurship and promote value added Redgram using mini dal mill.

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1. INTRODUCTION

The pigeon pea (*Cajanus cajan*), also known as red gram is a perennial legume from the family Fabaceae. India is the largest producer of pulse in the world [1]. In India approximately 13 million tons of pulses are produced annually and more than 70 % of these pulses are processed by dal mill. Dehulling pigeon peas is an age-old practice in India in many traditional methods. Milling of dal is aged old practice and various conventional methods are adopted for milling and many machines are available but they are very huge and space consuming. In India, split of pulses are prepared called as "Dal" or "Dhal" and are used as a food material. Milling includes complete removal of the husk along with splitting of dal with less generation of powder and broken husks are the main characteristics. The milling process is generally includes, loosening of husk by wet or dry method and dehulling and splitting using suitable machines. Milling pulses improves bio-availability of nutrients and Partial or complete removal of antinutritional and toxic compounds making it nutritive for human consumption. According to the reports of CFTRI 2001, legume or pulse occupy an important place in the world food and nutrition economy, Present world production estimated to be 50 million metric tones, at an average price of 2000 per metric tones, its total value would amount to be Rs. 100 billion. In India Pulse processing and milling industry ranks next only to rice and flour industry with about 10,000 commercial mills in capacity range of 1-50 tonnes /day [2]. According to the study by Thejashree et al.2020, the adoption of certified seed production of Redgram in farmers' fields is helpful in providing a profitable enterprise for increasing the net farm income. The results of the study conducted by the team of Praveen et. al 2019, has concluded that establishment of mini Dhal milling units at rural areas have the potential to enhance farmer's income, employment opportunities and better stabilization of price inflation in the Indian market during drought situations. Value-addition to red gram and other pulses at cottage scale will not only make cheaper food products available to rural population but also address protein energy malnutrition problems among rural population and strengthen the rural economy. Apart from profitable enterprise Redgram is nutritious pulse 100g of dhal provides 21.7 g protein, 1.5 g fat, 55.23 g carbohydrate, 9.06 g dietary fibre, 321.7 kcal energy, 108 µg total folates, 2.63 mg Zinc and

71.7 mg calcium [3,4]. Value-addition to red gram at small and medium scale will enable cheaper dhal based food products to rural population and also address the protein energy malnutrition problems among rural population and strengthen the rural economy [5].

2. METHODOLOGY

2.1 Objective

Promotion of value added products and increase rural entrepreneurship in Redgram.

2.2 Problem

Lack of knowledge on Redgram value addition and low income generation through Redgram cultivation was concern of farmers of Nagarkurnool district.

2.3 Hypothesis

Usage of mini dal mill will lead to promotion of value added products and increase rural entrepreneurship in Redgram.

2.4 Study Area

The study is conducted at Nagarkurnool district of Telangana state. The production of Redgram is 11,489.6 ha in Kharif and 54ha in Rabi in the district usually the varieties like PGR-176, PGR-156 are cultivated.

2.5 Study Subject

Farmers cultivating Redgram was purposively selected. The farmers usually sale their produce raw but in the present study they were motivated to process the redgram and sale a value added product of redgram for more profits.

2.6 Sample Size and Sampling Technique

Present study included 30 Redgram cultivating farmers and farm women were purposively selected from Nagarkurnool districts of southern Telangana state.

2.7 Data Collection

The basic family and economic data is collected through questionnaire method. The data of cost benefit ratio, gross income and net income profits were collected through questionnaires

every week. The economics shows that the minimum support price for Redgram has fluctuations like increased from Rs. 4300 to 5450 during the period from 2013-14 to 2018-19 and the average prices of dhal decreased from the year 2016-17 to 2018-19 and 50% dhal prices decreased due to increased production of Red gram [6]. The Msp on an average during study period was reported by farmers studied is Rs 5450/100 kg and cost of processing is Rs 5/kg which indicates Rs 500/100 kg [7].



Fig. 1. Redgram milling at KVK, Palem



Fig. 2. Redgram pulse milled to dal at KVK, Palem

3. INTERVENTION

There are three components in intervention of the present study a. Nutritional education programs, b. Method demonstrations and c. Training on marketing skills and entrepreneurship development.

- a. **Nutritional education programs:** Under nutritional awareness programs Dr. Afifa Jahan scientist, KVK-Palem has conducted awareness camps, group

meetings and diagnostic field visits to sensitize farmers and farm women about importance of milling Redgram for income generation in the district. As the dal processed through mini dal mill is unpolished it is of high nutritive value.

- b. **Method demonstrations:** Under this the farm women and farmers were given first hand training in handling the mini dal mill. Operations of min dal mill were clearly explained and they were allowed to mill dal using mini dal mill of KVK, Palem for free of cost.
- c. **Training on marketing skills and entrepreneurship development:** Farm women and farmers were encouraged to start the value addition of Redgram instead of selling the unprocessed Redgram. Farm women and farmers were every week given a class on entrepreneurship development in value added Redgram based products including market mix, branding, labeling etc. Experts from KVK, PVNRTVU, Warangal was also invited to educate farmers on entrepreneurship

3.1 Data Analysis

The SPSS software was used for the analysis of the data. The cost benefit ratio was calculated using formula of gross income divided by cost of cultivation by Perin et al. [8].

4. RESULTS AND DISCUSSION

Present study included 30 Redgram cultivating farmers and farm women. They were purposively selected and studied since year 2018 to 2020 in different villages from Nagarkurnool districts of southern Telangana state. The three years study aims to develop entrepreneurship in the farmers by milling redgram with mini dal mill.

The preliminary data about the produce of Redgram, there sales, cost of production, profits every years was collected through questionnaire method. Later the demonstration of using mini dal mill for milling the Redgarm was explained to all 30 farmers selected in the study. Then they were helped to sale the processed dal in package where labeling and branding was done.

The mini dal mill costs is around Rs 75000/- and consist of destoner, dehusker and splitter to spilt dal similar to the description of splitter given by

Gaodi et al. 2019, it is simple and very easy to handle. It is of capacity 100kg/hour and requires three phase electricity power to work. According to Maurya et al. [9], the cost of milling of Redgram by PKV Akola dhal mill was found much cheaper (Rs. 0.87/kg) in comparison with traditional method using stone chakki (Rs. 2.054/kg) which is 2.36 time folds. So PKV Akola dhal mill is found cheaper than the traditional method in the rural areas. According to the Wagh et al. [10], the economic performance of pulse processing units like PKV Dal mill in terms of cost is thus very essential for accelerating the growth of agriculture processing industries.

The selected farmers and farm women were sensitized towards milling Redgram, as it fetches more profits and unpolished Redgram is of high nutritive value. They were given method demonstrations of milling dal so that they can mill they own produce and reduce the labour charges according to study of Gaodi et al. [11], dal milling provides an additional source of income for the farmers which will help them for their well-being. The study also concluded that traditional milling machines takes more floor space area for the splitting of grains also the rate is less. The power consumption in this process is more and the output as compared to the power and size is less and it also becomes unaffordable for various farmers. Dal mill provides a higher rate of outcome as compared to the traditional milling machines at low power consumption rate [11].

The cost benefit ratio without milling of dal (Check) with milling of dal using mini dal mill (Demo) was studied for three years. The cost benefit ratio was calculated using formula of

gross income divided by cost of cultivation by Perin et al., 1979. The study of Navadkar D.S., et al., 2016, has proven that the profitability of pulse processing was closely associated with the installed capacity and its utilization in the case of the different sized dal mills. The per dal mill net returns over total variable cost as well as over total cost were increased with the increase in the size of dal mills and the estimated break-even quantity increased with the increase in the size of dal mills. The results indicated that Benefit-Cost Ratio was little lower in the case of the small sized dal mills than that of the medium and large sized dal mills [12].

Table 1 shows the average net income of 30 Redgram cultivating farmers. In the three years the gross value of produced sold is between Rs 40-42/KG without value addition which includes the cost of cultivation Rs 35/KG and Rs 5-7/KG as net profits to farmers. The farmers working so hard entire year will not get adequate profits if they sale Redgram without value addition. The middle men will pay them less and process the dal and gets high profits.

Table 2 shows the average net income of 30 Redgram cultivating farmers. In the three years the gross value of produced sold is between Rs 62-65/KG with value addition which includes the cost of cultivation Rs 34-35/KG and Rs 27-30/KG as net profits to farmers. The farmers working so hard entire year will get adequate profits if they sale Redgram with value addition. Hence processing of pulses is a good enterprise option for farmers. As the dal processed using mini dal mill at KVK is without polish it's of high nutritive value. This awareness must be created among farmers so that they start their own enterprises.

Table 1. The net income without value added Redgram (Check) for three years

S. No	Year	No. of Farmers	Gross Value in check Rs/KG	Cost of cultivation in check (Rs.) Rs/KG	Net Income in check (Rs.) Rs/KG
1	2018	30	40	35	5
2	2019	30	42	35	7
3	2020	30	42	35	7

Table 2. The net income with value added Redgram (Demo) for three years

S. No	Year	No. of Farmers	Gross Value in demo Rs/KG	Cost of cultivation in Demo (Rs.) Rs/KG	Net Income in Demo (Rs.) Rs/KG
1	2018	30	62	35	27
2	2019	30	61	34	27
3	2020	30	65	35	30

Table 3. Cost benefit ratio of Check and demo of Redgram

S. No	Year	No. of Farmers	Gross Value in check Rs/KG	Gross Value in demo Rs/KG	Percentage of improvement	Cost benefit ratio for check	Cost benefit ratio for demo
1	2018	30	40	62	22.00	1:1.14	1:1.77
2	2019	30	42	61	19.00	1:1.2	1:1.79
3	2020	30	42	65	23.00	1:1.2	1:1.86
Average		30	41.3	63	21.3	1:1.18	1:1.80

Table 3 explains that the average gross income through sale of Redgram is Rs 41.3/KG without processing and Rs 63/KG with processing. The profitability is more with the processing of Redgram. The cost benefit ratio is 1:1.18 without processing and 1:1.80 with processing so for every one rupee investment almost double income can be made with processing of Redgram and it's a good opportunity for farmers to start their own enterprise.

5. CONCLUSION

Milling of Redgram is aged old practice and various conventional methods are adopted for milling and many machines are also available. Usage of Mini Dal mill is low investment high profit enterprise. The profitability is more with the processing of Redgram than unprocessed. The cost benefit ratio is 1:1.18 without processing and 1:1.80 with processing. The farmers if investing one rupee they are getting almost double profits according to the results of the present study. The Redgram cultivating farmers need to be encouraged to start the enterprise for better income.

6. RECOMMENDATIONS

- The farm women and farmers whose pulses were sundried were very well milled.
- The pulses which were soaked overnight and sundried were producing more breakage and wastage percentage was more.
- The pulses which were coated with oil were having difficulty while milling.
- The only problem faced by farmers was the supply of electricity as milling equipment requires three phase electricity power.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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