



Review on Access of Small and Marginal Farmers to Improved Seeds in India

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Abstract

An attempt has been made in this paper to examine the role of small and marginal farmers in crop production and seed utilisation mechanism. The study also tries to highlight the availability of the existing institutional arrangement and policy supports towards improved seed production and distribution in India. The study has been undertaken based on the secondary data of diverse years starting from 2001 to 2011. It has been observed that small and marginal farmers still largely depend on public sources for seeds apart from their retention and local seeds. It has been also found that seed replacement rates are low and only 24% of the sub-marginal and 29% of the marginal farmers replace seed every year against 40% in case of large farmers. In spite of different policies like National Seed Policy, National Seed Project, National Seed Bill etc., the study has found that it is necessary to invest more in research and development for seed especially in the era of trade liberalization to make agriculture more remunerative and competitive.

Keywords: Small and marginal farmers, seed status and policies, constraints, policy options

Marginal and small farmers are the most vulnerable groups in the farming community even they are the main contributors for food security and employment in Indian agriculture. However, these groups are very often constrained in securing quality inputs and optimal quantities of technical knowledge in time. Small and marginal holders have recorded higher productivities than the large holdings. These groups possess 46.1% operational holding and contribute 51.2% of total crop output (Government of India, 2011).

According to Agricultural Census 2010-11, out of 138 million farm holdings in the country, 117 million are small and marginal holdings. Small and marginal land holdings together constitute 85% in 2010-11 and cultivate nearly 44% of the cultivated area. Similarly both number and average size of holdings of small and marginal farmers are waning in between 2001-01 to 2011-11 (Table 1). Quality seed is the most important

input because it has direct bearing to the production. Production can be enhanced by 15-20% in different varieties by the use of quality seed (Roy, 2014). It is known fact that artificial scarcity of quality and certified seeds are produced by the wholesalers and retailers during the peak seasons. Thus, marginal and small farmers mostly depend on farm-saved seeds which have low yield potential. This leads to decrease in seed replacement rate (SRR) and, consequently, low productivity (Barik, 2007). The role of policy and public investment in catering the interest of various stakeholders as well as facilitating the overall growth of the sector becomes crucial at this stage (NCEUS, 2008). However, farmers have to face the impact of other challenges like pressure of population, size of small holding, climate change, degradation of environment and resources, unavailability of optimum infrastructure, input supply etc.

Table 1: Number and area of operational holdings by size groups ('000 No. and '000 ha)

Category of holding	2000-01			2010-11		
	No. of Holdings	Area	Av. Size of Holding	No. of Holdings	Area	Av. Size of Holding
Marginal (<1 ha.)	75408 (62.3)	29814 (18.7)	0.40	92356 (67.0)	35410 (22.2)	0.38
Small (1-2 ha.)	22695 (19.0)	32139 (20.2)	1.42	24705 (17.9)	35136 (22.1)	1.42
Semi-Medium (2-4 ha.)	14021 (11.8)	38193 (24.0)	2.72	13840 (10.1)	37547 (23.6)	2.71
Medium (4-10 ha.)	6577 (5.5)	38217 (24.0)	5.81	5856 (4.3)	33709 (21.2)	5.76
Large (>10 ha.)	1230 (1.0)	21072 (13.2)	17.12	1000 (0.7)	17379 (10.9)	17.37
All	119931 (100.0)	159436 (100.0)	1.33	137757 (100.0)	159180 (100.0)	1.16

Source: Agricultural Census (2014), Ministry of Agriculture and Cooperation, Govt. of India.

In view of above, an attempt has been made in this paper to examine the role of small and marginal farmers in crop production and seed utilisation mechanism. The study also tries to highlight the availability of the existing institutional arrangement and policy supports towards improved seed production and distribution in India.

Database and Methodology

The study has been conducted based on thematic review of existing plan and policies as initiated by government/private sector for the betterment of seed industry. Data relating to diverse years starting from 1996-97 to 2012-13 have been scrutinised to review the entire gamut of changes in seed policy/seed industry in general and deployment in particular. Simple tabular analysis has been employed to acquire a holistic view of the entire scenario towards the issues like status of small and marginal farmers and their roles, technology adoption, seed supply mechanism (both public and private), institutional arrangement for seed development and distribution, constraints in seed supply, strategies for seed production and distribution to target group of farmers etc. Apart from secondary data, document of policies and programmes related to government and private sector have been consulted for elegance of results.

Results and Discussion

Small and marginal farmers use available inputs intensively except some regions, show higher efficiency compared to large farmers. Given right conditions, after the initial 'transitory' period, the small farmers catch up and even surpass the large farmers in the use of improved technologies if they are provided with improved inputs and credit (NCEUS, 2008).

Dev (2012) found that marginal and small farmers produce more output as compared to their acreage. The contribution of small and marginal farmers to output ranges from 19% in Punjab to 86% in West Bengal. It has been found that the marginal, small, medium and large farmers have been able to capture total return of ₹ 14754, ₹ 13001, ₹ 10655 and ₹ 8783 per hectare respectively.

Chand *et al.* (2011) estimated that out of the total operational holdings with full irrigation facilities, marginal and small farmers account nearly 87% and 51% in acreage. He showed that in the irrigated areas, the coverage of area under HYV was 89%, 86% and 78% respectively in marginal, small and large farmers in 2001-02. The percentage of area under high yielding varieties is also inversely related to farm size. Cropping intensity is found to be higher for marginal and small farmers than that of medium and large farmers (Table 2). Cropping intensity has increased from 134% to 139% in

Table 2: Share of area (%) under HYV according to farm size class

Year	Marginal	Small	Semi-medium	Medium	Large	All
Total Area						
1996-97	59	55	54	53	42	54
2001-02	72	68	65	61	47	64
Irrigated Area						
1996-97	80	76	76	76	75	77
2001-02	89	86	85	82	78	85
Un-irrigated Area						
1996-97	37	37	38	36	25	35
2001-02	52	54	52	46	30	48

Source: Chand *et al.* (2011): from Input Survey, Ministry of Agriculture.

Table 3: Crop-wise (cereal only) distribution of certified/quality seeds (lakh quintals)

Cereal crops	2008-09	2009-10	2010-11	2011-12	2012-13
Wheat	74.83	90.66	97.83	97.61	101.42
Paddy	58.18	60.95	69.34	74.41	72.27
Others	14.42	13.54	15.45	17.67	15.51
Total	147.43	165.15	182.62	189.69	189.20

Source: Ministry of Agriculture, Government of India, 2014.

case of marginal farmers and 116 per cent to 121 per cent in case of large farmers in between 1981-82 to 2011-02. The differences across farm sizes persisted over time. Thus, these observations indicate that the small holdings are comparable with large holdings or even better placed in reverence of farm efficiency.

Due to unavailability of quality and certified seeds in time and place and use of spurious seeds by small farmers, the percentage rate of germination and yield declines (Barik, 2007). Distribution of certified seed to the farmers remains almost stagnant for last three years i.e. from 2010-11 to 2012-13 in spite of growing demand (Table 3). Demand and supply need to be balanced for accessing the adequate quantities of good quality seed in time with affordable cost.

NCEUS (2008) report shows that about 48% of the farmer use purchased seeds and 47% use farm saved seeds. About 30% farmers replaced seed variety periodically and 17% changed it after four years. However, SRR is lowest among marginal farmers. Only 24% of the sub-marginal farmers and 29% of the marginal farmers replace seed every year, compared to 40% of the large farmers.

Seed distribution systems in India include (a) farmer to farmer distribution which is taken place either on cash payment or through exchange without the involvement of any formal marketing organization, (b) distribution by co-operatives which involves procurement of seeds by cooperatives and subsequent distribution takes place. This system is often encouraged by the government

through subsidies and guarantees, (c) distribution by departments of agriculture by which seeds are purchased by government and are distributed through extension machinery (d) distribution of seeds by non-government or quasi-government agencies and in this case seeds are distributed through the network of seed distributors and seed dealers (Kolvabi, 2008).

Rice Knowledge Bank (2012) reported that small and marginal farmers avail their seeds from two systems viz. (a) formal seed system and (b) informal seed system. The formal seed system is controlled either by the state or private industry. The formal hybrid seed industry led by the private sector focuses on profit-making crops. Farmers produce their own seed for generations and exchange seeds with neighbours for generations. This system is called as informal seed sector. Reddy (2007) observed that presently small and marginal farmers get only 20% of seeds from this system. According to him, informal sector is the main actor in developing countries and about 90-95% of the smallholder farmers in the world still obtain seed from informal source.

Seeds are produced and distributed by two sectors (a) public sector and (b) private sector. There are two corporation in public sector viz. (i) National Seed Corporation (NSC) and (ii) State Farm Corporation of India along with fifteen State Seed Corporations. NSC focuses to develop a sound seed industry and production and distribution of high quality seed. This sector includes the participation of central and state governments, Indian Council of Agricultural Research,

Table 4: Number of field crops seed varieties issued by the public and private institutions in India (2005-2010)

Crops	Truthfully Level Private Hybrid, 2005	Notified Public Varieties, 2010
Rice	79*	240**
Wheat	40	95
Maize	136	87
Pearl Millet	97	48
Sorgham	75	46
Cotton	255	70
Total	603	346

Note: *Includes only actual hybrids released by the private sector (not OPV)

**Includes open-pollinated varieties (mostly), 48 of which are hybrids.

Sources: Ministry of Agriculture, Govt. of India, 2010.

Table 5: Thrust area of seed policy

Seed Policy	Features
Thrust Area of National Seeds Policy, 2002	Variety development, plant variety protection, seed production, quality assurance, seed distribution and marketing, infrastructure facilities, transgenic plant varieties, import of seeds and planting materials, seed exports, promotion of domestic private sector seed industry and strengthening of the monitoring system.
Salient Features of Seeds Bill, 2004	Registration of kinds and varieties of Seeds etc. (Evaluation of performance, Compensation to Framers, Registration of Seed Producers and Processing Units, Seed dealers to be Registered), Regulation of Sale of Seed and Seed Certification, Seed Analysis and Seed Testing, Export and Import of Seeds and Planting Materials and Offences and Punishment.
National Seed Project (NSP), 2005	ICAR has launched the project on seed named as NSP. It envisaged research for development and improvement of seed at various SAUs, and ICAR institutes. It also gives financial support to NSC and SSC. Main objectives of NSP are :- (a) strengthening the breeder seed production, (b) giving support (financial/technical) to the NSC, SSC, SFCI, and private seed companies, (c) acting as primary co-ordination body and (d) creating the new as well as strengthening the existing facilities of seed testing, tech, research, set up etc. of SSC and SSCA.

Source: <http://seednet.gov.in/Material/Prog-Schemes.htm>

SAUs, cooperative sector, etc. There are 22 State Seed Certification agencies and 104 State Seed Testing Laboratories for quality control and certification. The public sector seed industry needs to address R&D, development and protection of new varieties and efficient technology transfer systems (Manjunath *et al.* 2013).

Trade liberalization brings private sector agencies to play a major role and, thus, the scenario of seed was changed significantly (Singh *et al.* 2008). Study of Lal (2008) showed that majority of the companies are involved in low volume and high value crops in order to maximize profit. Share of private sector seed production is nearly 42% but in term of value, it accounts almost 70% (approximate). Private seeds at remote and distant villages are rarely accessible due to lower profit margin. NIAM (2012) estimated that top ten seed companies holding increased from 70 to 90% of private seed market in a decade time. Table 4 demonstrates the number of field crop varieties issued by the public and private institutions in India from 2005 to 2010.

Evolution of seed industry can be categorized in three periods viz., (a) 1960s-1980 i.e. minimum private sector participation, R&D in public domain and restriction of foreign seed, etc.; (b) Post-NSP 1988 i.e. several government initiatives, FDI, import of varieties and breeding line and trade regulations liberalized; and (c) Current status: private sectors (MNCs) account for 80% turnover in seed industry, spending about 10-12% R&D (with a growth rate of 20% per annum) (Siddarudh, 2015). Different policies have been taken up by the Government for overall development of seed sector in India which are (i) Enactment of Seed Act, 1966, (ii) Seed Review Team (SRT), 1968, (iii) National Commission on Agriculture's Seed Group, 1972, (iv) Launching of World Bank Aided National Seed Programme (1975-85) leading

to creation of SSC, SSCA, SSSL, Breeder Seed Programme etc., (v) Seed Control Order, 1983, (vi) Creation of Technology Mission for Oilseeds and Pulses (renamed as Integrated Scheme on Oilseeds, Pulses, Oil Palm and Maize), (vii) Seed Transport Subsidy Scheme, 1987, (viii) New Policy of Seed Development, 1988, (ix) Seed Bank Scheme, 2000, (x) Protection of Plant Varieties and Farmers Right Act (PPVFRA), 2001, (xi) National Seed Policy, 2002, (xii) The Seed Bill, 2004, (xiii) National Seed Plan, 2005, (xiv) National Food Security Mission (NFSM), 2007, (xv) Rastriya Krishi Vikash Joyona (RKVY), 2007.

Department of Agriculture and Co-operation is implementing a Central Sector Scheme known as 'Development and Strengthening of Infrastructure Facilities for Production and Distribution of Quality Seeds' since 2005-06 with a objective to ensure production and multiplication of high yielding certified/quality seeds and make the seeds available to farmers, including those in remote areas. The components of the scheme are portrayed in Table- 6.

Contribution of science and technology has a great role in India's seed production and delivery system. Government has initiated a viable mechanism for rendering continuous service to the farmers. Table- 7 presents the existing system of Agricultural Science-Technology-Infrastructures in India. In fact, farmers' seed preferences make the shape of adoption patterns. Differences in resource endowment, management strategy and market situation affect farmers' valuation of seed production traits (yield potential and stability), consumption traits (taste, colour, texture), economic traits (early maturity, market demand, storability), and cultural traits (beliefs, rituals) (Lybbert, 2005).

Based on the review of different sources of publications on seed sector in India and also considering

Table 6: Components of the scheme entitled 'Development and Strengthening of Infrastructure Facilities for Production and Distribution of Quality Seeds'

Name of the component	Details of the component
Transport Subsidy on Movement of Seeds	To provide for (a) 100% reimbursement transportation cost for the movement of seeds produced outside the State and (b) a maximum of Rs.60 per quintal for the movement of seed within the State.
Establishment and Maintenance of Seed Bank.	In order to ensure seeds supply during natural calamities like floods, droughts, etc. this component is implemented to establish a seed bank to maintain stocks of foundation and certified seeds of different crops / varieties which can be utilised for such contingent requirements.
Quality Control Arrangement on Seeds	To arrangement to regulate the quality of seeds under the Seeds Act, 1966 to strengthen quality control organisations like State Seed Certification Agencies, State Seed Testing Laboratories, Central Seed Testing Laboratory and Central Seed Committee apart from imparting training to officials engaged in the seed sector and for enforcing the seed law.
Seed Village Programmes	To upgrade the quality of farmer-saved seed, which is about 80-85% of the total seed used for crop production programme, financial assistance is provided for increasing storage capacity, distribution of foundation / certified seeds at 50% cost of the seed of crops for production of certified/quality seeds only and for training on seed production and technology to the farmers.
Assistance for Creation/ Strengthening of Infrastructure Facilities in Public Sector.	To establish/strengthen infrastructure facilities for production and distribution of quality seeds, assistance for creating facilities of seed cleaning, grading, processing, packing and seed storage.
Assistance for Boosting Seed Production in Private Sector	To provide financial assistance for post-release monitoring of transgenic crops through SAUs/Department of Agriculture of States/KVKs, strengthening of SSTL for quality control of GM seeds, public awareness campaign through SAUs, scientific organisations/Institutes and for promotion of tissue culture through SAUs/specialised institutions/seed corporations.
Promoting for Hybrid Rice Seed Production	Under this component, credit linked back-ended capital subsidy is provided on seed infrastructure development to different stakeholders. National Seeds Corporation is the nodal agency for implementation and monitoring of this component.
Promoting for Hybrid Rice Seed Production	Assistance is provided for production as well as distribution of hybrid rice seeds.
Assistance for Boosting Seed Export	Under this component, assistance is meant for obtaining the membership of international organisations like International Seed Testing Association (ISTA) and to participate in the Organisation for Economic Cooperation and Development (OECD) schemes for the development of Indian seed industry and promotion of export of seeds.

Source: <http://seednet.gov.in/Material/Prog-Schemes.htm>

Table 7: Existing system of agricultural science-technology-infrastructures in India

Particulars	Regulatory bodies
A. Research and Development <ul style="list-style-type: none"> • State Agricultural Universities • Research institutes • National Research Centre (NRC) • National bureau • Project directorates • International Linkage 	D. Regulatory Agencies <ul style="list-style-type: none"> • PPV & FR authority • Plant quarantine
B. Seed Production/Distribution /Marketing <ul style="list-style-type: none"> • National seed corporation • State Seed Corporation • State Seed farm Corporation • Seed Companies 	E. Marketing Policy Regulation Body
C. Transfer Agencies <ul style="list-style-type: none"> • ATMA • Agriculture extension KVKs • State Agriculture Department • Private Seed Companies 	F. Centralized Authority

Source: Lal (2008).

the low socio-economic status of the farmers, some other issues have also been highlighted below.

- Seed growers need to be encouraged to avail of crop as well as Seed Crop Insurance to cover risk factors.

- Developing contractual agreements with farmers and establishment of parastatal seed cooperatives.

- Building capacity of self-help groups (SHGs) to facilitate community seed banks and provide incentives for farmers to grow indigenous varieties and seed conservation efforts.
- Facilitating marketing and credit support.
- Continual efforts and awareness for mutual learning by farmers and scientists to help improve the effectiveness of seed supply to local communities.
- Designing, developing and testing site specific alternative seed system models for improving local seed supply and supply chain mechanism.
- Taking into consideration and utilizing of the traditional seed management systems.
- Initiative by the stakeholders to work on Seed System of Innovation (SSI).
- Adopting socio-economic policies at macro level for development of small farmers.

Conclusion

Study on the review of small and marginal farmers' access to improved seed in India shows that small and marginal farmers are the major producers to contribute more than 50% of the total agricultural output. But they still largely depend on public sources of seeds beside their owned and locally available seeds. Only 29% of the marginal farmers replaced seed every year. Access to formal sector seeds by small and marginal farmers is presently only 20%. Nearly 90–95% of the world's smallholder farmers still obtain seed from informal sources. Private sectors are biased towards high value crops only and this trend is rising. In spite of development of science and technology and several programmes like National Seed Policy, National Seed Project, National Seed Bill etc., more investment in seed R&D from govt. is felt necessary in the era of trade liberalization. Efficient supply chain mechanism should be found to strengthen including both formal and informal channels, in order to reduce the costs to farmers of procuring and managing diverse crop varieties (Nagarajan and Smale, 2005). Strengthening and improving the overall efficiency of the seed sector are essential steps for easy access to low-cost seed in order to make agriculture more remunerative and sustainable.

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