

Short communication

Impact of seed hub on quality pulse seed production and productivity in Solapur district of Maharashtra

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Handling Editor:

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Received: 15 June 2023

Accepted: 3 November 2023

ABSTRACT

To ensure the availability of location specific high yielding varieties and quality seed, the Ministry of Agriculture and Farmers welfare, Government of India implemented the project entitled 'Creation of seed hubs for increasing indigenous production of pulses in India' during 2016-17 and provided funds for seed multiplication and infrastructure facilities across the country. Under this project pulses seed hub has been sanctioned to Krishi Vigyan Kendra Mohol, Solapur. The objective of this programme was to increase indigenous production of pulses and to make available quality seed of improved high yielding and climate resilient varieties to farmers to achieve self-sufficiency in respect of seeds at village level. Farmers of selected village for seed hub are working under the technical support and guidance of KVK scientists. They were trained technically and made more sound by adopting good agronomic practices to fulfil the objective. Each year, a target of 200 q for kharif and 800 q for rabi season was given to KVK, Mohol. With respect to the target received, KVK Mohol produced 355.34, 567.59, 784.88, 528.50, 752.00 q seed during the year 2016-17, 2017-18, 2018-19, 2019-20, 2021-22, respectively. Pigeonpea varieties BDN - 711 and Phule Rajeshwari perform well and gave higher seed yield as compared to local and old varieties. Due to wide acceptance by farmer there is huge horizontal expansion of chickpea variety Phule Vikram in the district. All procured seed of pigeonpea and chickpea were sold to the farmers.

Key words: Chickpea, Pigeonpea, Quality Seed, Seed production, Seed hub

Pulses are unique for high protein content (20 to 25%), has ability to fix atmospheric nitrogen (30-150 kg/ha) and consistent source of income and employment to small and marginal farmers; and thus hold a premier position in the global agriculture (Ali and Gupta, 2012). Pulses are cultivated in an area of 30.37 million ha with a production of 26.96 million tonnes and productivity of 888 kg/ha. Seed is one of the most important elements in increasing agricultural production in any farming system (Chatuvedi *et al.*, 2016). This element has become more crucial than ever for providing enough food security for the rising number of people in the world. Availability of quality seed of improved varieties has been a major constraint in enhancing production and productivity of pulses in India. This is primarily due to lack of organized seed production programme for pulses and poor seed multiplication rate. To ensure the availability of location specific high yielding varieties and quality seed, the Ministry

of Agriculture and Farmers welfare, Government of India implemented the project entitled 'creation of seed hubs for increasing indigenous production of pulses in India' during 2016-17 and provided funds for seed multiplication and infrastructure facilities across the country. Under this project 150 seed hubs were created across the country with an aim of making available the quality seeds of recently developed high yielding cultivars for achieving self-sufficiency (Choudhary *et al.*, 2021). Likewise, seed hubs were also sanctioned to Krishi Vigyan Kendra, Mohol, Solapur, which is working under Mahatma Phule Krishi Vidyapeeth, Rahuri. Accordingly, seed production of newly released and high yielding varieties was taken up as per the targets fixed. Pigeonpea is a major kharif pulse crop and chickpea is a major rabi pulse crop in Solapur district of Maharashtra. In pigeonpea, 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 pigeonpea varieties BDN-711 and Phule Rajeshwari are short duration (140 – 150 days), wilt resistant and fit well in the areas where the crop is grown on medium soils under rainfed conditions.

In chickpea, there has been a consistent demand of farmer for wilt resistant, rainfed and mechanically harvestable short and medium duration varieties (Kumar *et al.*, 2020). Chickpea is mainly grown in Solapur district of Maharashtra state. The chickpea varieties Digvijay and Phule Vikram are popular among farming community. Chickpea variety Phule Vikram has semi-erect growth habit and suitable for mechanical harvesting. Keeping in view, the specific advantages offered by these newly developed varieties large quantities of seed was produced under seed hub programme through participatory mode (Kumar *et al.*, 2020).

Selecting improved varieties adapted to the area of production, with disease, insect, lodging, and shattering resistance along with other desirable characteristics are basic keys for satisfactory crop performance and yield. Efficacy of other agricultural inputs in enhancing productivity and production is largely determined by the quality of a seed. Quality seed accounts for 20-25% increase in crop productivity (Ali and Gupta, 2012). Therefore, it is important that availability of quality seed to the farmers is a major step towards doubling farmer's income. Through Seed hub project, an attempt was made to involve small farmers to take up quality seed production of pulses (Ramakrishna *et al.*, 2023). To make India self-sufficient in pulses production through productivity enhancement, availability of quality seed needs special attention. Non availability of quality seed especially in pulses is a major constraint to become self-sufficient in pulse production. There is a need of about 25- 30 lakh quintals of quality seed every year to achieve 30% seed replacement rate to enhance production and productivity of pulse crops (Chauhan *et al.*, 2016; Shivaswamy *et al.*, 2022).

Production of quality pulse seeds under seed hub was started in Solapur district of Maharashtra by Krishi Vigyan Kendra Mohol (Solapur II) in 2016-2017. Selection of villages in Solapur district was decided on the basis of favorable micro-climatic situation with respect to yield potential of indigenous pulse crops and farmers groups to carry out the seed production in a participatory mode. Two major pulse crops of the district i.e.,

pigeonpea and chickpea were cultivated for seed production in selected villages. Participatory pulse seed production was carried out in different blocks of the district. Farmers of selected villages were trained for good agronomic practices and also for soil sampling for soil test, soil amendment techniques, identification of quality seeds, types of seed produced, registration, field preparation, seed treatment, nutrient management, pest and disease management, isolation distance, roguing, harvesting and safe storage. Time to time field visit and advisory when needed were provided by the scientists of KVK, Mohol. All the required activities in the field were done by the farmers in participatory mode up to storage and KVK, Mohol played a vital role in processing, grading and marketing of seeds. Pulses varieties, preferably not older than 10 years, were procured by KVK Mohol (Solapur II) for seed production. Universities and institutions like MPKV Rahuri and Mahabeej (Maharashtra State seeds Corporation Limited) supplied foundation seeds. The produced seeds were certified by the Maharashtra state Seed Certification Agency.

Introduction of high yielding varieties of pulses for sustainable production is required to meet the demand (Kandir *et al.*, 2021). The data (Table 1) showed the quality seed production of high yielding pulse varieties produced under the scheme seed hub. Every year, a target of 200 q during *Kharif* and 800 q during *Rabi* season was allotted to Krishi Vigyan Kendra Mohol (Solapur II). With respect to the target received, KVK Mohol produced 355.34, 567.59, 784.88, 528.50 and 752.00 quintals seed during the year 2016-17, 2017-18, 2018-19, 2019-20 and 2021-22, respectively (Table 1). In spite of all our efforts to dispose-off the seed particularly in chickpea and pigeonpea, the production targets were not achieved due to several biotic and abiotic stresses, and unpredictable seasonal conditions (Dixit *et al.*, 2015). According to NARP, Solapur district comes under western Maharashtra scarcity zone (MH-6), hence deficit rainfall and dry spells are common in this region. Under such climatic conditions, pigeonpea varieties BDN-711 and Phule Rajeshwari performed well and gave higher seed yield as compared to local and old varieties (Table 2). Being a semi spreading nature and short duration, drought escaping, wilt and sterility mosaic resistant pigeonpea varieties BDN-711 is widely accepted by farming community (Zade *et al.*, 2021). Due to wide acceptance by farmers, there is a huge horizontal expansion BDN-711 observed in the district due to the seed hub programme carried out by KVK

Mohol. During 2016-17, 2017-18 and 2018-19, quality seed produced for chickpea variety Digvijay were 355.34 q, 252.00 q and 670.88 q, respectively (Table 2). The important characteristics of chickpea variety Digvijay are high yield potential, bold seeds, wilt resistant, suitable for rainfed, irrigated and late sown conditions (Table 3). Phule Vikram was the another chickpea variety which is high yielding, wilt resistant and suitable for mechanical harvesting were taken under the programme.

Machine harvesting of chickpea can reduce cost of production, prevent risk of harvest losses, improve resource use efficiency and reduce drudgery for women who carry out the manual harvesting. Machine-harvestable chickpea varieties have the potential to enhance the area under chickpea and production, and can help in achieving self-sufficiency in pulse production and doubling farmers' income (Singh and Singh, 2016). Due to wide acceptance by farmers, there is huge horizontal expansion of chickpea variety Phule Vikram was observed in the district. The quality seeds of high yielding recently developed varieties of pigeonpea

and chickpea were disseminated to the farmers with an aim of increasing productivity and income (Salunkhe *et al.*, 2021).

Table 1. Year-wise production of quality seeds of pulses (pigeonpea and chickpea) under Seed hub project

Year	Seed production (q)
2016-17	355.34
2017-18	567.59
2018-19	784.88
2019-20	528.50
2020-21	582.00
2021-22	752.00

Thus, to meet the supply of quality pulse seed, KVKs are playing a vital role through seed hub. Hence, in this direction Krishi Vigyan Kendra, Mohol (Solapur II) has made an attempt to produce quality seed of pulses like pigeonpea and chickpea. In its six years of production during kharif 2016-17 to rabi 2021-22, 2850.22 q of chickpea and 720.09 q of pigeonpea seeds were produced at KVK Mohol under seed hub. Chickpea and pigeonpea seeds

Table 2. Variety wise details of quality seed production under seed hub by KVK Mohol, Solapur

Year	Season	Crop	Variety	Area (ha)	Production (q)
2016-17	Rabi	Chickpea	Digvijay	42.00	355.34
2017-18	Kharif	Pigeonpea	BDN-711	20.00	315.59
	Rabi	Chickpea	Digvijay	36.00	252.00
2018-19	Kharif	Pigeonpea	BDN-711	20.00	114.00
	Rabi	Chickpea	Digvijay	40.00	670.88
2019-20	Kharif	Pigeonpea	Phule Rajeshwari	9.60	72.50
	Rabi	Chickpea	Phule Vikram	60.00	456.00
2020-21	Kharif	Pigeonpea	Phule Rajeshwari	8.8	110.00
	Rabi	Chickpea	Phule Vikram	40.00	472.00
2021-22	Kharif	Pigeonpea	Phule Rajeshwari	12.00	108.00
	Rabi	Chickpea	Phule Vikram	40.00	644.00

Table 3. Improved, high yielding varieties of pigeonpea & chickpea) used for quality seed production under Seed Hub during 2016-17 to 2021-22 by KVK Mohol

Crop	Variety	Release Year and Institute	Rainfed Yield (q/ha)	Characteristics/Features
Pigeonpea	BDN-711	2011 VNMKV, Parbhani	18-20	Semi-spreading white seeded variety, resistant to wilt and sterility mosaic. Crop Duration 150-160 days.
	Phule Rajeshwari	2012 MPKV, Rahuri	22.00	Early maturity, dark brown colour, medium bold seeds (10.5 to 11.0 g/100 seeds), Moderately resistant to wilt and sterility mosaic diseases, Released for Maharashtra, MP and Gujarat. Crop Duration 140-150 days.
Chickpea	Digvijay	2006 MPKV, Rahuri	14-15	High yield potential, bold seeds, wilt resistant, Suitable for rainfed, irrigated and late sown conditions, Released for Maharashtra. Crop Duration 105-110 days.
	Phule Vikram	2016 MPKV, Rahuri	16-18	Tall growth habit hence suitable for mechanical harvesting, medium size yellowish brown seeds, Wilt resistant, suitable for rainfed, irrigated and late sown conditions, Released for Maharashtra, MP, south Rajasthan and Gujarat. Crop Duration 105-110 days.

produced were sold to the farmers through State Agriculture Department, Sale counter of KVK and MPKV, Rahuri. Now the high yielding quality seeds of pulses are in the cultivation practices in the district increased the production and productivity of pulses. However, there is a need for convergence of various schemes on seed as well as stakeholders to synergize the efforts for better output and outcome. Increased percentage of varietal and seed replacement rates, proper planning and execution by including new climate resilient varieties in the seed chain can lead to the significant increase in productivity of pulses in Solapur district.

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