

# Farmers Participatory Seed Production Programme of IARI Varieties/Hybrids: A Success Story

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**ABSTRACT:** Seed is a key component among all inputs for sustainable crop production. It is a vehicle for delivery of improved technologies along with utilization of inherent genetic potential of a variety /hybrid. Seed can play a critical role in achieving higher productivity, use of quality seeds alone could increase productivity by 15-20% highlights the important role of in agriculture [1, 2]. One of them of the reason for low productivity of crops is the unavailability of reliable quality seeds in the local markets. The studies indicate that the small and marginal farmers still prefer to rely on farm saved seeds and obsolete varieties. The quality seed production largely follows the limited generation's system for seed multiplication with defined responsibility of production of different classes of seeds for different agencies. Most of the time quality seeds of new improved varieties cannot meet the demand of farmers' as most seed producing agencies have limited land resources. This wider gap between supply and demand of quality seed can be reduced with involvement of farmers in seed production through farmers participatory seed production programme (FPSP). Considering the importance of quality seeds of crops, ICAR-Indian Agricultural Research Institute (ICAR-IARI) initiated the FPSP with a buy back system and enhance the quality seed production (Agri-horticultural crops) and revenue more than four time (2018-19 to 2023-24). The main objectives of the FPSP system is to disseminate the knowledge about new improved crop varieties/hybrids to the farmers, enhance the availability of quality seeds in the region, promote entrepreneurship development and employment generation for rural youth and women by involving them in seed production, processing and distribution of quality seeds. This system not only helps to disseminate technology but also enhances the socio-economic condition of the farming community.

**Keywords:** Farmers participatory seed production, Quality seed, Improved variety

Seed production scenario in India has undergone numerous changes after the green revolution. The economic importance of quality seed of high yielding varieties and hybrids have been of late, receiving increased recognition. However, availability of quality seed of improved cultivars are grossly inadequate and is one of the major constraints for enhancing production well as productivity [2, 3, 4,]. In most of the field crops, where high volume low value seeds, predominantly the farmers are using farm saved seeds resulting in about 80 per cent of the area sown with farm saved seeds of obsolete varieties. The formal seed production as well as distribution system in India has inherent problems such as time lapse from release of new varieties to reaching the farmers' fields, varietal as production mismatch in seed chain etc. The lack of interface with the ultimate growers often lead to delay in transfer of improved technologies, even though many improved varieties have been developed and released by the system for the benefit of the farmers. Thus, there exists a wide gap in

demand and supply of quality seeds and the imminent challenge of ensuring assured supply of quality seed and its production technology to the resource poor farmers. Hence, a strong seed system with linkages between all stakeholders are essential, which in turn is crucial for food and nutritional security as well as the survival of rural communities. Farmers also play a pivotal role in this process and this problem can be addressed by involving them in the production and distribution network, which is possible through farmers' participatory seed production system [5]. Farmers participatory seed production and buy back systems are successful methods to produce quality seeds in large quantity.

## MATERIAL AND METHODS

In order to enhance the availability of quality seeds, disseminate the knowledge about new varieties/hybrids to the farmers and promote entrepreneurship development as well as create employment generation for rural youth by involving them in seed production,

**Table 1.** Farmer selection criteria under farmer participatory seed production programme

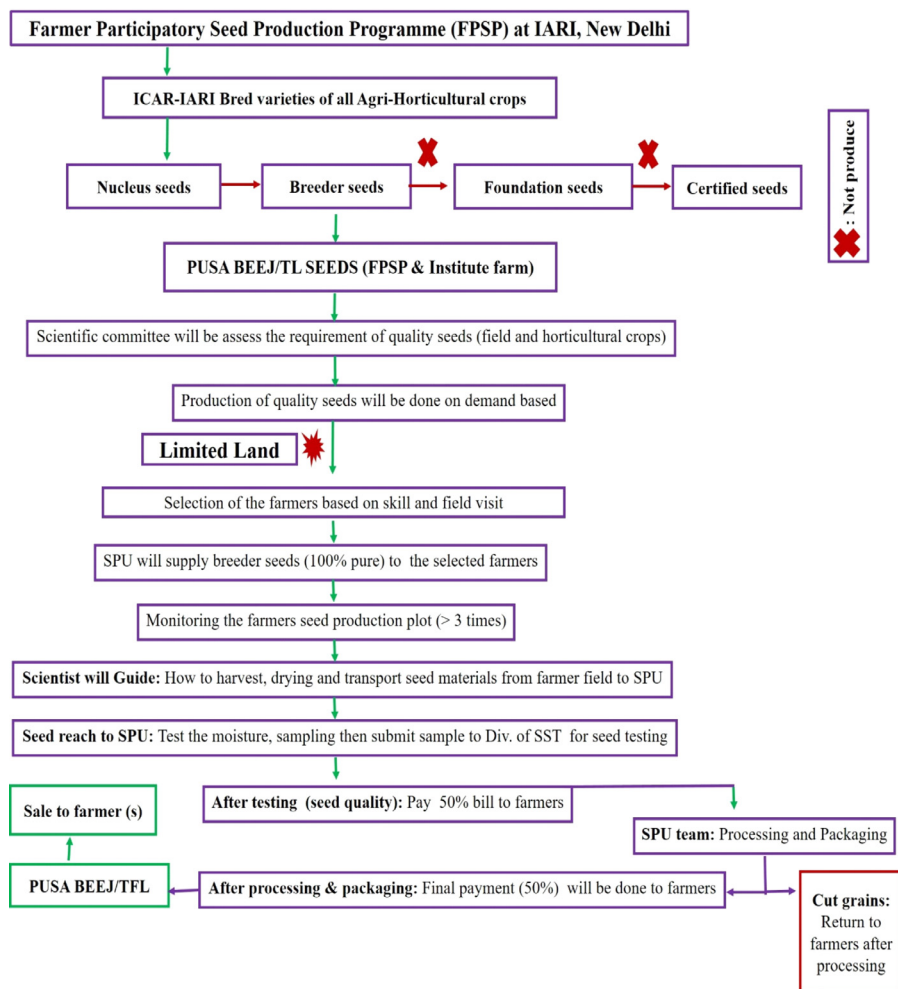
Profile	Parameters
Farmer profile	Education, seed production experience, farming background, reliable farm, good resources
Area profile	Proposed site, distance from institute, availability of transport, approach area, cropping system
Farm profile	<b>Selection of crops and varieties:</b> Predominant cropping system, suitability to region, new varieties/ hybrids
	Availability of isolation distance, topography of area, total area available, area in largest block, type of soil, availability of irrigation, quality of water, labour availability, farm machinery availability

processing and distribution, the ICAR-Indian Agricultural Research Institute, New Delhi has implemented farmers participatory seed production programme with buy back system to produce quality seeds of IARI developed varieties /hybrids in large quantity.

**Adapted model: farmer participatory seed production programme (FPSP)**

The crop which is widely grown in the region and variety recommended for the agro-climatic zone having great

demand for its seeds must be selected for seed production programme [6]. On the basis of criteria (Table 1 and Figure 1), which are required for quality seed production only the interested as well as resourceful farmers may be identified for seed production of improved varieties /hybrids under the guidance of scientists. The farmers must be willing to devote a major portion of land for a quality seed production programme. Other criteria is avail of assured isolation distance, irrigation source, quality of water, previous crop information, land free from



**Figure 1.** Adapted model: Farmer Participatory Seed Production Programme (FPSP)

weed infestation, and suitability of soil have to be verified by visiting the field of the farmer. The selected farmers are being trained by the IARI scientific community for all aspects of seed production technology of the particular crop variety and hybrid. A total of four training sessions (pre-sowing, before flowering, before harvesting and after harvesting) are being arranged per crop per season. The selected farmers were supplied breeder seed on cost basis (as per cost fixed by Department of agriculture and cooperation) with all information packages of practices of the particular crop (variety/hybrids) in local language (for e.g. Hindi and English).

The seed production plots are critically monitored by a multidisciplinary team of scientists (Breeder, pathologist, entomologist, agronomist etc.) with the active participation of seed growers at regular intervals. The seed crop is harvested at physiological maturity and dried optimum moisture levels and is brought to the processing plant for the up gradation of seed quality. Payment mode under farmers' participatory programme are reviewed annually by IARI seed committee and as per present norm payments are being made in two instalments. First instalment of payment will be made on unprocessed seed (raw seeds) quantity as soon as the seed is received and seed moisture is permissible level (seed moisture should be below 14% and sample will draw of each lot and submitted to Division of seed science and technology, ICAR-IARI, New Delhi for germination test), based on MSP (100% of MSP), where some of crops, the MSP is not available (e.g. Basmati and Sugandh series of paddy,

Berseem, Garden pea etc.) even though payment of first instalment will be @ 50% of price based on IARI procurement price. As per demand of farmers, payment can be made in a single instalment after processing, testing and packaging. Payments of farmers will be made through NEFT transfer

## RESULT AND DISCUSSION

Under the novel programme called "Farmer participatory seed production programme" (FPSP). The Seed Production Unit, IARI, New Delhi has produced quality seeds "Pusa Beej" of new and popular varieties of different Agri-horticultural crops such as wheat, paddy, chickpea, lentil, mustard, moong-bean, maize and vegetables crops were produced under FPSP. The total number of farmers involved for quality seed production were from more than 20 villages of six districts, which comes under two states e.g. Uttar Pradesh and Haryana. The quality seeds produced by the farmers under this programme during 2018-19 to 2023-24 are given in Table 2.

The ICAR-IARI has enhanced quality seed production of IARI bred new and high yielding varieties of Agri-Horticultural crops through the FPSP programme. The production of quality seeds has increased more than four times since 2018-19 (2398.61 q) to 2023-24 (9754.78 q) and along with percent of production over the year has tremendously increased though this model (Figure 2 and 3). Similarly, the quality of seed production has increased due to involvement of farmers in the programme i.e., 27

**Table 2.** Seed Production Scenario under farmer participatory Seed Production Programme (2018-19 to 2023-24) at ICAR-IARI-SPU, New Delhi-12

Crop	(In quintal & Revenue in Lakh)					
	2018-19	2019-20	2020-21	2021-22	2022-23	Total
Wheat	622.40	1257.68	1172.40	1819.30	2217.54	7089.32
Paddy	1586.45	1851.45	2223.00	2392.33	3658.73	11711.96
Mustard	19.23	38.28	35.18	85.77	79.34	257.8
Chickpea	-	34.14	9.48	70.41	93.07	207.1
Pigeon pea	2.80	4.06	4.06	0.21	3.75	14.88
Mung bean	126.73	79.29	71.35	175.64	81.99	535
Lentil	3.77	20.34	25.57	20.00	54.79	124.47
Maize	-	-	-	-	-	-
Vegetables	37.23	37.16	43.17	106.93	106.93	331.42
Total	2398.61	3322.40	3584.21	4670.59	6296.14	20271.95
% increase over the yea	-	27.80	7.30	23.26	34.80	93.16
No. of variety in seed chain	47	48	54	66	71	286
No of farmers	27	32	36	50	60	205
Revenue generated through seed sale	268.66	339.78	472.51	573.99	885.92	2540.86

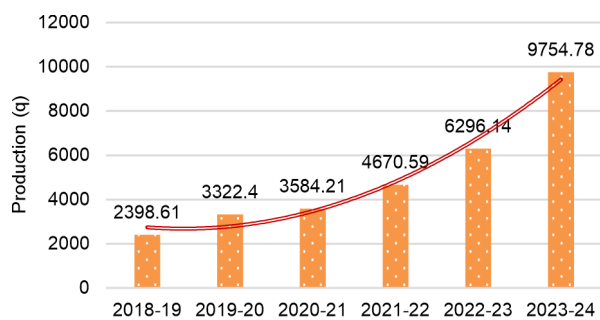


Figure 2. Production of quality seeds over the year

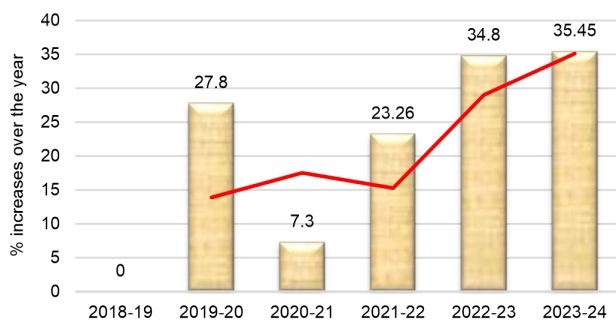


Figure 3. Per cent of production over the year

farmers (2018-19) to 90 farmers (2023-24), therefore it is concluded that, due to this programme, the socio-economic condition of farmers have enormously increased (Figure 4). This programme not only increases the economic condition of farmers, but also enhances the institute revenue (Figure 5) i.e., 268.66 lakhs to 1116.82 lakhs during 2018-19 to 2023-24, respectively, [2, 6, 7]. The FPSP model could help to enhance the quality seed production and reduced the alarming gap between demand and supply of quality seeds and also enhance the seed replacement rate (SRR), seed multiplication rate (SMR) and varietal replacement rate (VRR).

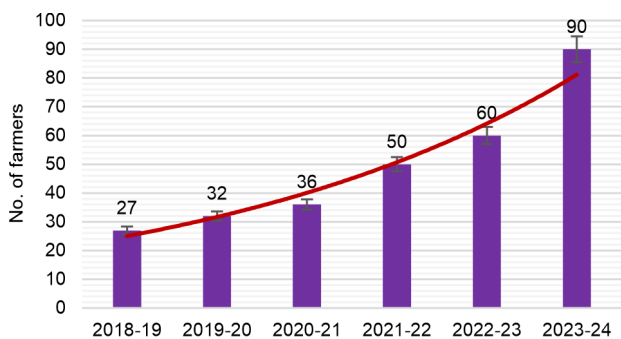


Figure 4. Number of the farmers over the year

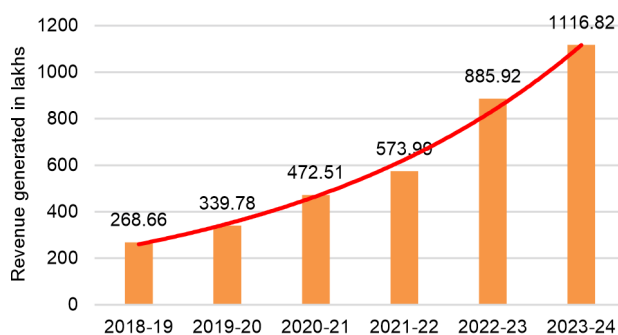


Figure 5. Revenue generation over the year

### Socio-economic implications of FPSP

- There is shortage of quality seeds of desirable, popular/new crop varieties. The farmers of the Delhi and NCR Region, Uttar Pradesh, Haryana, Rajasthan, Madhya Pradesh and Punjab get quality seed at a reasonable price and at appropriate time.
- The availability of quality seeds of new varieties will help in increasing seed replacement rate (SRR), which is one of the major objective for improvement of crop productivity.
- This programme generated employment opportunities for rural youths, farm workers and farm women as seed production is skill oriented work. Skilled oriented farm works include nursery preparation, transplanting, rouging, pollinating, harvesting, threshing, drying and winnowing. A huge number of farm workers and farm women are being involved for the above mentioned farm works. Next step of seed production include seed storage, processing, bagging, transporting and marketing. Here also huge number of farm workers and rural youths are being employed. Thus, this programme helps in decreasing the rural unemployment pressure as unemployed rural youths will be getting opportunity to work.
- In case of FPSP, a buy back arrangement was made to purchase the seed produced by farmers by the institute on satisfaction of the quality of the seed at 20% higher rate than the prevailing minimum support price (MSP).
- It also help in crop diversification.
- The additional income earned through seed production, which could help to farmers to initiate other enterprises on Opening Avenue for further development of farming community [7].

### Constraints of FPSP

The main constraints encountered during last six years under farmer participatory Seed Production Programme are a) The payment to seed growers are often delayed as the management takes its own time to decide on the purchase price and release only part payment at the time of procurement and the remaining payment is made after processing and grading with proper quality test, for this it may take a few months delay the payment, therefore this could discourage to seed growers. b) Non-availability of mobile processing plant at village level, hence it increases the cost of transportation of seed grower. c) The seed growers are always looking for a new variety for production of quality seed in their plot. d) No incentive to scientist (s), who were involved in the venture. e) Inadequate facility is available for seed production (for e.g. threshing floor, storage, advance chemical to control disease, insect and pest etc.) at village level. To mitigate these constraints under the FPSP programme, we can enhance the seed replacement rate and seed multiplication ratio and reduce the utility of farm saved seed and improve the socio-economic condition of the farming community, nutritional security and food security of the nation. Hence, we can confidently say that for food security and food self-sufficiency, seed security in addition to seed self-sufficiency is also required for any country of the world (8).

### CONCLUSION

One of the main causes of low productivity of crops is non-availability of reliable quality and quantity of seeds in the local markets. In India, the small and marginal farmers depend on farm saved seeds (FSS) for sowing, which ultimately causes poor productivity. Despite implementation of the organized seed programme, there exists an alarming gap between the demand and supply of quality seeds. The ICAR-IARI has initiated the FPSP, which could help to enhance production more than four times and meet the quality seed requirement of the farming community. Due to this programme, SRR, SMR,

and VRR were improved through distribution of quantity and quality seeds of IARI bred new and high yielding varieties of Agri-horticultural crops.

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