

Technology adoption and their impact on farmers : A Case study of PKV Mini Dal Mill in Vidarbha Region



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Abstract

The production of pulses in Vidarbha region of Maharashtra state is increasing day by day, keeping this in point of view of small farmers, PKV dal mill, which is a compact mini dal mill with all essential operations, has been developed at Dr.PDKV, Akola. Dal milling activity being an important economic aspect in realizing the better price for the produce and the contribution of dal mills in employment generation is equally important. Age and education play vital role in farmers disposition towards technology and their comprehension and adoption. Hence, it is observed from the table that, only 4 percent of the respondents fell under Old age category while 72 percent belonged to middle age category and rest 24 percent to young category. The study revealed that, the amount of Rs. 33750 was the average capital investment in PKV miniDalmill along with accessories. This contributes 40.49 per cent to the total fixed capital investment. It was further observed that the farmers having PKV mini dal mill was more interested in adopting custom hire practice in order to avoid high investment in storing the raw material Thus Rs. 279.93 was estimated as a net returned per quintal. However the annual net income from PKV mini Dal mill was estimated to be Rs. 85378. It is revealed from the study that, amongst all farmers high change was observed in five dimension i.e. Subsidiary occupation (100 Per cent) and Increased in family income (100 per cent) followed by increased in consumption of dal (96 per cent), human labour utilization self and family labour (88 per cent) and migration ceased (84 per cent). The income of the farmers were increased by 73.89 per cent and the result in change in consumption habit i.e. Fruits, Eggs, Meat and Milk consumption increased by 46.23 per cent. The inadequate supply of electricity was the major problem faced at the time of operating PKV dal mill; this is due to the heavy load-shedding in villages during day time. About 56 percent of the farmers were state the inadequate availability of skill labour. However, 36 per cent dal mill owner facing the problem of technical knowledge about operating of machinery. Hence there is a need to conduct the training programme or disseminate the information about operating of PKV Mini Dal Mill through leaf let.

Keywords PKV Dall Mill, Adoption and Technology.

Introduction

Agricultural research systems all over the world are acclaimed for their significant contributions to food and nutritional security and poverty alleviation. Agricultural research in India is largely in the public sector domain. There is empirical evidence of agricultural growth induced the Green Revolution technologies having benefited the rural and urban poor through reduction in food prices. Although the impact in term of poverty reduction has multiplied over the years and spread geographically, there is a need to accelerate these impacts in order to improve the livelihoods of the poorest of the poor Maharashtra is one of the major important states in growing pulses. The major pulses grown in the state are mung, urid, tur, chickpea etc. The area under major pulses i.e. mung, urid, tur and chickpea during the year 2009-10 in Maharashtra was around 12.50 lakh hectares and production was about 9.13 lakh tonnes with productivity of major pulses 730 kg/ha. However, Vidarbha contributes, 5.14 lakh hectares area under pulses and the production was about 5.43 metric tonnes with productivity of major pulses 997 kg/ha. As the production of pulses in Vidarbha region of Maharashtra state is increasing day by day, the Akola and Amravati districts of Vidarbha region are important according to pulse processing point of view. Keeping this in point of view of small farmers, PKV dal mill, which is a compact mini dal mill with all essential operations,

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has been developed at Dr.PDKV, Akola. It uses an electric motor of 3.0 hp. It is advantageous to small-scale processors due to less cost and space economy and also the investment is low with higher dal recovery as compared to commercial dal mills at rural levels. Similarly, it can save the transportation and handling losses to the extent of 3.7 per cent. With the use of this PKV dal mill, it is possible to process the pulses at home, which can work for 150-250 days per annum with 72-75 per cent dal recovery for red gram, 80-82 per cent dal recovery for green gram and black gram. Its processing capacity is 10 qt. for red gram and 12 qt for green gram and black gram per day. This mill can also give 3-4 per cent more dal recovery than the mega dal mills. Such processing is possible through the use of "PKV Dal Mill Plant".

Thus, dal milling activity being an important economic aspect in realizing the better price for the produce and the contribution of dal mills in employment generation is equally important. Hence, study of impact of PKV dal mill is very essential for accelerating the growth of pulses processing units in Vidarbha region. It will help the rural farmers to get the benefit of processing and value addition to their farm produce. Keeping the importance of the technology in rural area, the study was undertaken with the objectives of estimate the economics and assess the technology of PKV Mini Dal Mill.

Methodology

The main objective of any scientific investigation is to draw useful conclusion in light of objective of study. In order to get the meaningful conclusion, it is essential for investigator to adopt appropriate method and procedure, keeping this in view, to explain the methodology adopted, and to fulfill the objective of study. It also deals with source of data, type of data, selection of area, selection of farmers, collection of data, and analytical tools used.

Selection of Area and sample:

The present study was undertaken in Akola, Amravati, Wardha and Nagpur district in Vidarbha. The villages and the number of farmers selected are as follows.

Table1: Tahsil wise distribution of farmers:

| Sr. no. | Name of District | Name of Tehsil | Name of Villages |
|---------|------------------|----------------|--|
| 1 | Akola | Telhara | Hiwarkhed, Madgaon Bazar |
| | | Balapur | Dadham, Bhauradh |
| | | Patur | Pacharan |
| | | Barshitakdi | Mahan |
| | | Akola | Ugwa, Mehsang |
| | | Akot | Mundgaon, Jitapur |
| 2 | Amravati | Bhatkuli | Checharwadi |
| | | Chadur Bazar | Brahmanwadi Tadi, Karajgaon, Shirajgaonkasba |
| | | Warud | Haturna |
| | | Morshi | Morshi, Ner, Nimbi |
| | | Anjangaon | Anjangaon Surji |
| 3 | Wardha | Hinganghat | Shokapur, Satephal, Chicholi |
| | | Arvi | Arvi, Rohana |
| 4 | Nagpur | Kalmeshwar | Kalmeshwar |

In all total 25 farmers were selected from 24 villages of four district in vidarbha region for the study. Akola, Amravati, Wardha and Nagpur districts were purposively selected as majority of PKV Dal mill units which were concentrated in rural area. It was found that the pulse processing units (PKV Dal mills) had installed processing capacity of 8-10 qt/day. In the present study, a sample of one Dal mill owners from each village was selected purposively to accomplish the objectives of the present study on the basis of existing status of PKV dal mills. The details of selected villages are given in the table no. 1. The primary data from selected PKV Dal mill owners were collected in the questionnaire by personal interview. The information regarding PKV Dal mill owners had obtained from Head, Department of Post Harvest Technology, Dr.PDKV, Akola and Manufacturer of PKV Dal mill, M/s. Shriram Associates, J-27, Phase III, M.I.D.C., Akola. The Dal mill owners of processing units were interviewed separately for the collection of information on various aspects related to processing. The data pertained to the year 2011-12.

Estimation of cost and returns

The fixed cost include the cost of the Machinery, Land / Building, Taxes, installation charges paid by the owner at the initial stage etc.. However, the variable cost consist of labour charges, repairs, maintenance and replacement of machinery, Electricity, storage and water charges, Interest on working capital @ 6 per cent etc.. Thus, the total cost includes the fixed cost and variable cost.

Depreciation on machinery was calculated by straight line method by considering the life of machinery as 18 years. Depreciation on building was worked out @ 2 per cent per annum. Whereas, Interest on fixed capital was calculated @ 14 per cent on the total capital invested and was charged for one year. For calculating interest on working capital, the expenditure on items included in variable cost was taken into consideration. Interest on working capital was calculated @ 6 per cent per annum.

Per quintal fixed cost was calculated by dividing total fixed cost during the year by the total quantity of pulses processed in that year and per quintal variable cost was calculated by dividing total fixed cost during the year by the total quantity of tur processed in that year. The per quintal total cost of processing was estimated by adding together per quintal fixed cost and per quintal variable cost which included processing charges in that year. Gross return per quintal for processing of tur was calculated by adding together value of main product and by-product received after processing of one quintal of tur.

Simple tabular analysis such as averages and percentages etc. were carried out to accomplish the objective of the study. The problems faced by PKV dal mill owners during the adoption of the technology were examined by discussing personally, which were interpreted by simple tabular form.

Results and Discussion:

Keeping in view the objectives of the study, the data were analyzed using suitable techniques.

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The results obtained from this study have been presented and discuss critically.

A) Distribution of the farmers :

The size of holding wise distribution of the selected farmers are presented in the table no. 2, it is revealed that 56 per cent farmers were from small size of holding. These farmers had only 1.2 ha. area. The small size holding farmers are interested to purchase the PKV MiniDall Mill as a subsidiary enterprise to get more income. However, 28 per cent farmers from large size of holding, having 5.43 ha. of land.

Table no. 2: Size of holding wise distribution of the farmers

| Sr. No. | Particulars | No. of Farmers | Average size of holding |
|---------|---------------------------|----------------|-------------------------|
| 1 | Small (0.01 -2.0 ha.) | 14 (56.00) | 1.207 |
| 2 | Medium (2.01-4.00 ha.) | 4 (16.00) | 2.834 |
| 3 | Large (Above 4 ha.) | 7 (28.00) | 5.437 |
| | Total | 25 | 3.159 |

(Figures in parenthesis indicate the percentage over total)

A) Profile of Sample Farm:

A total of twenty four (24) villages spread across four district of Vidarbha region were surveyed for the study. The demographic characteristics of the sample farm's families are profiled in table 3. Age and education play vital role in farmers disposition towards technology and their comprehension and adoption. Hence, it is observed from the table that, only 4 percent of the respondents fell under Old age category while 72 percent belonged to middle age category and rest 24 percent to young category. The educational profile showed that 32 percent farmers had high school level, followed by 28 percent secondary level, 24 per cent primary level and 16 per cent Diploma/ College level. While illiteracy was not found in the sample.

Table no. 3: Family Profile of the sample farm household

| Sr. No. | Particular | Small | Medium | Large | Overall |
|---------------------------|-------------------|---------------|--------------|--------------|---------------|
| A Age groups | | | | | |
| 1 | Young (<30) | 2 (14.28) | 2 (50.00) | 2 (28.57) | 6 (24.00) |
| 2 | Middle(30 - 50) | 11 (78.57) | 2 (50.00) | 5 (71.42) | 18 (72.00) |
| 3 | Old (>50) | 1 (7.14) | 0 (0.00) | 0 (0.00) | 1 (04.00) |
| B Education status | | | | | |
| 1 | Illiterate | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) |
| 2 | Primary level | 5 (35.71) | 0 (0.00) | 1 (14.28) | 6 (24.00) |
| 3 | Secondary level | 5 (35.71) | 0 (0.00) | 2 (28.57) | 7 (28.00) |
| 4 | High School level | 2 (14.28) | 3 (75.00) | 3 (42.85) | 8 (32.00) |

| | | | | | |
|-------------------------------|---------------------------|---------------|--------------|--------------|---------------|
| 5 | Diploma/Coll ege level | 2 (14.28) | 1 (25.00) | 1 (14.28) | 4 (16.00) |
| C Family size (member) | | | | | |
| 1 | Small (<5) | 11 (78.57) | 3 (75.00) | 4 (57.14) | 18 (72.00) |
| 2 | Medium(5-10) | 3 (21.43) | 1 (25.00) | 2 (42.85) | 7 (28.00) |
| 3 | Large (>10) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) |

(Figures in parenthesis indicate the percentage over number of farmer in respective size of holding)

Family size is a major factor in determining the economic well being of the farmers. The family size distribution showed that 78.57, 75.00 and 57.14 percent had small family under small, medium and large size of holding respectively. Whereas on an average 72 percent came under small and rest of 28 per cent was under medium family size. However, no bigger families observed in the sample.

Economics of PKV MiniDal Mill

Average capital investment in PKV dal mill

The average capital investment includes land, building with drying platform, along with PKV Dal mill accessories, furniture and fixtures, and installation of electric meter and other charges. The same is presented in Table 4.

Table 4: Average capital investment in PKV dal mill

(Rs/Unit)

| Sr. No. | Particulars | Amount in (Rs) |
|---------|--|-------------------|
| 1. | Investment in PKV dal mill along with accessories | 33750 (40.49) |
| 2. | Investment in land, building with drying platform. | 30444 (36.52) |
| 3. | Investment in furniture and fixtures | 4200 (5.04) |
| 4. | Electrical installation and other charges | 14961 (17.95) |
| | Total : (Rs.) | 83355 (100.00) |

(N.B: Figures in parenthesis indicate the percentage to total investment)

The table 4 observed that the amount of Rs. 33750 was the average capital investment in PKV miniDalmill along with accessories. This contributes 40.49 per cent to the total fixed capital investment. The actual price of the PKV minidalmill is Rs. 55000/- . But most of the farmers were got the fifty per cent subsidy. However, few farmers were received hundred per cent subsidy.

The investment in land, building with drying platform was contribute 36.52 per cent share in total capital investment. Whereas, 17.95 and 5.04 per cent has contribution from electrical installation and investment in furniture/ fixtures respectively.

Average Cost of processing:

The processing cost of tur into dal is given in table no. 5. The table shows that the total cost for processing of tur in PKV mini dal mill was estimated to

be Rs. 39802/-. In which Rs. 14084 and Rs. 25717 were the fixed and variable cost constitute 35.39 and 64.61 percent in total cost respectively. The cost of processing per quintal was estimated to be Rs. 130.49/-. The labour charges has the major share i.e. 36.31 per cent in total cost of processing followed by Interest on fixed capital, edible oil and electricity charges viz 29.32, 10.68 and 6.60 in total cost of processing of tur in PKV mini Dal Mill respectively.

Table no. 5: Average cost of processing of tur in PKV Mini dalmill.

| Sr. No. | Particulars | Amount (Rs./An num) | Percentage |
|---------|---|---------------------|------------|
| A | Fixed cost | 14084 | 35.39 |
| | Depreciation on PKV dal mill & accessories | 1597 | 4.01 |
| | Depreciation on building with dry platform @ 2 per cent | 608 | 1.53 |
| | Depreciation on furniture and fixtures | 210 | 0.53 |
| | Interest on fixed capital @ 14 per cent | 11669 | 29.32 |
| B | Plant operated (Days/year) | 150 | |
| C | Quantity of tur processed per annum (Quintals) | 305 | |
| D | Fixed cost Rs. per quintal | 46.18 | |
| E | Variable cost | 25717 | 64.61 |
| | Labour charges | 14454 | 36.31 |
| | Electricity Charges | 2625 | 6.60 |
| | Repairs & maintenance | 1976 | 4.96 |
| | Edible oil charges | 4250 | 10.68 |
| | Miscellaneous Charges | 975 | 2.45 |
| | Interest on working Capital @ 6 % | 1455 | 3.66 |
| F | Variable cost per Quintal | 84.32 | |
| G | Total Cost (A + E) | 39802 | 100.00 |
| | Cost of Processing per quintal | 130.49 | |
| | Charges of Processor per quintal of tur | 410.42 | |
| | Net return per quintal | 279.93 | |
| | Annual net income | 85378 | |

It was observed that the farmers having PKV mini dal mill was more interested in adopting custom hire practice in order to avoid high investment in storing the raw material and they used to processed the raw material i.e. tur of the other farmers of the adjacent villages and charge on an average Rs. 410.42 per quintal as a processing charges. Thus Rs. 279.93 was estimated as a net returned per quintal. However the annual net income from PKV mini Dal mill was estimated to be Rs. 85378.

Table 6: Quantity of raw material processed and product obtained from PKV dalmill

| Sr.No | Particulars | Quintals |
|----------|--|----------|
| 1. | Plant operated (Days/Yr.) | 150 |
| 2. | Raw material processed(qt.) | 305 |
| Products | | |
| a) | Dal (finished product) (qt.) | 226 |
| b) | Broken dal (Churri) (qt.) | 46 |
| c) | By-product (Bhusa) (qt.) | 33 |
| 3. | Percentage of finished product to raw material | 74 |

The table 6 revealed that the plants were operated 150 days per year with on an average 305 quintals of raw material processed. From which, 226 quintal dal i.e. finished product has processed. The product from PKV mini dal mill is quite comparable with that from traditional mills in respect of quality. It contributes 74 per cent of the raw material. However, 15 and 11 per cent was the broken dal (Churri) and powder (Bhusa) respectively.

Impact of PKV MiniDal Mill

The impact of the PKV Mini Dal Mill was assessed at farmer's level on various dimensions. The dimensions were, employment generation for other, human labour utilization work for self and family member, income generation, change in consumption habit, change in social status etc. The data were collected with the help of structured interview scheduled by personally interviewing the respondent entrepreneur / farmer. Impact of the technology was assessed in the term of percentage change i.e. difference between before and after change converted into percentage change.

Table no. 7: Perception of the farmers on Impact of PKV Mini Dal Mill on farmers.

| Sr. No. | Indicators | Frequency (n=25) | Change after adoption of technology (%) |
|---------|--|------------------|---|
| 1 | Subsidiary occupation | 25 (100.00) | -- |
| 2 | Employment generated for other | 10 (40.00) | -- |
| 3 | Labour utilization of Family member | 22 (88.00) | |
| 4 | Income increased | 25 (100) | 73.89 |
| 5 | Migration Ceased | 21 (84.00) | |
| 6 | Change in the consumption habit (Increased in consumption of Fruits, Eggs, Meat, Milk etc) | 18 (72.00) | 46.23 |
| 7 | Change in Standard of leaving (better) | 14 (56.00) | |
| 8 | Purchase of new assets for family | 09 (36.00) | |
| 9 | Increased in consumption of dal processed in own PKV Mini Dal mill | 24 (96.00) | 43.12 |
| 10 | Change in social Status | 01 (04.00) | |

The information regarding the impact of PKV mini dal mill is depicted in table no.7. It is revealed from the table that, amongst all farmers high change was observed in five dimension i.e. Subsidiary occupation (100 Per cent) and Increased in family income (100 per cent) followed by increased in consumption of dal (96 per cent), human labour utilization self and family labour (88 per cent) and migration ceased (84 per cent). The income of the farmers were increased by 73.89 per cent and the result in change in consumption habit i.e. Fruits, Eggs, Meat and Milk consumption increased by 46.23 per cent. As the dal processed in the PKV Mini Dal mill is good in quality hence 96 per cent farmers state that 43.12 per cent consumption of dal in daily diet was increased.

Constraint in adoption of technology

PKV dal mill is the technology released by Dr. PDKV, Akola, However few major problems expressed by owners of PKV dal mill while processing of tur. The constraints are tabularized and presented in Table 8. It is revealed from Table that all most all farmers has express, the inadequate supply of electricity was the major problem faced at the time of operating PKV dal mill; this is due to the heavy load-shedding in villages during day time. About 56 percent of the farmers were state the inadequate availability of skill labour. However, 36 per cent dal mill owner facing the problem of technical knowledge about operating of machinery. Hence there is a need to conduct the training programme or disseminate the information about operating of PKV Mini Dal Mill through leaf let.

Table no. 8: Problems faced by Dal mill owners

| Sr.No. | Problems | Frequency (n=25) |
|--------|--|------------------|
| 1 | Varietal problems for processing | 12 (48) |
| 2 | Inadequate skilled labour supply | 14 (56) |
| 3 | Irregularity in supply of electricity | 25 (100) |
| 4 | Inadequate dry platform | 13 (52) |
| 5 | Lack of technical knowledge about operating of machinery | 09 (36) |
| 6 | Breakage of sieves while processing | 16 (64) |

(N.B: Figures in parenthesis indicate the percentage to total).

Fifty per cent farmers has install the PKV Mini Dall mill at nearer to their own house and hence they face the problem of sufficient dry platform for drying the raw material. Farmers from Akola and Amravati district has identified that the problem in the processing of few variety of tur for example Nirmal tur. This tur was not processed properly in PKV Mini Dal mill. However, sixty four per cent farmer has face the problem of breakage of sieves while processing. Some minor repairs required were in four point suspension and eccentric mechanism of sieve unit. It was getting choked due to lack of oiling and play

observed in eccentric mechanism. It was suggested to apply oil/grease properly once in three months wherever it is necessary.

Conclusion

Thus the study is conclude that, 56 per cent farmers were from small size of holding. These farmers had only 1.2 ha. area. The small size holding farmers are interested to purchase the PKV MiniDall Mill as a subsidiary enterprise to get more income. However, 72 percent belonged to middle age category. Rs. 279.93 was estimated as a net returned per quintal. However the annual net income from PKV mini Dal mill was estimated to be Rs. 85378. The income of the farmers were increased by 73.89 per cent and the result in change in consumption habit i.e. Fruits, Eggs, Meat and Milk consumption increased by 46.23 per cent. As the dal processed in the PKV Mini Dal mill is good in quality hence 96 per cent farmers state that 43.12 per cent consumption of dal in daily diet was increased. The inadequate supply of electricity was the major problem faced by the farmers. However, 36 per cent dal mill owner facing the problem of technical knowledge about operating of machinery. Hence there is a need to conduct the training programme or disseminate the information about operating of PKV Mini Dal Mill through leaf let.

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