

A Study on Contribution of Formal and Informal Sectors in Indian Seed Domain: An Analytical Study

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ABSTRACT

Formal and informal both seed systems prevails in the country to supply the seed to the farmers. Formal seed systems are deliberately constructed, involving a chain of activities leading to clear products (Certified seed of notified varieties). In an informal seed system, farmers themselves produce, disseminate and access seed directly from their own harvest, through exchange and barter among friends, neighbours, relatives and through local grain markets. The present study was taken with the objectives to study the contribution of formal and informal sectors and also contribution of public and private sector in the total seed supply to the farmers in the country. The study is based on primary as well as secondary data. The primary data was collected from 9800 farmers from 126 districts of 23 states. The results of study showed that breeder seed production in the country has increased from 0.94 lakh quintal to 0.99 lakh quintal, foundation seed production has increased from 9.60 lakh quintal to 18.00 lakh quintal and certified / quality seed has increased from 250 lakh quintal to 399 lakh quintal during the period 2008-09 to 2018-19. The average size of land holding of surveyed farmers was 2.36 ha while average size of land holding at National level is 1.08 ha. The analysis of secondary data showed that contribution of formal and informal sector in Indian seed domain was 54:46 for field crops, 64:36 for cereals, 29:71 for pulses and 44:56 for oilseeds crops. The overall contribution of formal seed sector has increased from 45 per cent to 54 percent during the year 2016 to 2018. The analysis of primary data showed that ratio of formal and informal seed sector was 64.20:35.80 for field crops 67.10:32.90 for cereals, 57.20:42.80 for pulses and 52.30:47.70 for oilseeds. Among different class of seed, highest share was of the TL seed (29.80 per cent) followed by certified seed (27.50 per cent) and foundation seed (6.90 per cent) for field crops. Higher share of formal seed sector in total seed supply of field crops show the concentrated efforts of public and private sector in seed supply. The findings of the present study is crucial for future planning towards quality seed supply through formal seed sector.

HIGHLIGHTS

- The average size of land holding of surveyed farmers was 2.36 ha.
- The ratio of formal and informal seed sector was 54:46 for field crops, 64:36 for cereals, 29:71 for pulses and 44:56 for oilseeds.
- The overall contribution of the formal seed sector has increased from 45 per cent to 54 percent during the year 2016 to 2018.
- Among different classes of seed, the highest share was of the TL seed (29.80 per cent) followed by certified seed (27.50 per cent) and foundation seed (6.90 per cent) for field crops.

Keywords: Quality seed supply, Formal, Informal sector

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Seed is the *numero uno* input for agriculture, which determines the response of all other inputs *viz.*, irrigation, fertilizer and plant protection chemicals etc. In the significant advances that India registered in agriculture in the last few decades, the role of the seed sector has been substantial. A sustained increase in agriculture production and productivity has dependent on the development of new improved variety, timely and adequate supply of quality seed to the farmers. It is estimated that the direct contribution of quality seed alone to the total production is about 15-20 per cent depending upon the crop and it can be further raised up to 40 per cent with effective management of other inputs (Anonymous, 2007). A superior quality seed not only increases productivity per unit area, but it also helps produce uniform crops without any admixtures which is important for obtaining high prices on the market. Quality seed production is a specialized activity. The general farm produce retained for seed cannot be substituted for quality seed, farm saved seed generally lacks genetic vigour and has poor germination (Singh *et al.* 1990).

Seed production in India comprises of both public and private sector companies. Indian seed industry has been traditionally a mixture of large, medium and small companies apart from the nationalized seed organizations. Indian seed programme includes the participation of more than 100 ICAR institutes, 70 Agricultural Universities (State Agricultural Universities, Central Agricultural Universities and Deemed Universities), National Seed Corporation (NSC), 15 State Seed Corporation (SSC), co-operative sector and private sector institutions. For certification and quality control, there are 22 State Seed Certification Agencies (SSCAs) and 104 state Seed Testing Laboratories (SSTLs). The organized seed sector particularly for food crops continues to be dominated by the public sector. The private seed industries of India who previously had been mainly confined to production and marketing of seeds are now increasingly emerging in their role as producers of new varieties and hybrids especially low volume high value crops through technological advancement in breeding and biotechnology. Their research focus is on pest and disease resistance and

most recently into developing varieties that can resist climatic extremities. Private seed companies' major share has been into seeds of hybrids of maize, cotton, sunflower, vegetables and flowers. Public share in the seed production of these crops are meagre in terms of commercial production. High margin and low volume nature of the above crops attracted private companies to tap the potential for huge profit making through quality seed production. The private sector is represented by 500 small & medium players and 50 large national & Multinational players in the country.

Formal and informal both seed systems prevails in the country to supply the seed to the farmers. Formal seed systems are deliberately constructed, involving a chain of activities leading to clear products (Certified seed of notified varieties). Institutions involved in formal seed system may be publicly and privately funded. In an informal seed system, farmers themselves produce, disseminate and access seed directly from their own harvest, through exchange and barter among friends, neighbours, relatives and through local grain markets. Informal Seed System focuses on farmer management of local varieties which have been selected over time and produced under local circumstances.

There are few studies pertaining to various aspects of formal and informal sector has been conducted in the country (Kuruganti, 2005; Pionetti, 2006; Wekundah, 2012; Singh *et al.* 2013; Vashishta, 2013; Singh and Agrawal, 2018 and Hiremath *et al.* 2020). But no study related to contribution of formal and informal sectors with respect to quality seed supply in the country have been conducted. Considering these facts, the present study was taken with the objectives to study the contribution of formal and informal sectors and also contribution of public and private sector in the total seed supply to the farmers in the country.

METHODOLOGY

The study is based on primary data collected at National level in the country. Data and information was collected by personnel interview with the farmers using a well-structured and pre-tested interview schedule for the agricultural year 2017-18 and 2018-19. The survey was

conducted by co-operating centers of network project 'ICAR Seed Project in Agricultural Crops' coordinated by ICAR- Indian Institute of Seed Science, Mau, Uttar Pradesh. The frame work for collection of data and information, Districts was randomly selected by co-operating centers on the basis of their working area and jurisdiction. From each selected district, two blocks was selected randomly. From each selected block, five villages was selected through random sampling. From each selected village, ten farmers were selected through random sampling on the basis of probability proportion to the number of farmers falling under each categories. Those farmers and villages have been discarded in sampling process which are part of any seed production and promotion programme of Institutes and Universities.

All together data and information was collected from 9800 farmers from 126 districts of 23 states (Andaman and Nicobar Islands, Andhra Pradesh, Assam, Bihar, Chhattisgarh, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Maharashtra, Manipur, Odisha, Puducherry, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttarakhand, Uttar Pradesh, West Bengal). Secondary data on average area under important cereals, pulses and oilseed crops, seed rate, contribution of formal seed sector in total seed requirements were collected from various issues of Agricultural Statistics at a glance published by Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India.

RESULTS AND DISCUSSION

Trend in quality seed production

There is an increasing trend in quality seed production in the country over period of time. The breeder seed production has increased from 0.94 lakh quintal (2008-09) to 0.99 lakh quintal (2018-19). Similarly, the foundation seed production has increased from 9.60 lakh quintal (2008-09) to 18.00 lakh quintal (2018-19) and certified / quality seed has increased from 250 lakh quintal (2008-09) to 399 lakh quintal (2018-19). Trend in production of breeder, foundation and certified / quality seed during last ten years have been presented in Fig. 1.

Average land holding

The data pertaining to average size of land holding of surveyed farmers and average size of land holding at national level has been given in Table 1. The analysis of data shows that majority of surveyed farmers (87.60 per cent) belongs to marginal category (< 1 ha) followed by small (1-2 ha) and semi-medium (2-4 ha). The average size of land holding of surveyed farmers was 2.36 ha while average size of land holding at National level is 1.08 ha.

Table 1: Average size of land holding of sample farmers and at National level

Sl. No.	Land holding particulars	Average size of land holding	National average*	Percentage of farmers
1	Marginal (<1ha)	0.54	0.38	36.40
2	Small (1-2ha)	1.49	1.40	33.80
3	Semi-medium (2-4ha)	3.01	2.69	17.40
4	Medium (4-10ha)	6.34	5.72	9.60
5	Large (>10 ha)	18.97	17.07	2.80
6	Average /Total	2.36	1.08	—

* 2015-16 (P), Department of Agriculture, Cooperation & Farmers Welfare (Agriculture Census 2015-16, Phase-I).

Contribution of formal and informal sector (secondary data)

Group-wise estimated contribution of formal and informal seed sector based on secondary data have been presented in Fig. 2. Figure clearly indicating that ratio of formal and informal seed sector was 54:46 for field crops, 64:36 for cereals, 29:71 for pulses and 44:56 for oilseeds.

Estimated contribution of formal and informal seed sector in important crops at National level based on secondary data have been provided in Table 2. Formal seed sector contributes around 88.60, 49.50 and 30.10 per cent of total seed requirement of country in case of paddy, wheat and ragi respectively. Formal sector seed availability is sufficient enough to cover entire acreage of maize, pearl millet, sorghum, castor, sunflower and safflower. All pulses have comparatively low contribution in seed availability from formal sector and

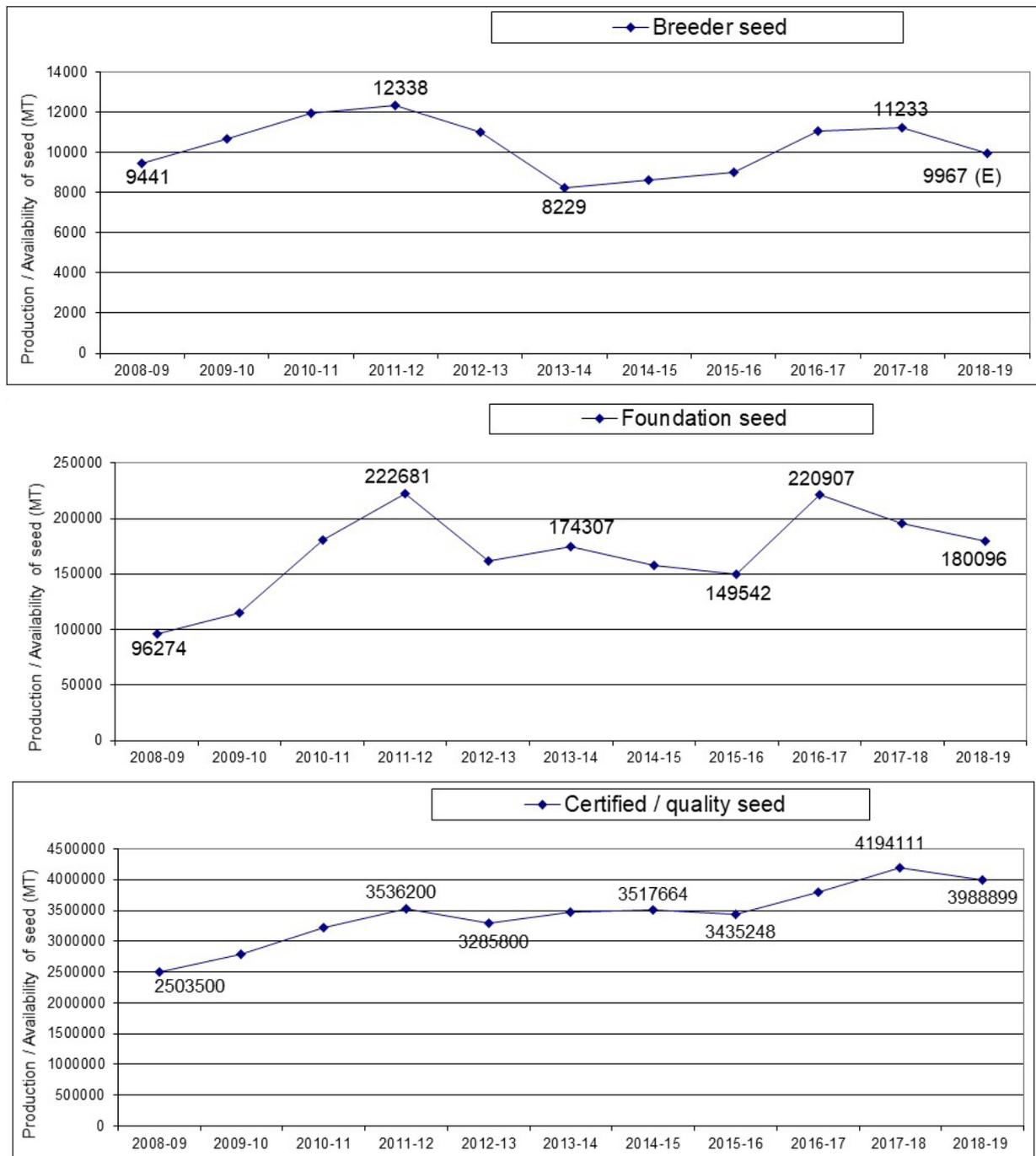


Fig. 1: Trend in production of breeder, foundation and certified / quality seed

it is only 27.00, 42.70, 19.00, 55.50, 26.10 and 35.90 per cent in Chickpea, Urd, Lentil, Pigeonpea, Field pea and Moong respectively. In case of oilseeds formal seed sector contributes around 86.00, 51.90, 33.70 and 60.00 per cent of total seed requirement of country with respect to

Rapeseed & Mustard, Soybean, Groundnut and Sesame respectively. Paddy, pigeonpea and rapeseed & mustard were the crops with highest contribution of formal seed sector in case of cereals, pulses and oilseed group.

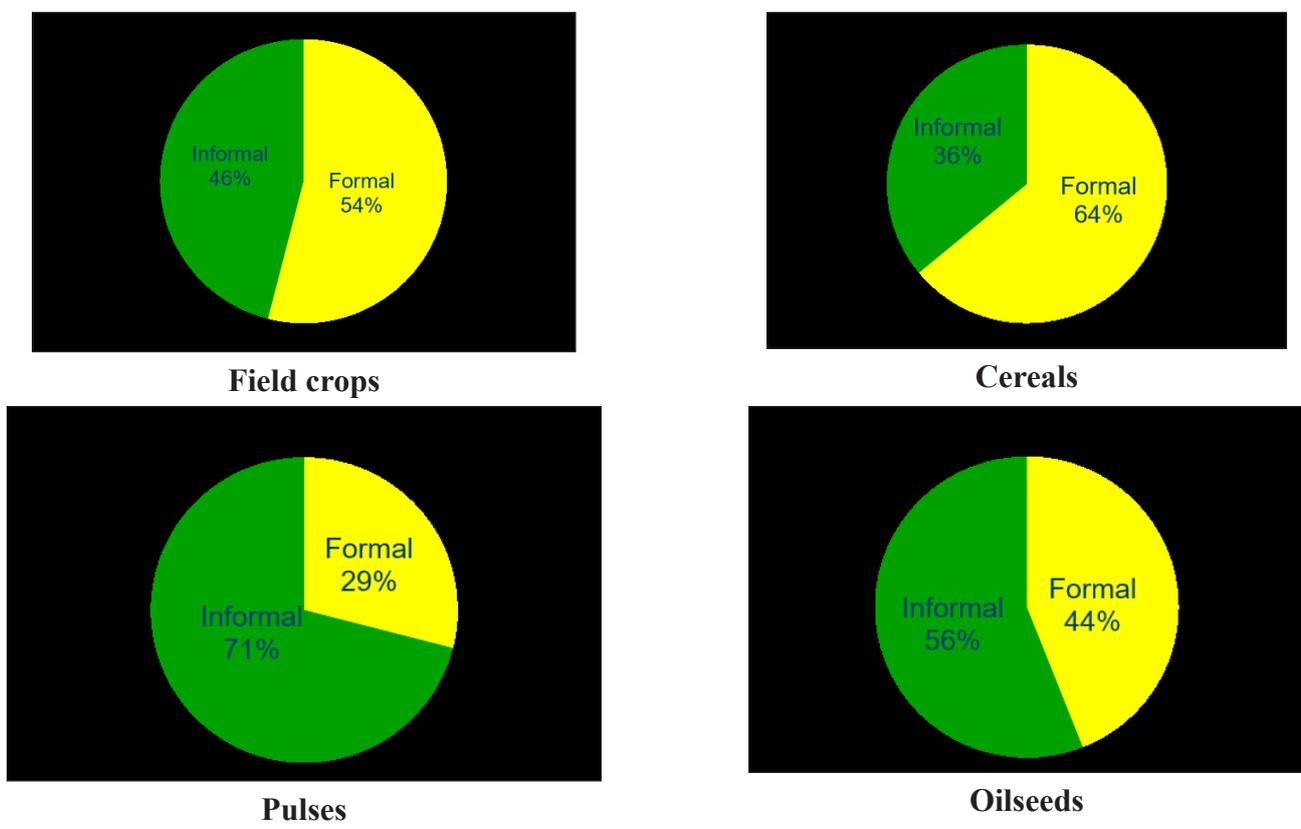


Fig. 2: Estimated contribution of formal and informal seed sector in Indian seed domain (2018)

Table 2: Estimated contribution of formal and informal seed sector in important crops at National level

Sl. No.	Crop	Average Area (m. ha) TE 2017-18	Seed Rate Kg/ha (V/H)*	Total Seed Requirement (lakh q)	Formal Sector Contribution (%)	Informal Sector Contribution (%)
1	Paddy	43.76	30/12	124.08	88.6	11.4
2	Wheat	30.26	100	302.6	49.5	50.5
3	Ragi	1.42	11	1.56	30.1	69.9
4	Maize	9.30	30/20	22.30	#	—
5	Pearl millet	7.32	5/5	3.66	#	—
6	Sorghum	5.55	10/7.5	5.34	#	—
7	Chickpea	9.53	75	71.48	27.0	73.0
8	Urd	3.50	25	8.75	42.7	57.3
9	Lentil	1.43	50	7.15	19.0	81.0
10	Pigeonpea	4.58	15	6.87	55.5	44.5
11	Field pea	1.13	80	9.04	26.1	73.9
12	Mung	3.5	25	8.75	35.9	64.1
13	Rapeseed & Mustard	5.93	5	2.97	86.0	14.0
14	Soybean	11.08	70	77.56	51.9	48.1
15	Groundnut	4.95	150	74.2	33.7	66.3
16	Sesame	1.71	5	0.86	60.0	40.0

Seed availability is sufficient enough to cover entire acreage; *V: Variety, H: Hybrid. Formal sector contribution is also 100 % in castor, sunflower, safflower.

Comparison for estimated contribution of seed supply through formal and informal seed sector in Indian seed domain during the year 2016 and 2018 have been presented in Table 3 which was based on secondary data. It is evident from the table that in case of field crops the contribution of formal sector has increased from 45 percent to 54 percent during the year 2016 to 2018. The maximum increase was found in cereals crops (54 per cent to 64 per cent) followed by oilseeds (33 per cent to 44 per cent) and pulses (23 per cent to 29 per cent).

Table 3: Comparison of estimated contribution of formal and informal sector at National level (2016 Vs 2018)

Sl. No.	Particulars	2016		2018	
		Formal (%)	Informal (%)	Formal (%)	Informal (%)
1	Field crops	45	55	54	46
2	Cereals	54	46	64	36
3	Pulses	23	77	29	71
4	Oilseeds	33	67	44	56

Contribution of formal and informal sector (primary data)

Group-wise estimated contribution of formal and informal seed sector based on primary data analysis have been shown in Table 4.

Table 4: Group-wise share of formal and informal seed sector at farmers level (in percentage)

Sl. No.	Groups	Ratio of formal and informal		Ratio of public, private and informal		
		Formal	Informal	Public	Private	Informal
1	Field crops	64.20	35.80	33.70	30.50	35.80
2	Cereals	67.10	32.90	34.80	32.30	32.90
3	Pulses	57.20	42.80	33.40	23.80	42.80
4	Oilseeds	52.30	47.70	29.60	22.70	47.70

The ratio of formal and informal sector was 64.20:35.80 for field crops, 67.10:32.90 for cereals, 57.20:42.80 for pulses and 52.30:47.70 for oilseeds. The contribution of public, private and informal sector (Farm saved seed) in case of field crops was 33.70, 30.50, and 35.80 per cent

respectively. In case of cereals, the contribution was 34.80, 32.30, and 32.90 per cent respectively. In case of pulses the contribution was 33.40, 23.80 and 42.80 per cent respectively and in case of oilseed, the contribution was 29.60, 22.70 and 47.70 per cent respectively.

Share of different class of seed supplied at farmers level based on primary data analysis have been presented in Table 5. In case of field crops, highest share was of farm saved seed (35.80 per cent) followed by TL seed (29.80 per cent), certified seed (27.50 per cent) and foundation seed (6.90 per cent). In case of cereals same pattern was followed. In case of pulses and oilseed highest share was of farm saved seed followed by certified seed, TL seed and foundation seed.

Table 5: Share of different class of seed supplied at farmers level (in percentage)

Sl. No.	Groups	Foundation seed	Certified seed	TL seed	Farm saved seed
1	Field crops	6.90	27.50	29.80	35.80
2	Cereals	7.20	28.10	31.80	32.90
3	Pulses	9.90	25.90	21.40	42.80
4	Oilseeds	3.50	28.10	20.70	47.70

Crop-wise share of formal and informal seed sector at farmers level based on primary data analysis have been presented in Table 6. Share of formal seed supply was highest in case of pearl millet (87.10 per cent) followed by rapeseed & mustard (86.80 per cent), paddy (73.80 per cent), soybean (70.80 per cent), wheat (65.00 per cent), sorghum (62.10 per cent), maize (61.90 per cent), pigeonpea (60.10 per cent), chickpea (56.30 per cent), green gram (53.30 per cent) and groundnut (38.70 per cent). In case of ratio among public, private and informal sector the highest share of public sector was found in case of rapeseed & mustard (49.70 per cent) followed by green gram, chickpea, soybean, pigeonpea, wheat, paddy, sorghum, groundnut, pearl millet and maize. Highest share of private sector was found in pearl millet (67.70 per cent) followed by maize, paddy, rapeseed & mustard, sorghum, soybean, wheat, pigeonpea, chickpea, groundnut and green gram.

Table 6: Crop-wise share of formal and informal seed sector at farmers level

Sl. No.	Crops	Ratio of formal and informal		Ratio of public, private and informal		
		Formal	Informal	Public	Private	Informal
1	Paddy	73.80	26.20	35.50	38.30	26.20
2	Wheat	65.00	35.00	35.90	29.10	35.00
3	Maize	61.90	38.10	14.60	47.30	38.10
4	Pearl millet	87.10	12.90	19.40	67.70	12.90
5	Sorghum	62.10	37.90	30.70	31.40	37.90
6	Pigeonpea	60.10	39.90	39.10	21.00	39.90
7	Chickpea	56.30	43.70	42.40	13.90	43.70
8	Green gram	53.30	46.70	43.30	10.00	46.70
9	Rapeseed & Mustard	86.80	13.20	49.70	37.10	13.20
10	Groundnut	38.70	61.30	26.80	11.90	61.30
11	Soybean	70.80	29.20	40.90	29.90	29.20

CONCLUSION AND IMPLICATIONS

The study shown that the quality seed production in the country have positive trend in last one decade. The majority of surveyed farmers (87.60 per cent) belongs to marginal, small and semi-medium category of land holding. The average size of land holding of surveyed farmers was 2.36 ha. The analysis of secondary data on contribution of formal and informal sector in Indian seed domain shows 54:46 for field crops, 64:36 for cereals, 29:71 for pulses and 44:56 for oilseeds crops. Paddy, pigeonpea and rapeseed & mustard were the crops with highest contribution of formal seed sector in case of cereals, pulses, and oilseed group respectively. Formal sector seed availability is sufficient enough to cover entire average of maize, pearl millet, sorghum, castor, sunflower and safflower. Formal seed sector contribution was more than 50 per cent in paddy pigeonpea, rapeseed & mustard, soybean, and sesame. The overall contribution of formal seed sector has increased from 45 per cent to 54 percent during the year 2016 to 2018. The analysis of primary data on contribution of formal and informal seed sector showed

the ratio of 64.20:35.80 for field crops 67.10:32.90 for cereals, 57.20:42.80 for pulses and 52.30:47.70 for oilseeds. The share of public, private and informal seed sector was 33.70, 30.50 and 35.80 for field crops respectively. Among different class of seed, highest share was of the TL seed (29.80 per cent) followed by certified seed (27.50 per cent) and foundation seed (6.90 per cent) for field crops. Share of formal seed supply was highest in pearl millet followed by rapeseed & mustard, paddy, soybean, wheat, sorghum, maize, pigeonpea, chickpea, green gram and groundnut. Higher share of formal seed sector in total seed supply of field crops show the concentrated efforts of public and private sector in seed supply. This ultimately increase the production of field crops in the country as quality seed has direct impact on the productivity of agriculture. In spread of new high yielding varieties role of formal seed sector is crucial. The findings of the present study is crucial for future planning towards quality seed supply through formal seed sector.

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