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# "Cropping Pattern, Productivity and Resource Use in Instructional Farm of Krishi Vigyan Kendra Dewas, Madhya Pradesh"

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***Abstract:*** *Agriculture is the primary source of income for rural families in India. About 65 percent of the population is directly dependent on agriculture for their livelihood. Krishi Vigyan Kendra dewas has got a farm of 20.489 hectare. Out of this, in 18.00 hectare, breeder seed production programme has been taken in kharif and in Rabi season. In the farm of Krishi Vigyan Kendra (KVK) Dewas, Mainly Soybean crop grown in kharif season and gram grown in Rabi season. On an average, total cropped area was* ***32.21*** *hectare per year. Net cultivated area of farm was* ***18.00*** *hectare. On an average Cropping intensity of farm was* ***183.50*** *percent, the productivity of Soybean came to* ***10.30*** *quintals and the gram came to* ***10.86*** *quintals per hectare in KVK Farm. On an average, in soybean crop* ***67*** *labours and in case of gram,* ***89*** *labours were used per hectare. The labour efficiency in soybean crop came to* ***124.69*** *percent and in gram crop came to* ***114.24*** *percent. . The productivity of whole farm came to* ***15.03*** *kg per hectare.*

*Land of Farm is undulating. Some fields are requiring leveling. It is need for appointment of Farm Manager (Breeder) and tractor driver and provide facility of Go down and grading at Farm. It is also need for increasing the area of threshing floor, making boundary wall near to residential area of farm to protect the crops.*

## I. INTRODUCTION

Agriculture is the primary source of income for rural families in India. About 65 percent of the population is directly dependent on agriculture for their livelihood. The crop yield depends on many factors like weather, soil type and its nutrients status, Management practices and other available inputs. As weather plays a major role, efficient crop planning requires proper understanding of the agro-climatic conditions.

Madhya Pradesh is a state blessed with vast natural resources, rich cultural heritage, and excellent industrial base coupled with a progressive investor friendly government located in central India. Dewas district comes under the Malwa plateau agro climatic zone of Madhya Pradesh. The major crops of the district are Soybean, gram and wheat are grown in 270.25, 130.68 and 114.15 thousand hectare respectively.

Rajmata Vijyaraje Scindia Krishi Vishwa Vidyalya, Gwalior, second agriculture university in the state was established by govt. of Madhya Pradesh on dated 19.8.2008. The territorial jurisdiction of RVSKVV is spread over 25 districts of Madhya Pradesh encompassing 19 Krishi Vigyan Kendra. The University represents a well knit and action oriented network of education, research, seed production and extension centers working in agriculture and allied fields in the state. The university is actively engaged in the maintenance of crop varieties and production of nucleus and breeder seeds to full fill the requirement of the state.

Each Krishi Vigyan Kendra (KVK) has got a farm to organize production units (crops, horticulture, dairying, fisheries, poultry etc) with a view to demonstrate techno economic feasibility and social acceptability of the new technologies to the extension system and target farmers of the district. Krishi Vigyan Kendra Dewas has got a farm of 20.489 hectare. Out of this, in 18.00 hectare, breeder seed production has been taken in kharif as well as in Rabi season. Sometimes due to rains, the sowing area in Rabi season effected and it falls down in some limit.

Keeping in view the above observation a study "Cropping Pattern, Productivity and Resource use in the farm of Krishi Vigyan Kendra Dewas (RVSKVV) of Madhya Pradesh" was studied with the following objectives-

1. To examine the cropping pattern, Rain fall and cropping intensity of the farm.
2. To Analyze the productivity of main crops of the farm
3. To work out the labour use, labour efficiency and labour productivity of the farm.
4. To find out the constraints in the production of different crops and to suggest suitable measures to overcome them.

## II. RESEARCH METHODOLOGY

The research procedures include sampling and interview techniques, use of appropriate analytical tools, period of enquiry etc.

Purposively sampling technique has been used for selecting farm of Krishi Vigyan Kendra, Dewas of Madhya Pradesh.

The enquiry was conducted by survey method. The data were collected by personal interviews on well prepared schedule and questionnaires. In the course of investigation, several visits were made for time to time to collect the information. The primary data were collected from the selected farm. The secondary data were obtained from the department of Agriculture Dewas.

The study was conducted during **2015-16**. For the analysis and interpretation of data, tabular analysis was made to compare the different aspects of selected farm of Krishi Vigyan Kendra with their relevant information. The average given refers to the weighted average of the value. Simple correlation coefficients were calculated to study the extent of relationship between two variables with the help of the following expression.

$r = \frac{\sum xy}{\sqrt{\sum x^2 \ \sum y^2}}$

$x = X - \overline{X}$ , $y = Y - \overline{Y}$

And the significance of r tested by't' test given by

$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$ , df= n-2

Efficiency of a farm is affected by the various techno-economic, organizational and special problems operation at the farm. On the basis of various problems at the farm, techno- economic and organizational suggestions will be given to improve the functional efficiency of the farm business.

## III. RESULT AND DISCUSSION

**CROPPING PATTERN, RAINFALL AND CROPPING INTENSITY OF THE FARM**

Year wise Cropping pattern, Annual rainfall and cropping intensity of Farm of Krishi Vigyan Kendra Dewas are given in table1

TABLE-1A, YEARWISE, CROPS, VARIETY, AREA, RAINFALL AND CROPPING INTENSITY OF THE FARM

| S.N. | YEAR | KHARIF | | | | RABI | | | | Average rainfall/ rains day | Cropping intensity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SOYBEAN | | MOONG | | GRAM | | WHEAT | | | |
| | | VARIETY | AREA (HA) | VARIETY | AREA (HA) | VARIETY | AREA (HA) | VARIETY | AREA (HA) | | |
| 1 | 2008-09 | JS-335 | 18.00 | - | - | VISHAL | 10.00 | - | - | 743 (64) | 155.55 |
| 2 | 2009-10 | JS-95-60 | 18.00 | - | - | JG-11 | 11.00 | - | - | 921.10 (48) | 188.88 |
| | | | | | | JG-16 | 05.00 | - | - | | |
| 3 | 2010-11 | JS-95-60 | 18.00 | - | - | JG-6 | 16.00 | - | - | 874.20 (73) | 200.00 |
| | | | | | | JG-16 | 02.00 | - | - | | |
| 4 | 2011-12 | JS-95-60 | 18.00 | - | - | JG-6 | 13.00 | MP-1203 | 02.00 | 1186.20 (84) | 194.44 |
| | | | | | | JKG-2 | 02.00 | | | | |
| 5 | 2012-13 | JS-95-60 | 18.00 | - | - | JG-6 | 08.00 | - | - | 1215.20 (59) | 188.88 |
| | | | | | | JGK-3 | 08.00 | - | - | | |
| 6 | 2013-14 | JS-95-60 | 18.00 | - | - | JG-6 | 16.00 | - | - | 1395.00 (76) | 200.00 |
| | | | | | | JG-16 | 02.00 | - | - | | |
| 7 | 2014-15 | JS-95-60 | 09.00 | TJM-3 | 03.00 | JAKI-9218 | 11.50 | - | - | 684.30 (62) | 152.78 |
| | | JS-335 | 04.00 | - | - | | | | | | |
| 8 | 2015-16 | JS-95-60 | 10.00 | - | - | JAKI-9218 | 10.75 | - | - | 1126.50 (38) | 187.50 |
| | | RVS2001-4 | 08.00 | - | - | RVG 202 | 05.00 | - | - | | |
| | | TOTAL | 139.00 | | 3.00 | | 110.25 | | 2.00 | | 254.25 |
| | | **Average** | **17.75** | | | + | **14.03** | = | 31.78 | | 183.50 |

It is clear from above table, in the farm of Krishi Vigyan Kendra Dewas, Mainly Soybean crop grown in kharif season and Gram grown in Rabi season. Under Soybean crop, mainly J.S. 95-60 variety were taken and under gram JG-11, JG-6, JG -16, Jaki 9218 & JKG-3 have been taken. Soybean –Gram crop rotation has been followed. On an average, total cropped area was **31.78** hectare per year. Net cultivated area of farm was 18.00 hectare. On an average Soybean crops cultivated in **17.75** hectare land and gram covered only **14.03** hectare land per year. The area of gram was affected by the rainfall in kharif season.

The cropping intensity of the farm of Krishi Vigyan Kendra Dewas varied from **152.78 to 200.00** percent. On an average it was 183.50 percent. From the annual rain fall data, it is clear that rainfall affected the cropping intensity of the farm. Partial irrigation available in the farm, if rains become more, the area in Rabi season has been increased if rains falls less than the average the area in Rabi season fall down. The intensity of cropping is an important measure to judge the efficiency of a farm.

TABLE 1B- RAINFALL DAYS, RAINFALL AND CROPPING INTENSITY OF THE FARM

| S.N. | RAINFALL (DAYS) | RAINFALL(MM) | AVERAGE CROPPING INTENSITY ( PERCENT) |
|---|---|---|---|
| 1 | Less than 60 | 1068.15 | 188.42 |
| 2 | 60-70 | 713.65 | 154.17 |
| 3 | 70-80 | 1134.60 | 200.00 |
| 4 | Above 80 | 1186.20 | 194.44 |

Table 1B, also reveals that if rains falls 70 to 80 days then cropping intensity increase up to 200.00 percent and rains fall above 80 days and less than 70 days then cropping intensity fall down and it was less than 200.00 percent. Rain fall comes 60 to 65 days then cropping intensity was 150.00 to 160.00 percent. Rain fall less than 60 days than cropping intensity was 188.42 percent.

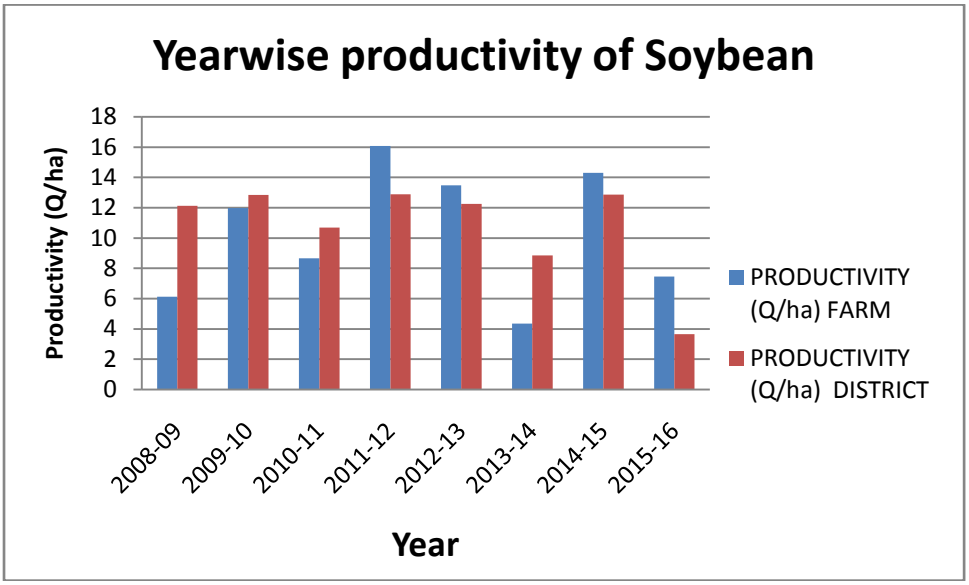
**YEARWISE, AREA, PRODUCTION AND PRODUCTIVITY OF MAIN CROPS OF THE FARM**

Year wise area, production and productivity of soybean crop of farm of Krishi Vigyan Kendra and Productivity of Farm compared with district productivity has been given in table -2

TABLE- 2, YEARWISE, AREA, PRODUCTION AND PRODUCTIVITY OF SOYBEAN

| S.N. | YEAR | AREA (ha) | PRODUCTION (Q) | PRODUCTIVITY (Q/ha) | | REMARKS |
|---|---|---|---|---|---|---|
| | | | | FARM | DISTRICT | |
| 1 | 2008-09 | 18.00 | 110.42 | **6.13** | **12.12** | |
| 2 | 2009-10 | 18.00 | 215.50 | **11.97** | **12.85** | |
| 3 | 2010-11 | 18.00 | 156.10 | **8.67** | **10.68** | |
| 4 | 2011-12 | 18.00 | 289.35 | 16.08 | 12.89 | |
| 5 | 2012-13 | 18.00 | 242.50 | 13.47 | 12.25 | |
| 6 | 2013-14 | 18.00 | 78.29 | **4.35** | **8.85** | DUE TO HEAVY RAINFALL, CROP HAS BEEN DESTROYED |
| 7 | 2014-15 | 13.00 | 185.90 | 14.30 | 12.87 | |
| 8 | 2015-16 | 18.00 | 134.19 | 7.46 | 3.65 | Due to 22 days dry spell, productivity was effected |
| | TOTAL | 139.00 | 1412.25 | **82.43** | **86.16** | |
| | AVERAGE | 17.38 | 176.53 | **10.30** | **10.77** | |

Table2 clearly shows that the productivity of Soybean varied from 4.35 to 16.08 quintals per hectare. Productivity in farm was higher than the district in the year 2011-12, 2012-13, 2014-15 and 2015-16. In the year 2008-09, 2009-10, 2010-11 and 2013-14, the productivity of Soybean in KVK farm was lower than the district productivity. On an average the productivity of Soybean was 10.30 quintals per hectare which is lower than the district average. The productivity of Soybean in KVK Farm was less than 4.56 percent in comparison to district productivity.



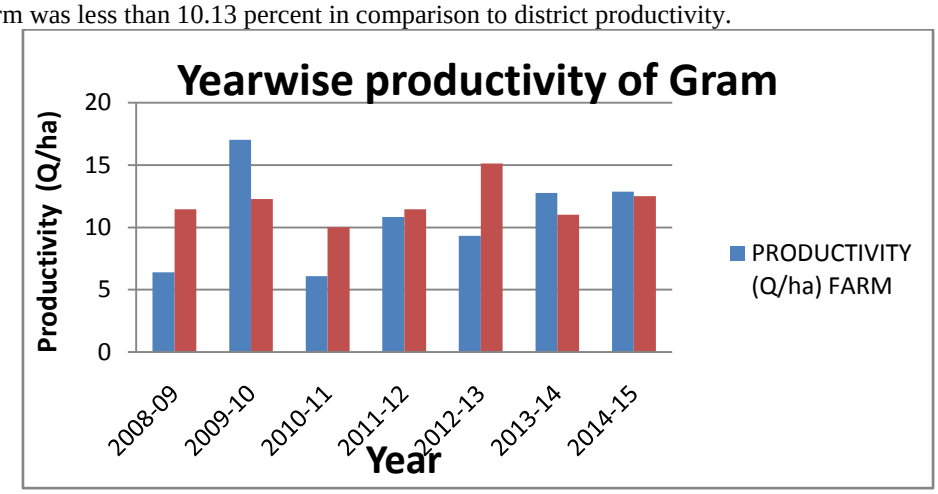

Fisher 't' test between farm productivity and district productivity of soybean was workout to **2.95** which was Non significant at 5% levels, meaning thereby that the district productivity was not affected by the farm productivity.

Year wise area, production and productivity of Gram crop of farm of Krishi Vigyan Kendra and Productivity of Farm compared with district productivity has been given in table -3

TABLE-3, YEARWISE, AREA, PRODUCTION AND PRODUCTIVITY OF GRAM

| S.N. | YEAR | AREA (ha) | PRODUCTION (Q) | PRODUCTIVITY (Q/ha) | |
|---|---|---|---|---|---|
| | | | | FARM | DISTRICT |
| 1 | 2008-09 | 10.00 | 64.00 | **6.40** | **11.44** |
| 2 | 2009-10 | 16.00 | 272.52 | 17.03 | 12.27 |
| 3 | 2010-11 | 18.00 | 109.50 | **6.08** | **10.02** |
| 4 | 2011-12 | 15.00 | 162.65 | **10.84** | **11.44** |
| 5 | 2012-13 | 16.00 | 149.24 | **9.33** | **15.11** |
| 6 | 2013-14 | 18.00 | 229.60 | 12.76 | 11.02 |
| 7 | 2014-15 | 11.50 | 147.98 | 12.87 | 12.50 |
| TOTAL | | 104.50 | 1135.49 | 75.31 | 83.69 |
| AVERAGE | | 14.93 | 162.21 | **10.86** | **11.96** |

Table3 indicates that the productivity of gram varied from 6.08 to 12.87 quintals per hectare. In farm of KVK, productivity of gram, in the year 2009-10, 2013-14 and 2014-15 was higher than the district productivity. The farm productivity of gram was lower than the district productivity in the year 2008-09, 2010-11, 2011-12 and 2012-13. From the year 2008-09 to 2014-15, on an average, the productivity of gram in farm was 10.86 quintals per hectare which was lower than the district average i.e. 11.96 quintals per hectare. The productivity of Gram in KVK Farm was less than 10.13 percent in comparison to district productivity.



Fisher 't' test between farm productivity and district productivity of gram was workout to **0.727** which was Non significant at 5% levels, meaning thereby that the district productivity was not affected by the farm productivity.

**YEARWISE LABOUR USE, LABOUR EFFICIENCY AND LABOUR PRODUCTIVITY OF THE FARM**

Per hectare labour use in the soybean and gram crop in the farm of KVK have been given in table 4.

TABLE-4 YEARWISE LABOUR USED IN THE FARM (KHARIF- APRIL TO SEPT. & RABI- OCT. TO MARCH)

| S.N. | YEAR | KHARIF | | RABI | | TOTAL | | KHARIF | RABI | TOTAL PER ha PER YEAR |
|---|---|---|---|---|---|---|---|---|---|---|
| | | AREA (ha) | TOTAL NO.OF LABOUR | AREA (ha) | TOTAL NO.OF LABOUR | AREA (ha) | NO.OF LABOUR | PER ha NO.OF LABOUR IN SOYBEAN | PER ha NO.OF LABOUR IN GRAM | |
| 1 | 2008-09 | 18.00 | 1569 | 10.00 | 1500 | 28.00 | 2831 | **87** | **150** | **119** |
| 2 | 2009-10 | 18.00 | 1319 | 16.00 | 1615 | 34.00 | 2934 | **76** | **101** | **89** |
| 3 | 2010-11 | 18.00 | 1285 | 18.00 | 1141 | 36.00 | 2426 | **71** | **63** | **67** |
| 4 | 2011-12 | 18.00 | 770 | 15.00 | 1876 | 33.00 | 2646 | **43** | **125** | **84** |
| 5 | 2012-13 | 18.00 | 1126 | 16.00 | 1186 | 34.00 | 2312 | **63** | **74** | **69** |
| 6 | 2013-14 | 18.00 | 579 | 18.00 | 935 | 36.00 | 1517 | **32** | **52** | **42** |
| 7 | 2014-15 | 13.00 | 725 | 11.50 | 688 | 27.50 | 1413 | **45** | **60** | **53** |
| 8 | 2015-16 | 18.00 | 1032 | 15.70 | - | 33.00 | - | **57** | **-** | **-** |
| | AVERAGE | 17.71 | 1053 | 14.93 | 1277 | 32.64 | 2297 | **67** | **89** | **75** |

Table 4, clearly shows that the per hectare labour use in soybean varied from 57 to 87 labours. In gram crop, it varied from 52 to 150. On an average, in soybean crop 67 labours and in case of gram, 89 labours were used per hectare. From the year 2008-09 to 2014-15, number of labour used in soybean and gram crop was the highest in the year 2008-09 in comparison to the other years.

**LABOUR EFFICIENCY OF THE FARM**

The labour efficiency has been worked out as given in table 5-

Labor efficiency = number of normal labour /Number of actual labour * 100

Table-5, year wise, Labour efficiency of Farm of Krishi Vigyan Kendra Dewas

| S.N. | YEAR | Labour efficiency ( percent) | | Average |
|---|---|---|---|---|
| | | Soybean | Gram | |
| 1 | 2008-09 | 77.01 | 59.33 | 68.17 |
| 2 | 2009-10 | 88.16 | 88.12 | 88.14 |
| 3 | 2010-11 | 94.37 | 141.27 | 117.82 |
| 4 | 2011-12 | 155.81 | 71.20 | 113.51 |
| 5 | 2012-13 | 106.35 | 120.27 | 113.31 |
| 6 | 2013-14 | 209.38 | 171.15 | 190.27 |
| 7 | 2014-15 | 148.88 | 148.33 | 148.61 |
| 8 | 2015-16 | 117.54 | - | 117.54 |
| | AVERAGE | 124.69 | 114.24 | 119.67 |

Table 5, clearly shows that, on an average, the labour efficiency in soybean crop came to 124.69 percent. Labour efficiency in gram crop, on an average came to 114.24 percent. In soybean crop, labour efficiency varied from 94.37 to 209.38 and in gram crop it varied from 59.33 to 171.15 percent. In both the crop, labour efficiency on an average came to 119.67 percent. Labour efficiency of soybean crop was higher than the gram crop. Labour efficiency of Soybean continuously increased from the year 2008-2009 and for Gram crop it was increased continuously from the year 2012-2013 due to well planning, timely management and intensive monitoring.

**LABOUR PRODUCTIVITY OF THE FARM**

Labour productivity has been calculated as-

labour productivity = productivity of crops /per hectare labour used (no.).

Labour productivity of main crops of farm has been given in table 6

Table-6, year wise, Labour productivity of Farm of Krishi Vigyan Kendra Dewas

| S.N. | YEAR | Labour Productivity ( Kg/ Hectare) | | Average |
|---|---|---|---|---|
| | | Soybean | Gram | |
| 1 | 2008-09 | 7.05 | 4.26 | 5.66 |
| 2 | 2009-10 | 15.75 | 16.86 | 16.31 |
| 3 | 2010-11 | 12.21 | 9.65 | 10.93 |
| 4 | 2011-12 | 37.40 | 8.67 | 23.04 |
| 5 | 2012-13 | 21.38 | 12.61 | 17.15 |
| 6 | 2013-14 | 13.59 | 24.54 | 19.07 |
| 7 | 2014-15 | 31.78 | 21.45 | 26.62 |
| 8 | 2015-16 | 13.09 | - | - |
| | AVERAGE | 17.85 | 12.21 | 15.03 |

Table6 reveals that, on an average, the labour productivity of soybean came to 17.85 kg and the labour productivity of gram came to 12.21 kg per hectare. On an average, the productivity of farm came to 15.03 kg per hectare. The above analysis reveals that the labour productivity of soybean crop was more than the gram crop

## IV. PROBLEMS AND SUGGESTION

Soil fertility, seed availability, technological, managerial and budget related problems are not seen in the farm. Problems have been identified in Farm were-

1. Land of Farm is undulating. Some fields are requiring leveling.
2. Drainage problems are available.
3. Untimely Rainfall effected the timely sowing of soybean which effected the productivity of the farm.
4. Rains bellow the average, the area of Rabi crops i.e. gram were also fall down the target.
5. Labour problem also available in the farm because of industrial area near to the farm. So old and retired female labour were available i.e. the reason labour efficiency and labour productivity was poor.
6. All the parameter of production technologies were follow but the productivity of the crops bellow its potential yields as well as district productivity.
7. 10 to 20 percent losses are seen in the fields after harvesting. It is need to manage to avoid the losses.
8. Godown is not available in 20.489 ha farm. Produce of the farm stored in residential quarter and farmer's hostel.
9. Threshing floor of farm is also small size. It is not up to the capacity of farm produce. It is required big size of threshing floor.
10. Near to public residential area of the farm, it is required boundary wall.
11. One boring between fields no 9 and 10 is required for increasing cropping intensity.
12. Tractor is old. New tractor is essential.
13. Tractor driver is not posted till date. Tractor driver should be posted as soon as possible.
14. All the committee consisted by college/ university level related to farm were ineffective. Farm related committee should be effective.
15. Farm monitoring by breeder is also ineffective due to some reason.
16. Monitoring schedule and checklist should be prepared and the activities should be done according to checklist and should be monitored by college/ university level.
17. Grading facilities is not available in the farm, Therefore 2 to 3 percent losses is seen in the farm.
18. Farm Manager, Field Extension officer and Field supervisors are not appointed till date. Farm manager and one field supervisor is required.

## V. CONCLUSION

Krishi Vigyan Kendra Dewas has got a farm of 20.489 hectare. Out of this, in 18.00 hectare, breeder seed production taken in kharif as well as in Rabi season. Mainly, Soybean in kharif and Gram in Rabi was grown in the farm. Cropping intensity of farm was 183.50 percent. On an average the productivity of Soybean came to 10.30 and in gram it was 10.86 quintals per hectare. In the farm of KVK, 67 Labours in Soybean and in gram

89 labours were used per hectare. labour efficiency and labour productivity in soybean crop came to 124.69 percent and 17.85 kg and in gram crops its came to 114.24 percent and 12.21 kg per hectare respectively. It is need to appoint Farm Manager (Breeder) and tractor driver. A facility of Go-down and grading at Farm is required. It is also need for increasing area of threshing floor, making boundary wall near to residential area of farm to protect the crops. All the parameters of technology fallowed for production of breeder seed but the productivity of farm lower than the district average, So well planning, management, intensive monitoring from the college/vishwa-vidyalaya level senior officer/scientist is essential to increase the productivity of farm.

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