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QUALITY SEED PRODUCTION OF PULSES THROUGH PULSE SEED HUB PROJECT AT KVK, PALEM NAGAR, KURNOOL DISTRICT, TELANGANA STATE



In this good practice note, K. Ramakrishna, M. Rajashekhar, T. Prabhakar Reddy, B. Rajashekar, Adi Shankar, Afifa Jahan, M. Jagan Mohan Reddy and K. Avil Kumar discuss seed production of pulses under Farmers-Scientist Participatory Mode on farmers' fields of Nagarkurnool district through seed hub project.

CONTEXT

Quality seed production is one of the most critical components for ensuring quality seed supply of pulses at the doorstep of farmers. Provision of quality seeds is an important step in enhancing the yield and production of pulses. Replacing old varieties from seed chain and farmers' fields remains a major concern among research managers, extension workers and other stakeholders. Realizing importance of quality seed in enhancing productivity of pulses, Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW), Government of India (GoI), approved a special project "Creation of seed hubs for increasing indigenous production of pulses in India" worth INR 225.31 crores during 2016 involving eight ICAR Institutes, 47 centers of All India Coordinated Research Projects (AICRPs) located in State Agricultural Universities (SAUs) and 95 Krishi Vigyan Kendras (KVKs). The main objective of this project was to ensure supply of quality seed and maintain sustainability with profitability to the farmers locally by developing suitable infrastructure for seed quality enhancement, safe storage and seeds development.



Despite their utility as a noble crop, pulses face stiff competition from other cereals and oilseeds. A number of constraints also affect pulses production (Box 1).

Box 1: Constraints in pulses production

Technological: Diversity and spatial distribution of different types of pulses due to varied agro-ecologies.

Climatic: Pulses are grown under rainfed condition (82%) and are thus mostly monsoon dependent.

Soil related: Diversity in soil condition/fertility/crop productivity in pulses hinders optimum crop growth and yield formation.

Input related: Critical inputs of sufficient quality and quantity are often not available, hindering timely sowing and other operations and subsequently affecting productivity and production.

Biotic stress: Weeds, pests and diseases

Infrastructural and market related: Post harvest storage, price fluctuation, lack of Minimum Support Price (MSP), low market value and lack of value addition

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The seed hub project was allotted to KVK, Palem, during 2016-17 and a one-time grant of INR 50 lakhs was sanctioned in the first year for creating infrastructure such as seed processing plant and storage facility. In addition to this, INR 1 crore has been allocated to the seed hub as a revolving fund to meet expenses for production, procurement and processing of seeds. At KVK Palem, the seed production was implemented on farmers' fields across different villages of Nagarkurnool and Jogulamba Gadwal districts.

Farmer Selection

Farmers were selected based on prior experience in pulse seed production and availability of adequate irrigation. The selected farmers were already a part of the seed production programme of Telangana State Seed Development Corporation (TSSDC) and had good knowledge and skills for undertaking quality seed production. Their fields were equipped with appropriate irrigation, infrastructure and assured supply of water.

Farmer Training

Farmers were trained by KVK staff in seed certification procedures viz., online registration, rouging, isolation distance, field inspection, seed processing and geo-tagging. The KVK conducted four on-campus trainings with 110 farmers and each training was divided into two sessions for four batches. Two off-campus trainings were conducted with 45 farmers and each training was divided into two sessions for two batches in farmers' fields.

Seed Distribution

Subsequently, breeder seeds of different varieties of red gram, green gram and black gram were distributed by the KVK to seed producing farmers for producing foundation seed in farmers' fields. During the last four years (2016-2020), with the support of KVK, Palem, 51 farmers have produced seed.

Field Inspections

Inspections and field visits were organised by scientific staff of KVK, Palem, certification officers and NFSM (National Food Security Mission) consultants during cropping period to create awareness of production technologies of pulses.

Buy Back Policy

Under the buy-back policy, farmers and KVK entered into a Memorandum of Understanding (MoU). The farmers agreed to follow suggestions the KVK makes with respect to seed production including quality, purity, other management practices and sell seeds to the KVK based on the price offered by the University.



Seed Procurement from farmers and seed processing unit at KVK

Promoting appropriate varieties

Seed production of newly released and high yielding/farmer preferred varieties were taken up as per fixed targets.

In Pigeonpea (red gram) production, there has been a consistent demand for wilt resistant, short and medium duration varieties owing to terminal moisture stress usually experienced by the mid-late and late cultivars that were hitherto grown. The recently released Pigeonpea variety, PRG-176 (Ujwala), is a short duration (140 days) variety that suits well in areas where the crop is grown on light red soils under rainfed conditions.

Green gram is an important pulse crop predominantly grown in Khammam and Warangal districts of Telangana. With concerted breeding efforts of scientists, the variety WGG- 42 was recently released by PJTSAU, Hyderabad. The variety WGG-42 is an extra early duration (60 days), resistant to yellow mosaic virus, uniform maturity with long pods and shiny bold seeds.

Black gram variety PU-31 is highly suitable and popular in the farming communities of Khammam and Mahabubnagar districts.



Red gram Var., PRG 176



Green Gram Var., WGG 42



Black Gram Var., PU 31

ECONOMIC BENEFITS TO THE FARMER DUE TO TECHNOLOGY INTERVENTION

KVK, Palem, procured 284 quintals of green gram (WGG 42), 571 quintals of red gram (PRG 176), 234 quintals of black gram (PU 31) and 2.2 quintals of horse gram (CHRG 19) from the farmers. The details of seeds procured during the four years, 2016-17 to 2019-20, and their procurement price are given below in Table 1. INR 13,49,989 was earned by the 51 farmers as additional income from seed production. It is noteworthy that this programme generated employment opportunities for rural youth, farm workers and farm women as seed production is a skill oriented work. Regular and timely management practices reduce additional expenditure while producing seeds, so that no additional labour and special input costs were incurred. Pulse crops (Red gram, Black gram and Green gram) are basically self-pollinated in nature and don't need any external pollination practices. Socio-economic status of the farmers has improved due to generation of additional income through seed production as compared to general cultivation.

Table 1: Details of seeds procured by the KVK, Palem from the year 2016-2020

| S. No | Crop | Local Market Rate of the seed (Rs./Q) | KVK Procurement Rate (Rs./Q) | Additional Amount (Rs./Q) | Quantity Procured (Q) | Total Additional amount (Rs.) over local rate |
|----------------|------------|---------------------------------------|------------------------------|---------------------------|-----------------------|---|
| 2016-17 | | | | | | |
| 1. | Green gram | 6,310 | 7,500 | 1,190 | 26.4 | 31,416 |
| 2. | Red gram | 5,600 | 6,515 | 915 | 216.9 | 1,98,463 |
| 3. | Black gram | 9,100 | 11,000 | 1,900 | 28.8 | 54,720 |
| 4 | Horse gram | 4,500 | 5,500 | 1,000 | 2.2 | 2,200 |
| Total | | | | | | 2,86,799 |
| 2017-18 | | | | | | |
| 1. | Green gram | 5,310 | 6,515 | 1,205 | 32 | 38,560 |
| 2. | Red gram | 5,700 | 7,500 | 1,800 | 129 | 2,32,200 |
| 3. | Black gram | 9,200 | 11,000 | 1,800 | 64.76 | 1,16,568 |
| Total | | | | | | 3,87,328 |
| 2018-19 | | | | | | |
| 1. | Green gram | 6,200 | 7,500 | 1,300 | 88.79 | 1,15,427 |
| 2. | Red gram | 5,800 | 7,000 | 1,200 | 182.70 | 2,19,240 |
| 3. | Black gram | 6,800 | 7,500 | 700 | 133.11 | 93,177 |
| Total | | | | | | 4,27,844 |
| 2019-20 | | | | | | |
| 1. | Green gram | 7,050 | 8,300 | 1,250 | 136.82 | 1,71,025 |
| 2. | Red gram | 5,800 | 7,500 | 1,700 | 42.14 | 71,638 |
| 3. | Black gram | 6,800 | 7,500 | 700 | 7.65 | 5,355 |
| Total | | | | | | 2,48,018 |

The buy-back policy of KVK, Palem, has been quite satisfactory for the farmers and 12-18 per cent higher procurement price was paid over prevailing minimum support prices of the government. The additional income earned from seed production helped farmers start other enterprises, thus opening newer avenues for further development for them.



Processed seed lots and Seed Packing

ECONOMIC BENEFIT TO THE KVK, PALEM, DUE TO TECHNOLOGY INTERVENTION

The quantity of pulse seed produced at KVK, Palem, sold to farmers during the period 2016-2020 and the amount earned by the KVK is given below in table 2.

Table 2: Economic benefit to KVK-Palem from pulse seed sale

| S. No. | Material sold | Quantity sold (quintals) | KVK sale Price (Rs/Q) | Gross amount earned (Rs) | Procurement price paid to farmers | Net profit to KVK, Palem |
|----------------|---------------|--------------------------|-----------------------|--------------------------|-----------------------------------|--------------------------|
| 2016-17 | | | | | | |
| 1. | Green gram | 26.4 | 11,000 | 2,90,400 | 1,98,000 | 92,400 |
| 2. | Red gram | 216.9 | 11,000 | 23,85,900 | 14,13,103 | 9,72,797 |
| 3. | Black gram | 28.8 | 13,000 | 3,74,400 | 3,16,800 | 57,600 |
| 4. | Horse gram | 2.2 | 11,000 | 24,200 | 12,100 | 12,100 |
| Total | | 274.3 | - | 30,74,900 | 19,40,003 | 11,34,897 |
| 2017-18 | | | | | | |
| 1. | Green gram | 32 | 11,000 | 3,52,000 | 2,08,480 | 1,43,520 |
| 2. | Red gram | 129 | 11,000 | 14,19,000 | 9,67,500 | 4,51,500 |
| 3. | Black gram | 64.76 | 13,000 | 8,41,880 | 7,12,360 | 1,29,520 |
| Total | | 225.76 | - | 26,12,880 | 18,88,340 | 7,24,540 |
| 2018-19 | | | | | | |
| 1. | Green gram | 88.79 | 11,000 | 9,76,690 | 6,65,925 | 3,10,765 |
| 2. | Red gram | 182.70 | 11,000 | 20,09,700 | 12,78,900 | 7,30,800 |
| 3. | Black gram | 133.11 | 13,000 | 17,30,430 | 9,98,325 | 7,32,105 |
| Total | | 404.6 | - | 47,16,820 | 15,09,031 | 17,73,670 |
| 2019-20 | | | | | | |
| 1. | Green gram | 136.82 | 11,000 | 15,05,020.00 | 11,35,606 | 3,69,414 |
| 2. | Red gram | 42.14 | 11,000 | 4,63,540.00 | 3,16,050 | 1,47,490 |
| 3. | Black gram | 7.65 | 13,000 | 99,450.00 | 57,375 | 42,075 |
| Total | | 186.61 | - | 20,68,010.00 | 15,09,031 | 5,58,979 |

1,091 quintals of pulses seed was produced by KVK, Palem, during 2016-2020. Accordingly, these quality seeds covered 7,690 hectares, contributing 16 to 18 per cent of total cropped area under cultivation of pulses in Nagarkurnool district. The total gross amount realized from pulses seed production programme in the four years (2016-17, 2017-18, 2018-19 and 2019-20) was INR 1.24 crores. The net profit to KVK, Palem, is INR 41,92,086. The profit generated out of seed sale has been utilized by Seed-Hub for development of additional facilities/workforce as needed for scaling quality seed production of pulses.

IMPACT OF THE PROJECT FROM 2016-17 TO 2019-20

We have covered almost 7,690 ha area of Nagarkurnool, Mahabubnagar, Narayanpet, Wanaparthy and Jogulamba Gadwal, parts of Nalgonda and Ranga Reddy districts. The total number of farmer beneficiaries is 9,481 (Table 3) who are getting 25-30 per cent higher profits than before.

Table 3: Area coverage and number of farmers who purchased seed during 2016-17 to 2019-20 at KVK, Palem

| Crop | 2016-17 | | 2017-18 | | 2018-19 | | 2019-20 | | Total Impact | |
|--------------|----------------------|----------------|----------------------|----------------|----------------------|----------------|----------------------|----------------|-------------------|----------------|
| | Area Covered (Acres) | No. of farmers | Area Covered (Acres) | No. of farmers | Area Covered (Acres) | No. of farmers | Area Covered (Acres) | No. of farmers | Area Covered (ha) | No. of farmers |
| Red gram | 3,615 | 1,807 | 2,150 | 1,075 | 3,045 | 1,523 | 1,456 | 743 | 4,106 | 5,148 |
| Black gram | 480 | 240 | 1,079 | 540 | 2,218 | 1,109 | - | - | 1,511 | 1,889 |
| Green gram | 440 | 220 | 536 | 268 | 1,479 | 740 | 2,313 | 1,202 | 1,907 | 2,430 |
| Horse gram | 27 | 14 | 0 | 0 | 0 | 0 | - | - | 11 | 14 |
| Total | 4,562 | 2,281 | 3,765 | 1,883 | 6,742 | 3,372 | 3,769 | 1,945 | 7,535 | 9,481 |



Inspection of red gram fields by NFSM consultants, KVK staff and Certification Officer

Cultivation of long duration crops like cotton and red gram in rainfed conditions without technical knowledge leads to increased cost of cultivation and reduction in net income. This is a recurring problem faced by farmers of erstwhile Mahabubnagar district, parts of Nalgonda and Ranga Reddy districts. Even in pulses crops (red gram, black gram and green gram) farmers are getting low yields (an average of 4-6 quintals/acre) due to lack of availability of quality seeds. Therefore, we introduced our good quality varieties like PRG-176 (Ujwala) in red gram, PU-31 in black gram and WGG-42 (Yadadri) in green gram. In addition, we also provided technical guidance for integrated crop management for these crops. As a result, with all these practices, farmers are now able to produce 7-8 quintals/acre with minimum cost of cultivation.

CONCLUSION

The implementation of seed hub programs on pulses led to an overall increase in area under pulses and increased adoption of improved high yielding varieties. This programme has attracted several farmers of the district to pulses seed production in a farmer participatory mode not only in their main field but in the marginal land as well, resulting in additional expansion of pulses cultivation over 7,690 ha during last three years (2016-2019). Additionally, productivity of red gram, green gram and black gram has increased around 200-300 kg/ha with the implementation of the seed hub project. It has generated year-round two-three fold more income for farmers. The seed hub project has not only led to horizontal expansion of area (7,690 ha) in pulse production, but has also provided opportunity to skilled and unskilled workforce in various day to day activities, thus, making livelihoods sustainable.

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