

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/327689743>

# STRENGTHENING FORMAL SEED SUPPLY SYSTEM BY INTEGRATING SMALL-HOLDER FARMERS IN SEED MULTIPLICATION CHAIN: A POTENTIAL COMPONENT OF SECOND GREEN REVOLUTION

Article · August 2018

CITATIONS

0

READS

84

7 authors, including:



**P R Kumar**

ICAR Research Complex for Eastern Region

68 PUBLICATIONS 87 CITATIONS

[SEE PROFILE](#)



**Arun Kumar Singh**

Indian Council of Agricultural Research

71 PUBLICATIONS 144 CITATIONS

[SEE PROFILE](#)



**Rabi Sankar Pan**

ICAR Research Complex for Eastern Region

30 PUBLICATIONS 273 CITATIONS

[SEE PROFILE](#)



**Sudarshan Maurya**

Indian Council of Agricultural Research

72 PUBLICATIONS 628 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Development of sustainable production system in fruit crops [View project](#)



AICRP on Agroforestry [View project](#)

## STRENGTHENING FORMAL SEED SUPPLY SYSTEM BY INTEGRATING SMALL-HOLDER FARMERS IN SEED MULTIPLICATION CHAIN: A POTENTIAL COMPONENT OF SECOND GREEN REVOLUTION

P. R. Kumar<sup>1</sup>, A. K. Singh<sup>1</sup>, R. S. Pan<sup>1</sup>, S. Maurya<sup>1</sup>, J. S. Chaudary<sup>1</sup>, Bikash Das<sup>1</sup> and B. P. Bhatt<sup>2</sup>

<sup>1</sup>ICAR-Research Complex for Eastern Region, Research Centre, Ranchi-834010

<sup>2</sup>ICAR-Research Complex for Eastern Region, Patna-800014

### Abstract

*Success of the first phase of green revolution can largely be attributed to increased availability of improved seeds. Arguably, farmers' accessibility to quality seed is poised to play a pivotal role in the envisaged second green revolution. The formal seed sector's limitations in reaching every corner have been found to affect the identification of diverse and complex needs of farmers in remote corners. In an attempt to augment seed availability in tribal villages, seed production under farmers' participatory approach was initiated at several ICAR institutes. The scheme has been able to achieve twin goals of popularization of new varieties as well as easy availability of seeds at village level. Initially conceived and guided by the formal seed sector, it has eventuated into an informal network of small holder farmers, small seed companies, researchers, certain NGOs in some places and the formal seed sector. Production increased by 2.47 times between 2011-2015 at IARI, R S Pusa (Bihar) and by 2.19 times at RCER, R C Ranchi between 2015- 2018. It has also resulted in enhanced income of participating farmers by 38.76% in case of wheat, 16% and 19% in case of tomato and brinjal, respectively. During the implementation of the programme, there has been rapid adoption of recommended agronomical technologies such as seed rate, raising seedlings in plastic trays in case of vegetables and line sowing and irrigation at CRI stage in wheat. Seven instances of participating farmers and farmer groups turning into entrepreneurs have been recorded. All participating farmers in case of wheat opted for certified seed production. From 2015 onwards, in villages engaged in participatory seed production of vegetables, 30% expansion in area under vegetable production has been observed.*

**Key words:** Participatory seed production, seed supply system, seed, farmers' income

### Introduction

Population of India, currently at 1.25 billion and continuing to increase, is exerting tremendous pressure to increase agricultural productivity. A lot of research results and technologies are available which only need to be outreached to remote areas and unreached corners in order to meet the challenges to increase productivity and farmers' income. For millions of farmers with limited resources, quality seed is one of the important factors which is responsible for poor productivity. Non availability of seeds in adequate quantity has often been cited a reason of low seed replacement rates (SRR) (Kumar et al, 2018). At an assumed SRR of 25% for self-pollinated and 35% for cross pollinated crop, the National Seed Plan (2005) (National Seed Corporation, 2015) projected an annual seed requirement of 254 lakh quintals (Anonymous, 2014). However, present availability of quality seed is estimated at 206 lakh quintals (Anonymous, 2015). Contribution of public sector is 58.8% (Chauhan et al, 2015) and there is a scope of increasing seed production by bringing small holder farmers in seed chain. Almost two thirds of the seed requirement has been found to be met from farm-saved seed which is often poor quality (Kumar et al, 2018). The paper tends to elucidate the experiences of implementation of seed multiplication by farmers' participatory approach. The observations cover a period of 8 years, i.e., 2010 and 2018 over two different locations dealing in entirely different types of crops.

Seed production with farmers' participation was initiated with the objectives of producing quality seed in adequate quantity and creating seed multiplication hubs and seed distribution units wherever possible, for the greater benefit of farmers, among the farmers and through the farmers.

### Materials and Methods

To make sure that the seed produced by partnering farmers is of utmost quality, those farmers were added into programme who were cultivating respective crops (wheat in case of IARI, R S, Pusa, Bihar and self-pollinated vegetable crops at ICAR Research Complex for Eastern Region, Ranchi, Jharkhand) before undertaking production detailed description of varietal characters were explained to all partnering farmers. Although in most cases they were conversant with the package of practices, they were asked to observe certain high standards with respect to production of genetically pure seed with high vigour. Every care was taken to maintain field standards

regarding isolation distance, volunteer plants, designated diseases and obnoxious weeds. Farmers were clear guidelines regarding roguing operations to be carried out in seed crops at vegetative and reproductive stages. Tow field inspections were carried out invariably in all cases.

Activities carried out at Pusa, Bihar pertained to wheat during 2010 to 2015. Varieties under production in participatory scheme were HD 2733, HD 2824, HI 1563, HD 2985 and HD 2967. The programme was initiated in 2009-10 on the basis of Models suggested by Patil and Dadlani, 2009.

### Model 1:

The farmers are advised to grow, in limited areas, the new improved varieties suitable for the given location. During the crop season scientists visit the farmers' fields to provide guidance in cultivation as well as seed production. In the next season as per their choice and requirement the farmers take up seed production for own use (at village level).

### Model: 2

Progressive farmers having enterprising interests are identified in a village and guided to form a small consortium or cooperative. They are provided with the Basic seed of new and promising IARI varieties (having good market demand) to take up seed multiplication under regular monitoring by a team of IARI scientists. The seed thus produced is processed, tested and bought back by IARI at 20% bonus over the market price in case of food crops. In case of vegetables the buy-back price is 55% of the sale price of IARI (in case of wheat). The processed and quality tested seeds are treated, packed and sold as Truthfully Labelled seeds of IARI.

### Model : 3

Small Farmers' seed enterprises are also supported by IARI to take up seed production in a (small) commercial scale. Such farmers' companies can purchase the Breeder Seeds of IARI, open pollinated varieties or the parental lines of Hybrids, on non- exclusive basis, for further multiplication and sale under their brand (retaining the IARI name) just as any commercial seed company. However, the Farmers' companies need to pay only a small token money to IARI in place of royalty paid by commercial companies. The Farmers' Companies are fully responsible for the production, processing and quality testing of such seeds, however they may avail the consultancy services of IARI scientists.

Figure 1:  
Map of the State of Bihar showing districts covered under Farmers' Participatory Seed Production programme of IARI, Regional Station, Pusa (Bihar)

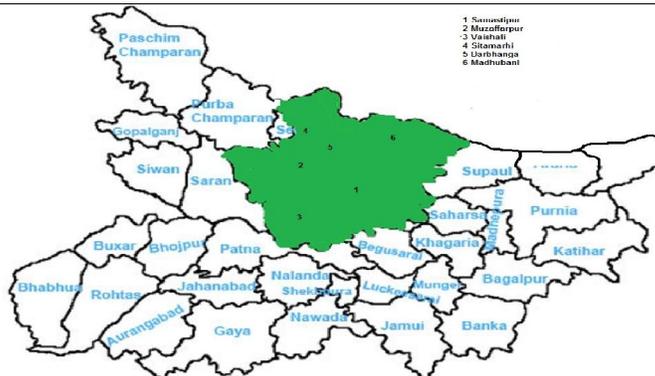
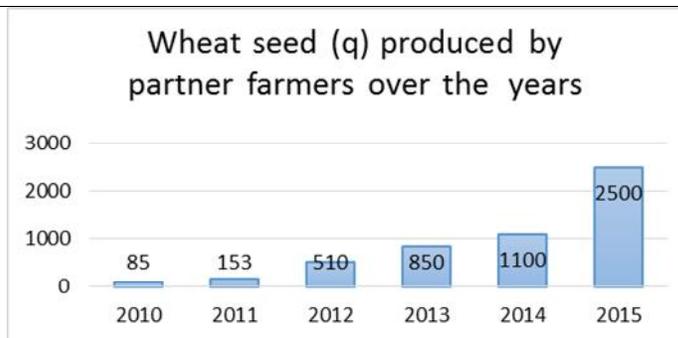


Figure 2:  
Quantity of seed produced by farmers under Farmers' Participatory Seed Production programme of IARI, Regional Station, Pusa (Bihar)



## Results and discussion

**Pusa Centre:** The programme was initiated in 2009-10 based on the models suggested by Patil and Dadlani (2009). In the first year only 3 farmers partnered in the scheme, two of them did not agree to carry out roguing for the fear of yield reduction, although an assured compensation as premium on procurement price was a part of the legal agreement between IARI and the partnering farmers. The production from participatory scheme rose gradually from 85 quintals in 2010 to 2500 quintals in 2015 (Fig. 2). Within the same period the total annual seed production rose from 100 quintals to 4200 quintals.

**Ranchi Centre:** the programme is running since 209-10. However, till 2015-16 the execution of scheme revolved around 2 farmers 2 adjacent villages of Ormajhi block. It was decided to extend the programme to Saraitoli and Hahap villages in Namkum block. In addition, from 2016-17 onwards the scheme further expanded on account of creation of a pulse seed multiplication hub at the centre. There is no convention of signing of formal memorandum of understanding. Till 2016-17, farmers had the convenience to obtain mother seed on loan, which they could return after multiplication and the rest was purchased on a stipulated price i.e., 80% of the sale price at the institute's sale counter. From 2017-18 onwards farmers are required to purchase the mother seed. From 2018-19 onwards a memorandum of agreement has been instituted consisting the term and conditions to which both parties are required to abide by. In a span of 3 years i.e., from 2014-15 to 2017-18 the annual quality seed

production under participatory scheme rose from 11.69 quintals to 25.6 quintals.

### Procurement Price and stake-holders' profits

In the second model, the procurement price of wheat seed was fixed at 55% of the sale price of wheat seed at the IARI seed store. In 2010 when IARI sale price was Rs 30 a kg, the procurement price was Rs 16.50 a kg and the minimum support price (MSP) of wheat was Rs 11.25 a kg. According to the memorandum of understanding the processing of seed was to be carried out at the institutes' processing plant, the price was to be calculated on the weight of processed good seed and the screenings were to be returned to the farmer. The packaging material was to be provided by the institute. Before payment is made to the farmer, the quality of the seed was to be ascertained. A farmer may expect to obtain Rs 1125 per quintal of his produce. On the other hand, when he sells his produce as seed to IARI, on an average 12% is rejected as screenings which fetch a price of Rs 1000 per quintal with poultry industry and the 88% of good seed is procured by IARI @ Rs 1650 per quintal. In this case he earns Rs 1572 per quintal for his produce as against Rs 1125 of MSP. The margin here is Rs 3.47 per kg, taking MSP as the benchmark (Fig 3). The scenario is 'win-win' for all stake-holders. Farmer gets a handsome profit margin, institute is able to save a comfortable margin for its revolving fund and the society at large has larger quantity of quality seed on its disposal (Fig 4).

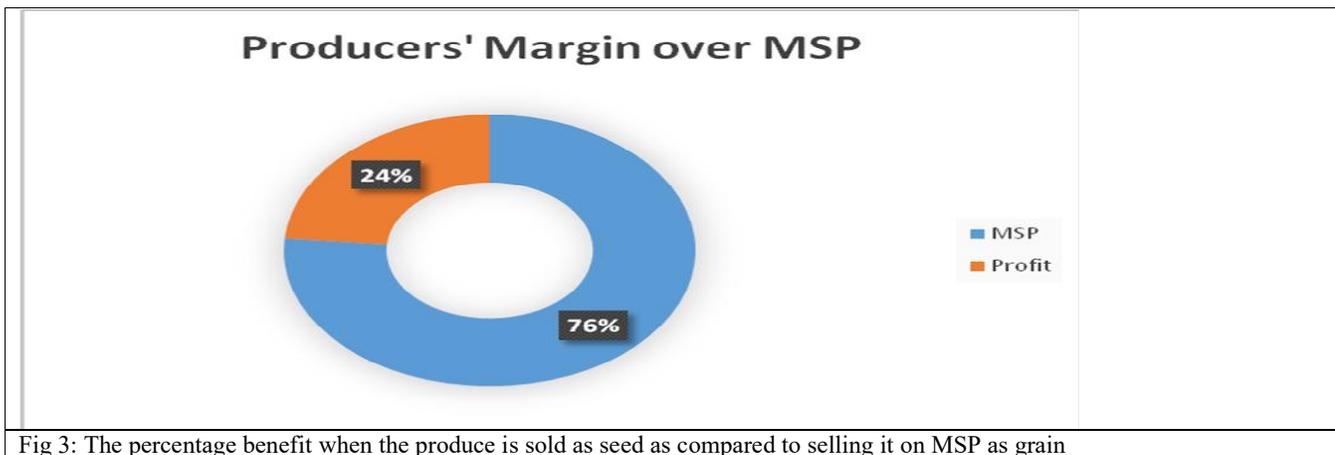


Fig 3: The percentage benefit when the produce is sold as seed as compared to selling it on MSP as grain

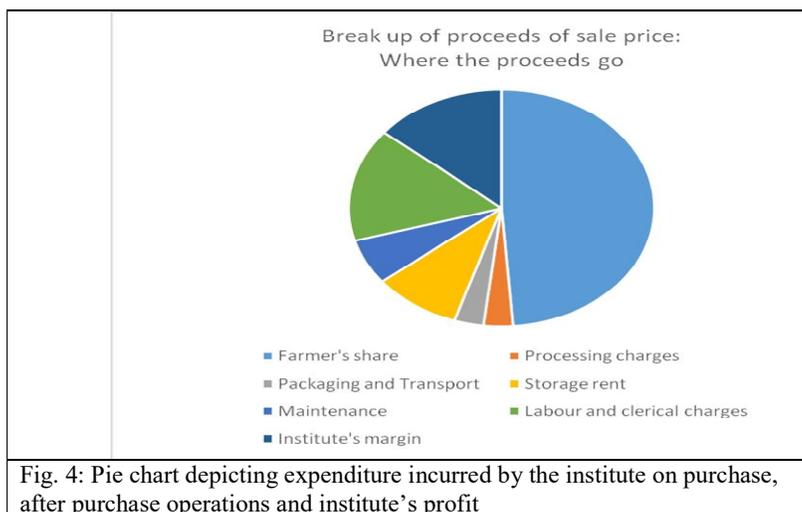


Fig. 4: Pie chart depicting expenditure incurred by the institute on purchase, after purchase operations and institute's profit

### Spin-offs

**Capacity building:** The activity which began from one farmer in 2009-10, spread to 6 districts of Bihar viz., Samastipur, Vaishali, Darbhanga, Muzaffarpur, Darbhanga and Madhubani (Fig 1). One farmer in Muzaffarpur district, Mr Shrawan Rai, began partnership under model 2 but later preferred to work under model 1. After capacity building, he continued to obtain breeder seed for multiplication and sale at village level on his own, although without any brand name.

**Seed Certification:** From 2012-13 onwards the farmers were encouraged to get their seed crops registered with the state seed certification agency. The seed crops were registered as certified class as well as foundation class.

**Custom Seed Production:** Two farmers registered with Bihar Rajya Beej Nigam, Patna and supplied certified as well as foundation seed to the State Seed Corporation (i.e., BRBN).

**Commercialisation:** one of the partnering farmers, Mr. Kashi Prasad Mehta, has eventually upgraded to a seed trader and obtained a license in seed trade from the Govt. of Bihar (with the brand name of Mehta Beej Nigam, Dholi, Muzaffarpur). He started under model 2 and changed over to model 3.

**Corporatization:** From 2012-13 onwards, a farmers' self-help group (SHG) viz., Creation Welfare Club, Rajapur-Dihuli (district: Muzaffarpur) also joined the programme and produced seeds of HD 2967 under conventional as well as 'conservation agriculture' mode. It now facilitated its group of farmers' producer company (FPC) and obtained financial support from NABARD.

**Socio-economic Impact:** in addition to direct benefits to the participating farmers in form of income augmentation and capacity building, the scheme also served to generate employment in rural hinterlands and impart skill in seed production techniques to the farm workers employed in the farms and yards of partner farmers.

**Partnerships:** Meaningful partnerships were established between seed producers (farmers), research institutes, state agricultural universities, farmers' organizations, NGOs, quality control agency (State Seed Certification Agency), State Seed Corporation, National Seed Corporation and seed traders of small as well as large demeanours.

### References:

**Anonymous. 2014.** *EFC to the XII Plan (2012-2017)*. ICAR, Krishi Bhavan, New Delhi, p 171.

**Anonymous. 2015.** <http://seednet.gov.in>, 15.06.2015.

**Chauhan, J S; Prasad S Rajendra; Pal, S.; Choudhury P R and Udaya Bhaskar, K (2016)** Seed production of field crops in India: Quality assurance, status, impact and way forward. *Indian Journal of Agricultural Sciences* 86 (5): 563-579.

**Kumar P.R., Singh C.B., Gupta A. K. and Kumar K (2018)** Quality Status of Wheat Seed in Eastern India and the Early Vegetative Growth of Wheat (*Triticum aestivum* L.) in Relation to Size of Seed. *Journal of Community Mobilization and Sustainable Development* Vol. 13(1), 98-106.

**National Seeds Corporation Limited (2015)** ([www.indiaseeds.com](http://www.indiaseeds.com)), 15.06.2015.

**Patil, S. A. and Dadlani, M. (2009)** <http://www.ncap.res.in/AKI%20Workshop/SESS-2/Dadlani.pdf>