Study No.88

Evaluation of Management of Seed Supply in Oilseeds and Pulses

(A Consolidated Report of 5 AER Centres Studies)

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PREFACE

Oilseeds and pulses are essential elements of human diet. While vegetable oils are essential for human development pulses are major sources of proteins. Oilseeds are important cash crops, whereas, pulses help in improving the fertility status of soil as these fix nitrogen in the soil from atmosphere.

Among crop inputs seed is very important as genetic crop qualities like yield, adoption to local conditions, resistance to diseases and response to improved inputs like fertilisers depend on seed. A good quality seed enhances the productivity by about 20 per cent. Government is making continuous efforts to supply high quality seeds of oilseeds and pulses to farmers. However, even after many efforts no breakthrough has been achieved, in quality of seeds of oilseeds and pulses. Firstly, no high yielding varieties seed are available and secondly management of seed supply of the two crop groups seems to lack coordination among different levels of seed supplying agencies. Not only there was short supply of certified seed but also gaps existed between requirement and availability at different stages of seed of both oilseeds and pulses.

The purpose of this study was precisely to go into above mentioned problems and study the linkages between different seed producing agencies in states as well as in the Centre. Besides, evaluation was to be done of the monitoring done to strengthen the chain of breeders seed to foundation seed to certified seed.

Crops considered for the study were : groundnut, soybean and sunflower among oilseeds and gram, lentil arhar, moong and urad among pulses.

This is a consolidated report of study conducted by 5 AER Centres in 6 states. While AER Centres at Allahabad, Jabalpur, Pune and Visakhapatnam conducted the study in the respective states the AER Centre at Vallabh Vidyanagar did so for two states of Gujarat and Rajasthan.

This study was possible due mainly to Directorate of Economics and Statistics, Ministry of Agriculture, Government of India which entrusted the work of consolidation of six studies to this centre and encouraged in its conduct.

I must express my sincere gratitute to our Honourable Vice-Chancellor, Director of Research Services and Dean, College of Agriculture, Jabalpur for extending their whole hearted support in this academic pursuit.

I wish to record my deep appreciation for Mr. Sita Ram for drafting the report under the overall supervision of Prof. M.C. Athavale, Both Prof. M.C. Athavale and Mr. Sita Ram toiled hard to complete the report in their post retirement months of March to June 2003.

I also thank other technical and non technical staff of the Agro-Economic Research Centre, J.N.K.V.V., Jabalpur their cooperation and help. *Mr. Shrikant Upadhye* and *Mr. Chandrakant Mishra* of AER Centre gave excellent computation assistance. *Mr. Sikandar Khan* did computer typing with great zeal and enthusiasm.

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I hope that the study report would be useful to Central as well as state government officials and all those associated with the management of supply of seeds of oilseeds and pulses.

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CHAPTER - I

INTRODUCTION

1.1 Oilseeds and Pulses

The importance of oilseeds and pulses need not be emphasised. These are essential elements of human diet. Oilseeds stand next only to foodgrains. Vegetable oils are essential for human development. Oils serve as raw material for industries like soap, paints, lubricants, pharmaceuticals, etc. Pulses are integral part of Indian diet. These are the major source of proteins especially for the vegetarians and the economically poor population of the country. Both oilseeds and pulses are important in the cropping systems. While the oilseeds are taken as cash crops, pulses help in improving the status of the soil by nitrogen fixation from the atmosphere. Thus, both these crop groups are very important for the Indian agricultural economy. Pulses increase cropping intensity.

India has successfully overcome the acute shortage witnessed in the early sixties culminating in the worst period following two serious droughts in 1965-66 and 1966-67 through application of research. This has been made possible by improved technologies and their extension among the farmers, backed up with supply of credit and inputs to enable them to translate the recommended technologies into agricultural operations. This process was facilitated by the creation of irrigation infrastructure during the plan era since 1950 and establishment of specialised institutions for production and distribution of different kinds of inputs required by farmers like seeds, fertilisers, agricultural machinery and pesticides[1].

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1. Rajan K., "Time for Proper Linkages" The Hindu, Survey of Indian Agriculture, 1997, p. 19,20.

Although, all these inputs are crucial in increasing production of crops, seed is the basic and vital input for attaining sustained growth in agricultural production and productivity in different agro-climatic regions. To an extent the efficiency of other agricultural inputs like fertilisers and pesticides is dependent on the quality of Seeds. Seeds of appropriate vigour are required to meet diverse agro-climatic situations and the demands of intensive cropping system. Seeds are also critical for achieving the desirable nutrition in food crops and for introduction of new crop varieties in non conventional areas. A sustained increase in agricultural production and productivity is thus dependent on the development of new and improved varieties of crops and supply of quality seeds to farmers.

1.2 Importance of Seed

Seed is the key input in the production of oilseeds and pulses, like other crop groups. The use of high quality seed not only increases the productivity of crops but also helps to stabilise the productivity. Quality seeds increase the germination percentage and respond positively to the inputs like fertilisers and irrigation. The good quality seeds at times, give out plants which are resistant to drought conditions and many pests and diseases. According to an observation a good quality seed helps to increase the productivity by 20 per cent. Since seed is basic to any kind of crop development, the Govt. has been keen to supply good quality and high yielding seeds to farmers. Even after many years of efforts by the Govt. the seed replacement ratio has remained low across many regions of the country. The farmers tend to use previous year's crop produce as seed although it lacks genetic vigour.

1.3 Qualities of Good Seed

A good quality seed should possess following characteristics :

a) It should be of adaptable crop variety or hybrid and the duration should suit the agro-climatic conditions and cropping systems of the region.

b) It should be pure with high sowing quality and high germination rate, uniform growth pattern and maturity.

c) It should be free from seed borne diseases and physiological disorders.

d) It should be plump, uniform in size, shape, colour, texture development and of proper weight.

e) It should be clean, free from dirt, sand, chaff, sticky substance etc.

f) It should be free from weed seeds.

g) It should be free from insects and diseases.

h) It should be whole, not broken or crushed or peeled or rotten and be free from dampness.

i) It should be fresh and of proper age.

j) It should contain enough moisture.

1.4 Types of Seeds and Suppliers

Among the guidelines circulated by the Technology Mission on Oilseeds and Pulses and Maize (TMOP & M) it has been mentioned that increasing productivity will be the major thrust in addition to area expansion through inter cropping and mixed cropping. In the action plan suggested Integrated Seed Management tops the list.

Management of the seed is the responsibility of the State Governments in collaboration with state and central seed production agencies. To ensure supply of quality seeds the State Governments should prepare a five year seed plan indicating requirement of breeder, foundation and certified seeds for each coming year.

1.4.1 Breeder Seeds

In the chain of seed production, the production of breeder seed forms the first link. Breeder seed is produced from nucleus seed. Its genetic purity, seed health conforms to the highest standards. Indian Council of Agricultural Research (ICAR) is the nodal agency for organising production and supply of breeder seeds of crops. Presently for obtaining breeder seeds the State Department of Agriculture forwards the indents of breeder seed to the seed division in the Central Department of Agriculture. This indent includes the requirement of the State Department of Agriculture, State Seed Corporation and the private seed production companies. Seed division assesses the demand of breeder seeds and forwards it to ICAR. The indents are scrutinised, compiled and finalised and after receiving breeder seed production report from ICAR, the allocation is made among the indentors. Lifting of breeder seeds of varieties by indenting agencies and its supply to them by producing SAUs/breeders is strictly in accordance with the allocation made by Department of Agriculture and Cooperation. Breeder seed is not subject to quality control by certification agency. The quality standards of breeder seed like genetic purity, germination capacity, physical purity or seed health are determined and controlled by the originating or sponsored breeder.

1.4.2 Foundation Seeds

Foundation seed is the progeny of the breeder seed. Foundation seed is an intermediate or a throughput in the generation system of seed production. It is produced by the seed corporation both public and private, the State Department of Agriculture, SAUs and also individual seed farmers for eventual production of certified seeds. Quality standards for the foundation seeds are laid down in the manual of Indian Minimum Seed Certification Standards, 1988. Its production is subject to certification.

1.4.3 Certified Seeds

Certified seed is the ultimate stage in seed production chain and is the progeny of the foundation seed. Certified seed production is undertaken by the public and private sector, seed companies, State Department of Agriculture and the seed farmers. Its quality standards are also set out in the same manual as mentioned in foundation seeds. Thus, multiplication has three stages of production, breeder seed, foundation seed and certified seed. Generally breeder seed is produced on the research farms of SAUs and ICAR's research centres, foundation seed is produced by private companies through the contract farmers, while NSC, SSC and SFC produce them on their farms. Certified seed is generally produced through contract farmers both in public and private sectors (Table 1.1).

Table 1.1 Production of breeder, foundation seed and distribution of certified/ quality seed

S. No	Type of seed	Unit	1993-94	1994-95	1995-96	1996-97 (Anticipated)	1997-98 (Target)
1	Breeder seed production	Qtl.	36,281	40,113	43,363	44,623	45,000
2	Foundation seed production	Lakh Qtl.	4.04	4.73	4.76	5.76	6.84
3	Certified/ quality seed distriction	Lakh Qtl.	62.29 (49.56)	65.86 (53.21)	69.90 (55.35)	70.00 (60.00)	75.50

Figures in parenthes are of certified seed.
Source : Annual Report, Deptt. of Agri. & Coop., Ministrry of Agri. G.O.I. 1997-98.

Advanced planning is necessary for seed production. It is because production of seed is a time consuming cost intensive process involving several stages and risks. The factors considered for the planning of seed production are

1. Increase in area under the crop
2. Varietal replacement contemplated
3. Progressive replacement of seed in the case of self/open pollinated varieties, and
4. Area expansion under hybrids[2].

The following chart indicates the stages and time involved in production of quality seed.

Stage	Stage 1 Nucleus	Stage 2 Breeder	Stage 3 Foundation	Stage 4 Certified
Year	1st	2nd	3rd / 4th	4th / 5th
Producer	Breeder	Breeder	NSC,SSC,SFC Pvt. Co.	Public/ Pvt. sectors

1.5 Agencies Involved in Seed Supply

Various agencies and organisations are functioning with the objective of providing good quality seed to farmers. These are TMOP (Technology Mission on Oilseeds and Pulses), OPP (Oilseeds Production Programme), NPDP (National Pulse Development Project), NSC (National Seed Corporation), SFCI (State Farms Corporation of India), SAU (State Agricultural Universities), ICAR (Indian Council of Agricultural Research), IARI (Indian Agricultural Research Institute), SSTL (State Seed Testing Laboratories) and private sector companies engaged in seed production and distribution.

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2. *Technology Mission on Oilseeds, Pulses and Maize, Guideline for implementation of oilseeds production programme, 1996-97, Govt. of India.*

1.5.1 National Seed Corporation:

National Seed Corporation (NSC) was established in 1963 under the companies Act, 1956 with the objective of developing a sound seed industry in the country and for producing and distributing high quality seeds to the farmers. It undertakes the production of breeder seeds on its own farms, foundation and certified / quality seeds production through contract growers, Agricultural Universities, State Seeds Corporations and State Farms Corporation of India (Table 1.2).

Table 1.2 Production of Seed by National Seed Corporation

(Quantity- '000 tonnes)

Type of seed	1993-94	1994-95	1995-96
Breeder seed	0.13	0.19	0.21
Foundation seed	1.78	2.96	2.51
Certified seed	34.49	38.93	29.41

Source : Directory of Indian Agriculture, CMIE, July, 1997

1.5.2 State Farms Corporation of India (SFCI)

State Farms Corporation of India (SFCI) Ltd. was established in 1969 under the companies Act, 1956 to maintain the erstwhile central farms run by Department of agriculture. There are twelve farms under the SFCI in the country. Besides production of quality seeds, it has been undertaking works on farm development and irrigation (Table 1.3).

Table 1.3 Total area, production and seed produced by State Farms Corporation of India

Year	Area under crops (Hectares)	Total production (Quintals)	Seed production (Quintals)
1995-96	28,441	5,78,005	1,91,467
1996-97	28,908	5,20,751	2,09,200

Source :Annual Report, 1997-98, Ministry of Agriculture, Govt.of India, New Delhi

In order to increase seed production, the grower seed production programme has also been started by SFCI.

1.6 Schemes for seed development

Various schemes for seed development are as below :

1.6.1 Transport subsidy on seeds

The main purpose of this scheme is to ensure timely availability of seeds to the farmers, mainly of north- eastern states including Sikkim at reasonable prices.

1.6.2 Integrated seed development programme

The centrally sponsored scheme on integrated seed development aims at increasing productivity by creating an awareness among farmers about the superiority of certified seeds over uncertified seeds and ensuring the availability of certified seeds at reasonable prices in time in remote and not easily accessible areas of the State.

1.6.3 Quality control arrangements on seed

The scheme aims at strengthening quality control arrangement for seeds in order to ensure that farmers get good quality seeds. The seed act, 1966 regulates the quality of seeds sold/ distributed to the farmers through voluntary certification and compulsory labelling of seeds of notified kinds/varieties. The scheme has following components.

- setting up of National Seed Training Centre at Varanasi
- secretarial support to Central Seed Committee/ Central Seed Certification Board

- strengthening of State Seed Certification Agencies, State Seed Testing Laboratories and seed Law Enforcement Agencies
- strengthening of seed division

1.6.4 National Seed Project

Following the successful implementation of Tarai Seed Project the Government of India implemented National Seeds Project-I and National Seed Project-II with World Bank's assistance. This project envisaged availability of adequate quantity of quality seeds and enforcement of quality control measures. National Seed Project Phase-III was launched in March, 1990 and came to an end in 1997-98. Besides above, the other schemes for seed development are-

(i) Streamlining certified seeds production of important identified vegetable crops

(ii) National programme for varietal development

(iii) Investment credit through National Bank for Agriculture and Rural Development

(iv) Varietal development and breeder seed production by ICAR

(v) Assistance to state seed certification agencies, and,

(vi) strengthening of state seed certification organisation.

1.7 TMOP and NPDP

For the proper administration of the Oilseed Production Programme (OPP) and National Pulse Development Project (NPDP), Technology Mission on Oilseeds and Pulses (TMOP) was constituted under the Department of Agriculture, Government of India. For 1998-99 the TMOP approved a total

outlay of Rs.134.60 crores for Oilseed Production Programme (OPP) out of which Rs.102.30 crores was to be borne by the Govt. of India. During the same year a total outlay of Rs.46.80 crores for National Pulse Development Project (NPDP) was approved. Out of this amount Rs.36.00 crores was to be borne by the Govt. of India. In both the programmes the pattern of assistance for the components was to be 75:25 basis to be shared between Govt. of India and State Government.

In 1998-99 out of the total allocation of Rs.134.60 crores for Oilseed Production Programme, the allocation for Madhya Pradesh was highest (Rs.18.40 crores or 13.67 per cent). In the case of NPDP also the share of Madhya Pradesh was highest. Out of the total outlay of Rs.46.80 crores the share of Madhya Pradesh was Rs.8.38 crores or 17.91 per cent. (Table 1.4 and 1.5).

1.8 Allocation of Funds for OPP, 1998-99

In the year 1998-99 a total amount of Rs.1,346.00 lakhs was allocated to different states and organisations like ICAR, NSC, SFCI, etc. The amount allocated to different states came to Rs.12,920.00 lakhs. As mentioned earlier the share of Madhya Pradesh was highest among all states (Rs.1,840.00 lakhs or 13.67 per cent).

The componentwise allocation showed that the highest amount of Rs.4,865.40 lakhs or 37.66 per cent was for distribution of sprinkler sets. As a group of different components the seed component shared second highest amount of Rs. 4,144.21 lakhs or 32.08 per cent. Among other components,

Table 1.4 Statewise financial allocation of Oilseeds Production Programme (OPP), 1998-99

(value in Rs. lakhs)

S.No	State	Allocation			
		GOI share	State share	Total	
				Rs.	Percentage
1	Andhra Pradesh	1,100.00	366.70	1466.70	10.90
2	Arunachal Pradesh	40.00	13 .3 0	53 .3 0	0.40
3	Assam	200.00	66.70	266.70	1.98
4	Bihar	100.00	33.30	133.3 0	0.99
5	Gujarat	1130.00	3,76.70	15 06.70	11.19
6	Haryana	200.00	66.70	266.70	1.98
7	Himachal Pradesh	40. 00	13.30	53.30	0.40
8	Jammu & Kashmir	80. 00	26.70	1 06.70	0.79
9	Karnataka	700.00	233.30	933.3 0	6.9
10	Kerala	50. 00	16. 70	66.70	30.50
11	Madhya Pradesh	1380.00	460.00	1840.00	13.67
12	Maharashtra	1100.00	366.70	1466.70	10.9 0
13	Manipur	100.00	33.30	133.30	0.99
14	Meghalaya	25.00	8.30	33 .30	0.25
15	Nagaland	30. 00	10.00	40. 00	0.30
16	Orissa	500.00	166.70	666.70	4.95
17	Punjab	100.00	33.30	133.3 0	0.99
18	Rajasthan	1,230. 00	410.00	1640.00	12.18
19	Sikkim	60.00	20.00	80.00	0.59
20	Tamilnadu	6 25.00	208.30	833.30	6.19
21	Tripura	50. 00	16.70	66.70	0.50
22	Uttar Pradesh	600. 00	200.00	800.00	5.94
23	West Bengal	250.00	83.30	333.30	2.48
	Total	9690.00	3230.00	12920.00	95.99
	ICAR, NSC, SFCI, KRIBHCO etc.	500.00		500.00	3.71
	Evaluation of OPP	40.00		40.00	0.30
	Sub - Total	**540.00**		**540.00**	**4.01**
	Grand Total	**10,230.00**	**3,230.00**	**13,460.00**	**100.00**

distribution of gypsum / constituted 7.28 per cent and demonstrations organised by State Govt., 7.19 per cent. The componentwise allocation for the state of Madhya Pradesh was similar to that of whole country. Distribution of sprinkler sets constituted the largest percentage of 44.08 and seed component as a group,

Table 1.5 Statewise financial allocation of National Pulse Development Project (NPDP), 1998-99

(value in Rs. lakhs)

S.No	State	Allocation			
		GOI share	State share	Total	
				Rs.	Percentage
1	Andhra Pradesh	125.00	41.00	166.00	3.55
2	Arunachal Pradesh	5.00	1.70	6.70	0.14
3	Assam	10.00	3.3 0	13.30	0.28
4	Bihar	120.00	40. 00	160. 00	3.42
5	Goa	1.00	0.30	1.30	0.03
6	Gujarat	130.00	43. 00	173.00	3.70
7	Haryana	70.00	23.00	93. 00	1.99
8	Himachal Pradesh	15.00	5. 00	20.00	0.43
9	Jammu & Kashmir	30.00	10.00	40.00	0.85
10	Karnataka	150.00	50.00	200.00	4.27
11	Kerala	12.00	4.00	16. 00	0.34
12	Madhya Pradesh	630.00	208.00	838.00	17.91
13	Maharashtra	430.00	142. 00	572.00	12.22
14	Manipur	25.00	8.00	33.00	0.71
15	Meghalaya	5.00	1.70	6.70	0.14
16	Nagaland	18.00	6.00	24.00	0.51
17	Orissa	180.00	60. 00	240.00	5.13
18	Punjab	22.00	7. 00	29.00	0.62
19	Rajasthan	525.00	173.00	698.00	14.91
20	Sikkim	15.00	5.00	20.00	0.43
21	Tamilnadu	150.00	50.00	200.00	4.27
22	Tripura	25.00	8.00	33.00	0.71
23	Uttar Pradesh	550.00	182.00	732.00	15.64
24	West Bengal	25.00	8. 00	33.00	0.71
25	Andaman and Nicobar Island	1.00		1.00	0.02
26	Delhi	1.00		1.00	0.02
	Total	**3,270.00**	**1,080.00**	**4350.00**	**92.95**
	ICAR, NSC, SFCI, KRIBHCO etc.	100.00 200.00		100.00 200.00	2.14 4.27
	Evaluation of OPP	**30.00**		**30.00**	**0.64**
	Sub - Total	**3,600.00**	**1,080.00**	**4,680.00**	**100.00**

claimed 39.08 per cent. Distribution of rhizobium culture (4.08 per cent) and demonstrations by the State Government (2.17 per cent) were also important components (Table 1.6).

Table 1.6 Componentwise allocation of funds for Oilseeds Production Programme (OPP) for the year 1998-99

(Figures - Rs. lakhs)

S. No	Particulars	Total of all States		Madhya Pradesh	
		Rs. Lakh	Percentage to total	Rs. Lakh	Percentage to total
1	Purchase of Breeder Seed & Foundation Seed	364.50	2.82	100.00	5.44
2	Distribution of Certified Seed	1,376.00	10.65	239.00	12.99
3	Seed Village Programme	832.00	6.44	150.00	8.15
4	Distribution of Minikits	981.71	7.60	80.00	4.35
5	Development of infrastructure for seed production	590.21	7.19	40.00	2.17
6	**Total Seed Component**	**4,144.21**	**32.08**	**719.00**	**39.08**
7	Demonstrations organised by State	928.90	7.19	40.00	2.17
8	Distribution of Improved implements	322.55	2.50		
9	Distribution of Sprinkler Sets	4,865.40	37.66	811.00	44.08
10	Seed treatment	164.49	1.27	30.00	1.63
11	I.P.M. Demonstrations	277.00	2.14	30.00	1.63
12	Control of root out through seed treatments	178.00	1.38	--	--
13	Phermone traps	73.70	0.57	--	--
14	Plant Protection Equipments	310.50	2.40	30.00	1.63
15	Distribution of rhyzobium.	196.50	1.52	75.00	4.08
16	Distribution of Gupsum/ Pyrit	941.00	7.28	20.00	1.09
17	Distribution of Micro- nutrients	95.20	0.74	--	--
18	Training of farmers	167.00	1.30	15.00	0.81
19	Staff &contingencies	254.65	1.97	40.00	2.17
	Total Non-seed	**8,775.79**	**67.92**	**1,121.00**	**60.92**
	Total	**12,920.00**	**100.00**	**1,840.00**	**100.00**

It will thus be noted that besides the component of distribution of sprinkler sets, seed component as a group was the most important item. Oilseeds production programme attached high priority to the seed component. It was true for the State of Madhya Pradesh.

1.9 Allocation of Funds for NPDP, 1998-99

It was observed that the allocation of funds for NPDP was one third that of the OPP. The total amount allocated was Rs.4,680.00 lakhs. Of this amount Rs.330.00 lakhs was for Central Institutions and Organisations. The amount allocated for the states was Rs.4,350.00 lakhs. Like OPP the largest allocation was for the State of Madhya Pradesh. It was Rs.838.00 lakhs or 17.91 per cent of the amount allocated for all the states (Table 1.5). The componentwise distribution showed that seed component claimed highest amount of Rs.1,760.00 lakhs or 40.46 per cent. The sprinkler set distribution was second important component and claimed 31.26 per cent. The componentwise distribution for Madhya Pradesh was similar. The seed component claimed highest percentage of 41.17 followed by sprinkler set distribution (28.64 per cent) (Table 1.7).

Table 1.7 Componentwise allocation of funds for National Pulses Development Project (NPDP) for the year 1998-99

(Figures - Rs. lakhs)

S. No	Particulars	Total of all States		Madhya Pradesh	
		Rs. Lakh	Percentage to total	Rs. Lakh	Percentage to total
1	Breeder Seed Procurement	72.30	1.66	15.00	1.79
2	Foundation Seed Production	216.00	4.96	60.00	7.16
3	Certified Seed Production / Seed Village	370.00	8.51	90.00	10.74
4	Certified seed Districution	540.20	12.42	100.00	11.93
5	Seed Miniskits distribution	561.50	12.91	80.00	9.55
	Total Seed Component	**1,760.00**	**40.46**	**345.00**	**41.17**
6	Field block demonstrations	613.00	14.09	140.00	16.71
7	I.P.M. Demonstrations	109.00	2.51	3.00	3.58
8	Trainings	22.00	0.50	4.00	0.48
9	Rhyzobium cultdure	70.00	1.61	6.00	0.71
10	Micronutrients	22.30	0.51	5.00	0.60
11	Storage bins	26.80	0.62	4.00	0.48
12	Distribution of Farm Implements	223.00	5.13	40.00	4.77
13	Plant Protection Equipments & Seed Treatment	86.90	2.00	18.00	2.15
14	Sprinkler Set Distribution	1,360.00	31.26	240.00	28.64
15	Staff contingencies	57.00	1.31	6.00	0.71
	Total Non-seed component	**2,590.00**	**59.54**	**493.00**	**58.83**
	Grand Total	**4,350.00**	**100.00**	**838.00**	**100.00**

Thus, the allocation of funds for NPDP assigned top priority to seed component followed by sprinkler set distribution.

1.10 This study

Inspite of the best efforts made under the two Centrally Sponsored Schemes of Oilseeds Production Programme (OPP) and National Pulse Development Project (NPDP) the availability of quality/ certified seeds remains a problem. The problem of availability of seeds is particularly noticed in oilseeds like groundnut, soybean and sunflower. Among pulses the problem of seed supply is particularly important for gram, lentil arhar, moong and urad.

The current study has an objective of finding out the problems of management of supply of seeds of oilseeds viz. groundnut, soybean and sunflower and pulses viz. gram, lentil, arhar, moong and urad. The specific objectives of the study are following.

1.11 Objectives of the Study

i) To find out the reasons for short supply of certified / quality seed in oilseeds & pulses.

(ii) To find out the demand supply gap in the requirement and availability of seeds of oilseeds and pulses variety wise in the concerned states.

(iii) To establish the proper linkages between the breeder's seed producing agencies/ ICAR/ SAUs and foundation seed producing agencies in the concerned state as also the central agencies like NSC and SFCI.

(iv) To study whether proper monitoring and evaluation is done to strengthen the chain of breeder's seed to foundation seed and from foundation seed to certified seed.

The crops considered were groundnut, soybean and sunflower among oilseeds and gram, lentil, arhar, moong and urad among pulses.

1.12 Coverage of the Study and Methodology

Six states under the 5 Agro-Economic Research Centres of the country were included in this study (Table 1.8). It was proposed that in each state two districts should be selected, one for oilseeds and another for pulses. In each of the selected two districts two development blocks were to be selected. One of the two blocks (say block 'A') was such which had larger number of farmers having obtained certified seeds. The second block (say block 'B') was one which has no farmer or lesser number of farmers obtaining certified seed. From block 'A' three villages having larger number of farmers obtaining certified seeds were selected. From block 'B' two villages having no farmers or lesser number of farmers obtaining certified seeds were selected. From three villages of block 'A' 10 farmers each having obtained certified seed of either oilseeds or pulses or both were selected. Thus, we had 30 farmers using certified seeds from block 'A'. From two villages of block 'B' 10 farmers each not obtaining certified seed either of oilseeds or pulses were selected. Thus, we had 20 farmers not using certified seeds from block 'B'. Thirty farmers of block 'A' were termed as "participant" farmers and 20 farmers of block 'B' were termed as "non participant" farmers. Thus in each district a sample of 30 participant and 20 non participant farmers was selected (Table 1.8).

Table 1.8 Details of selected districts, blocks, villages and crops for oilseeds and pulses by the Agro-Economic Research Centres as directed by the TMOP

S. No	AER Centre/ State	Districts		Blocks/ taluks				Villages				Crops	
		Oilseeds	Pulses	Oilseeds		Pulses		Oilseeds		Pulses		Oilseeds	Pulses
				Developed	Under Developed	Developed	Under Developed	Developed	Under Developed	Developed	Under Developed		
1	Vishakhapatnam (Andhra Pradesh)	Anantpur	Kurnool in place of Warangal	Block "A"	Block "B"	Block "A"	Block "B"	3 villages	2 village	3 villages	2 villages	ground nuts	Red gram & Bengal
2	Vallabh Vidyanagar (Gujarat)	Bhav-nagar	Panch Mahals	Palitana	Sihor	Godhara	Kalol	Village not mentioned		Village not mentioned		groundnut, soybean & sunflower	gram lentil, arhar, moong & urad
								30 partici-pants	20 partici-pants	30 partici-pants	20 partici-pants		
3	Jabalpur (Madhya Pradesh)	Indore	Narsinghpur	Block "A"	Block "B"	Block "A"	Block "B"	3 villages	2 villages	3 villages	2 villages	groundnut soybean & sunflower	gram, lentil, arhar, moong & urad
4	Pune Maharashtra	Sangli	Amravati	Tas-gaon	Tas-gaon	Darya-pur	Darya-pur	Ankalhop, Bhilwadi & Yelavi	Alte Limba	Shignapur Valner, Gangai & Yewda	Sahada & Sanquea	groundnut & soybean	gram & tur
5	Allahabad Uttar Pradesh	Jhansi & Agra	Jhansi & Agra	Moth Fatehpur Sikari	Babina Crihat	Moth Fatehpur Sikari	Babina Crihat	3 villages	2 villages	3 villages	2 villages	groundnut, soybean, sunflower	gram lentil, arhar, moong, urad.
6	Vallabh Vidyalnagar Rajasthan)	Kota	Bharatpur	Degod	Lodh pura	Bharat pur	Kum-char	3 villages	2 villages	3 villages	2 villages	groundnut, soybean, sunflower	gram lentil, arhar, moong, urad.

For the selection of 10 farmers from each village the farmers of the village were arranged in the ascending order of size of operational area. These were then stratified into five size groups viz. i) marginal, ii) small, iii) semi-medium, iv) medium and v) large. From each size group 2 farmers were randomly selected.

1.12.1 Data Collection

This study was based on both primary as well as secondary data. Primary data was collected from sample farmers and secondary data was collected from various Agricultural Statistics, published by Ministry of Agriculture, Government of India and Directorate of Agriculture of various State Governments, and other State Govt. publications.

1.12.2 Reference Period

The study covered kharif, rabi and summer seasons for the evaluation and management of seed supply in oilseeds and pulses in two years viz. 1996-97 and 1997-98. The data from the selected farmers was collected for the year 1997-98 (Table 1.9).

Table 1.9 Details of selection of sample farmers and reference year.

S. No	AER Centre/ State	Number of farmers selected				Reference year	Year of publication
		Oilseeds		Pulses			
		Partici-pant	Non-Participant	Partici-pant	Non-Participant		
1	Vishakhapatnam (Andhra Pradesh)	30	20	30	20	1997-98	September 1999
2	Vallabh Vidyanagar (Gujarat)	30	20	30	20	1997-98	2000
3	Jabalpur (Madhya Pradesh)	30	20	30	20	1997-98	June, 2000
4	Pune (Maharashtra)	30	20	30	20	1997-98	July, 1999
5	Allahabad (Uttar Pradesh)	30	20	30	20	1997-98	1999
6	Vallabh Vidyanagar (Rajasthan)	30	20	30	20	1997-98	April, 2001

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CHAPTER - II

SELECTED STATES AND DISTRICTS

As mentioned earlier the study was conducted by 5 A.E.R. Centres for the 6 States of Andhra Pradesh, Gujarat, Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh. The individual reports gave description of the concerned states and the selected districts. This has been summarised and given in the following pages of the chapter.

2.1 Andhra Pradesh

Andhra Pradesh is an important oilseeds and pulses producing state in the country. Oilseeds and pulses account for 20.66 per cent and 12.55 per cent respectively of the gross cropped area of the state (12.75 million hectares).

2.1.1 Anantapur District

Anantapur district lies between 13°40' and 15°15' northern latitudes and 76°50' and 78°30' eastern longitudes. The soils in Anantapur district are predominantly red (76 per cent) and the remaining (24 per cent) are black. The total geographical area of the district is 19.13 lakh hectares. Out of 9.70 lakh hectares of gross cropped area of the district oilseeds account for 76.39 per cent. The major oilseed crop in the district is groundnut. Out of 7.41 lakh hectares of area under oilseeds, groundnut accounts for 90.55 per cent.

2.1.2 Kurnool District

Kurnool district lies between the north latitudes of 14°54 and 16°11' and eastern longitudes of 76°58' and 78°25'.

The total geographical area of the district is 17.60 lakh hectares. Out of the total cropped area of 9.22 lakh hectares pulses account for 8.43 per cent. The major pulse crops grown in the district are bengalgram followed by redgram which account for 5.24 per cent and 2.28 per cent respectively of the gross cropped area.

Generally, redgram is grown as inter crop with groundnut and minor millets. Bengalgram is grown as pure crop and also as a sequence crop after Korra, and as mixture with coriander and sunflower in medium black soils.

The major constraints encountered in pulse production are :

1. Failure of southwest monsoon for redgram and less rains in October for Bengalgram resulting in reduced yields.
2. Non application of fertilisers and non adoption of proper plant protection measures in time, and,
3. Pest menace: Redgram - Heliothis (Podborer)
   Bengalgram - Podborer, Pod fly and Aphids

2.2 Gujarat

2.2.1 Panch Mahals District

This is located on the eastern border of Gujarat State. Except the western part which constitutes plain country, this district is a hilly tract. The whole of northern and eastern portions are covered by hills and forests intercepted by plain cultivated lands in villages situated in the river valley. The climate of the district is generally warm. However, the inter-taluka climatic variations are quite marked. The rainfall in the district is irregular and uneven. The district

often suffers from famine and scarcity conditions caused by the absence of or shortfall of rains at appropriate times. Soils in the district vary in their fertility status from place to place. In general, it is medium black. Godhara and Kalol talukas of Panch mahals district were selected for field survey. The field survey was carried out for participant farmers in Godhara taluka and for non-participant farmers in Kalol taluka.

About one fourth of the total area of the district was under forest. About 66 per cent of the total area was gross cropped area (GCA) in the district. GCA was 63.73 and 75.00 per cent of the total area in Godhara and Kalol talukas respectively. Gross Irrigated Area (GIA) to GCA was 21.23 per cent in the district as a whole and it was 16.68 per cent for Godhara and 27.99 per cent for Kalol taluka.

Cropping pattern of the district and talukas indicates that cereals were grown on 67 to 72 per cent of the GCA in both and the total pulses were cultivated on around 18 per cent of GCA in Panchmahals district during 1994-95 while same was around 15 and 10 per cent for Godhara and Kalol respectively. Urd and arhar are main pulses for Godhara and arhar for Kalol taluka. Groundnut was grown on 3 to 4 per cent of GCA in the district and in Godhara taluka. This proportion was double, i.e. 8 per cent in Kalol taluka.

2.2.2 Bhavnagar district

Bhavnagar district is located in the south-east of Saurashtra region of Gujarat State. Two hilly tracts pass through the district. The district has coastline of 120 kms. There is quite a difference in climate of coastal talukas and interior hilly region of the district. The rainfall in this district is highly uneven. Palitana taluka of this district was selected for participant farmers and Sihor taluka for non participant farmers for field survey.

The forest area is very low in the district. NSA to the total area was 62.69 per cent and GCA was 68.06 per cent. NSA and GCA were between 54 to 56 per cent in Palitana and Sihor talukas. NIA and GIA were 21.79 and 23.10 per cent of NSA and GCA respectively in Bhavnagar district. This percentage varied between 24 to 28 for Palitana and Sihor talukas.

Cropping pattern of the district and talukas reveals that cereals were grown on around 35 per cent of GCA in the district, while this proportion was around 26 and 39 per cent for Palitana and Sihor talukas respectively during 1994-95. Pulses occupied around 2 per cent of GCA in Sihor and it was less than one per cent for Palitana and district as a whole. Groundnut was grown on around 30 per cent of GCA in the State, while it was as high as 40 per cent for Palitana and around 19 per cent for Sihor. Cereals, pulses and groundnut were grown mostly without irrigation facilities in the district and selected talukas.

2.3 Madhya Pradesh

Being centrally situated Madhya Pradesh is called "The Heart of India". It lies between 17º48'N and 26º52'N latitudes and 74º2'E and 84º24'E longitudes. Seven states of India share their boundaries with Madhya Pradesh. These are : Uttar Pradesh in the north, Bihar and Orissa in the east, Andhra Pradesh and Maharashtra in the south and south west, Gujarat in the west and Rajasthan in the north west.

The area of the state is 4,43,482 sq. kms. It forms 13.49 per cent of area of the country distinguishing the state as the largest among all the states and Union Territories.

The population of the state as per 1991 census was 6,61,81,170 or 7.82 per cent of the country's population. In this respect the state ranks sixth among the states of the country.

The rural population constitutes 76.82 per cent of the total population as against 74.29 per cent for the country.

With 149 persons per square kilometre, (257 for the country as a whole) the state takes twenty second place in the ranking according to density of population. The state has a lower literacy percentage of 35.45, whereas, it is 42.90 for the country. Female literacy which has been recognised as crucial important factor influencing the literacy of the next generation, is only 23.07 per cent in the state as against 32.41 in the country.

The rainfall varies from less than 600 mm. to more than 1,600 mm. The rainfall is generally high in the south-eastern region and decreases in the north-west. About ninety per cent of the rainfall occurs between June to September.

Of the total geographical area 44.7 per cent was net sown area or 2.1 per cent lower than the country's average. However, in the matter of irrigation, with only 24.6 per cent of the gross cropped area under irrigation the state will have to increase its irrigated area considerably to be at par with the country's average of 37.5 per cent.

Foodgrains dominate the cropping pattern. About 49.16 per cent of the gross area is occupied by cereals and 20.66 per cent by pulses. Because of low percentage of area under irrigation the cropping intensity of the state is lower (126) as compared to the average for the country (131). Low percentage of irrigated area is also an important factor contributing to the low consumption of fertilisers in the state.

Low percentage of irrigation and low per hectare consumption of fertilisers have been the chief reasons of low productivity of crops. The other reasons being the use of local varieties and inadequate adoption of recommended practices. Paddy and wheat, the main important crops of the state, have far lower yields per hectare as compared to the average for the country. This needs critical examination and appropriate development strategy. Cash crops like groundnut, cotton and sugarcane have also yields lower than that of the country's average.

In the case of crops like, bajra, gram, arhar, and onion the yields were higher in the state than the all India yields.

Among the different sources, wells and tubewells were most important commanding 55.02 per cent. The second important sources were canals which commanded 28.61 per cent. "Other sources" such as stop dams, pumps on rivers and rivulets etc. had 13.37 per cent under these. Tanks had only 3.00 per cent area under these.

It is thus evident that minor irrigation sources like wells and tubewells and stop dams and other micro minor irrigation sources were popular in the state.

Rice and wheat were the most important crops of the state. Rightfully these claimed the largest proportion of irrigated area. While rice constituted 19.25 per cent of the irrigated area wheat constituted 46.52 per cent. Gram is the third important crop sharing 14.35 per cent.

The crop pattern was highly food crops oriented with as high as 71.4 per cent area allotted to them in 1996-97. Conversely only 28.6 per cent of the area was under non food crops or what could be termed as commercial crops.

It was noted that about 60 per cent of the cropped area was under kharif crops and 40 per cent under rabi crops.

2.3.1 Indore District

Indore district of Indore division is located in western part of Madhya Pradesh. It is southern district of Malwa Plateau. The extremeties of this comparatively small district measure between 22º22' and 23º05' north latitudes and between 75º25' and 75º15' east longitudes. It is bounded on the north by Ujjain district, in the east by Dewas district, in the south by Khargon district and in the west by Dhar district.

Geographical area of Indore district was 3,83,100 hectares. Population of Indore district as per 1991 census was 18,35,915. It comprised 52.47 per cent males and 47.53 per cent females. The district is very much urban in character as Indore is one of the most important industrial and financial centre of the state.

Of the total population only 30.58 per cent was rural and the majority (69.42 per cent), urban. The literacy percentage of the district was 54.96. Indore was one of the districts having high literacy percentage. However, the percentage was higher (64.85) for males than females (44.03). Of the total population 33.09 per cent were workers, 1.26 per cent marginal workers and 65.65 per cent non workers. Of the total workers the largest percentage (19.94) were engaged in "other" services. Cultivators constituted 18.51 per cent. Manufacturing Industries absorbed 17.54 per cent and trade and commerce, 16.58 per cent. Thus the district was urban in character. However, cultivators (18.51 per cent) and agricultural labourers (14.79 per cent) together as a rural group constituted 1/3 (33.30 per cent) of the total number of workers.

The peculiarities of land use of district were two : very low percentage of area under forest (13.63) and very high percentage of net sown area (67.35). Other uncultivated area excluding fallow constituted 9.24 per cent and land not available for cultivation, 8.17 per cent

Gross irrigated area in the district was 128.07 thousand hectares. With gross cropped area equalling 420.99 thousand hectares the percentage of irrigated area came to 30.42. This was quite high as compared to state average of 18.50 per cent

As in other districts of Malwa Plateau irrigation was mainly commanded by groundwater sources. Tubewells commanded as high as 68.15 per cent of irrigated area and open wells, 25.70 per cent. Other sources were not important.

With good quality soil and assured and perennial sources of irrigation Indore district produced wide variety of crops like jowar, maize, wheat, gram, potato, soybean and fodder. Of these crops soybean occupied highest percentage (45.25) of the gross cropped area. Indore had highest percentage of area under soybean and also had largest number of soybean processing units. Indore has been a traditionally wheat growing district and continued to be so with 23.41 per cent of the gross cropped area under it. Gram, another rabi crop occupied 12.88 per cent of the cropped area. With dairy industry thriving well, fodder crops occupied 6.72 per cent of the cropped area. Potatoes were grown on 2.09 per cent area, the largest in the state.

Pulses dominated the cropping pattern occupying 44.94 per cent of the gross cropped area.

Oilseeds and cereals occupied second and third positions with 29.90 per cent and 21.48 per cent or the gross cropped area respectively. Among cereals wheat occupied 16.46 per cent. Among pulses, gram was the major crop and occupied 30.30 per cent area. Other important pulses were lentil (3.60 per cent), pea (5.05 per cent) and arhar (4.28 per cent). Soybean was most important oilseed crop occupying 28.16 per cent. Sugarcane was another important crop and occupied 2.06 per cent area.

2.3.2 Narsinghpur district

Narsinghpur district lies almost in the central part of the state and is situated between 22°45'N and 23°15'N latitudes and 78°38'E and 79°38'E longitudes. It is surrounded by seven districts including Sagar in the north, Raisen in the north-west, Damoh in the north-east, Seoni in the south-east, Jabalpur in the east and Chhindwara in the south and south-west.

Narsinghpur district has an area of 5,136 sq. km. and forest area of 26.53 per cent of the total geographical area. The density of population per sq. km. is 153. Of the total population, rural population is 85.13 per cent and urban population is 14.87 per cent. The population belonging to scheduled castes and scheduled tribes is 16.59 and 12.90 per cent respectively. The proportion of main workers in this district is 36.08. The workers are mainly engaged in agricultural activities and returned as cultivators and agricultural labourers. These two categories accounted for nearly 80 per cent of the main workers.

The literacy percentage of the district is 45.33. Among rural population it is lower than the urban population. The literacy percentage among females is lower (41.59) than the males (68.44).

The average rainfall in the district is 1,300.8 m.m. The consumption of fertilisers in the district is 33.73 kg./ha.

Nearly 58 per cent of the district area is under cultivation. The cropping intensity is 135.44 per cent. The intensity of irrigation in the district is 102.15 per cent. Of the gross cropped area 36.09 per cent is irrigated.

Pulses dominated the cropping pattern occupying 44.94 per cent of the gross cropped area.

Oilseeds and cereals occupied second and third positions with 29.90 per cent and 21.48 per cent of the gross cropped area respectively. Among cereals wheat occupied 16.46 per cent. Among pulses, gram was the major crop and occupied 30.30 per cent area. Other important pulses were lentil (3.60 per cent), pea (5.05 per cent) and arhar (4.28 per cent). Soybean was most important oilseed crop occupying 28.16 per cent. Sugarcane was another important crop and occupied 2.06 per cent area.

2.4 Maharashtra

Maharashtra is one of the biggest states in terms of Gross Crossed Area (GCA). Among the states, it stands in the third place accounting for about 11 per cent of GCA in the country. Although the per capita income of the state is one of the highest in India, the performance of agriculture is not good when compared to many states. One of the important reasons for the poor performance of agriculture is that the crops are predominantly cultivated under rainfed conditions in the state. The percentage of irrigated area to the gross cropped area is not only much lower than the country's average but also very less as compared to many states. For instance, while the average irrigated area of the country is about 36 per cent to the GCA, it is only about 15 per cent in

Maharashtra. However, the percentage of irrigated area to GCA has increased relatively faster in Maharashtra (from 9.0 per cent to 15.4 per cent) compared to the national average where it increased from 23.3 per cent in 1971-72 to 35.7 per cent in 1992-93. As a result of lower irrigation and also due to lower percentage of area under water intensive foodgrain crops such as paddy and wheat, the average (1996-97 and 1997-98) consumption of fertilisers is also lower in the state (68.5 kg/ha) as compared to the national average of 81.05 kg/ha. Similarly, the cropping intensity of the state is much lower as compared to many states and to the national average as well.

As far as the cropping pattern of Maharashtra State is concerned, it differs in many ways from the rest of states. As we know, paddy and wheat are the two important foodgrain crops in majority of the states. But, this is not true in the case of Maharashtra. While paddy and wheat together accounted for about 35 per cent of GCA at the national level in TE 1992-93, these two crops accounted for only about 10 per cent of GCA in Maharashtra during the same period.

2.4.1 Sangli and Amravati Districts

Sangli and Amravati are distinctively different from each other in many aspects and also different from the average characteristics of the state. In terms of Gross Cropped Area (GCA), Sangli district is smaller by 3.39 lakh ha than that of Amravati district. While Amravati accounted for 4.64 per cent of GCA of the state. Sangli accounted for 3.06 per cent. Though the rainfall is relatively higher in Amravati district, both the area under irrigation (in absolute

term) as well as the percentage of irrigated area to gross cropped area are much less in Amravati district as compared to Sangli district. While the percentage of irrigated area was 19.51 in Sangli, the same was only 5.36 per cent in Amravati. Sangli district is not only one among the highest irrigated districts of Maharashtra but also the percentage of irrigated area is much higher than the average of the state. However, despite having more area under irrigation, the cropping intensity of Sangli district is very low compared to Amravati district as well as the state average.

As far as the cropping pattern is concerned, lot of differences are observed between these two districts. Relatively more water intensive crops are commonly found in Sangli district than in the case of Amravati district.

Food-grain crops account for nearly 73 per cent of the gross cropped area in Sangli district whereas the same is only about 35 per cent in the case of Amravati district. Because of higher irrigation facility in Sangli district, the farmers have allotted about six per cent of total cropped area for sugarcane cultivation, but the same accounts for very negligible per cent of area in Amravati district. Cotton is the most important single crop of Amravati district accounting about 36 per cent of GCA while the same accounts for very negligible percentage in Sangli district. As expected, since the pulse crops are mainly cultivated in rainfed condition, the area under pulse crops is higher in Amravati district (nearly 20 per cent) as compared to Sangli district (about 13 per cent). In fact, rainfed crops such as cotton and pulses together accounted for over 54 per cent of GCA in Amravati. Unlike pulse crops, the area used for the cultivation of total oilseeds is relatively higher in Sangli district (about 15 per cent) than that of Amravati district (about 12 per cent). This is mainly because of the fact that groundnut is cultivated relatively more in Sangli district.

Although there are differences in the cropping patterns between the districts of Sangli and Amravati, oilseeds and pulses crops together accounted for 28 to 32 per cent of the gross cropped area in both the districts.

2.5 Rajasthan

Rajasthan is the second largest State of the Indian Union accounting for 10.4 per cent of the country's land mass. With a population of 4.4 crores, its share in India's population is 5.2 per cent. Agriculture has been the pivotal sector of the state and it contributes nearly 43 per cent of the state GDP and absorbs nearly 70 per cent of the work force. Total geographical area of the state is 342.38 lakh hectares but cultivation is carried out in only 49.0 per cent area. Roughly, 40 per cent of its land area falls under desertic conditions.

Development of irrigation facilities has been impressive. The average annual gross irrigated area jumped from 1,791 thousand ha. to 4,884 thousand ha. It further increased to 6,743 thousand ha. in 1996-97. The percentage of gross irrigated area (GIA) to GCA also went up from 12.52 in 1958-59 to 32.88 per cent in 1996-97. The growth in irrigation potential has been achieved through increasing the number of wells/tubewells and major canal projects viz. IGNP, GANGA canal, BHAKRA canal together with Mahi and Chambal projects. The growth in irrigation potential brought significant changes in the cropping pattern.

The sourcewise data of irrigation reveals that wells/ tube wells are the main sources of irrigation. Over 63 per cent of total irrigated area was by wells/ tubewells. The area irrigated by canals was 32.63 per cent.

With the increase in the availability of irrigation and quality seeds, fertiliser consumption also increased at a very fast rate, particularly after 1970.

Bajra and jowar were the major kharif rainfed cereal crops covering about one-fourth of the gross cropped area (GCA) of the State. Wheat was the most important irrigated rabi cereal covering 12 per cent of the GCA. Among pulses, gram, moth, moong and urad were the important crops. Nearly 19.0 per cent of GCA was under pulse crops. The foodgrain crops dominate the cropping pattern. Among oilseeds, rapeseed mustard was the most important irrigated rabi crop. The other important oilseeds of the state were sunflower, soybean, sesamum and groundnut. Generally pulses are gown on marginal lands as rainfed crops, which is one of the main causes of low productivity of pulse crops. Among states of the country Rajasthan ranked first in terms of production of bajra, mothbean, rapeseed mustard rabi oilseed cumin and coriander.

2.5.1 Bharatpur district

Of the total geographical area of 5.07 lakh hectare, 77.02 per cent is available for cultivation. Of the total population, nearly 72 per cent is engaged in agriculture or allied activities. The cropping intensity is 127.06 per cent.

The normal rainfall of the district is 66.4 cm. but variation in rainfall for different years is high. The development of irrigation through ground water resources was impressive. Examination of source-wise irrigation data clearly reveals that wells and tubewells are the most important sources of irrigation in the district.

Fertiliser consumption per hectare of GCA is moving up at a faster rate.

Bajra, jowar and wheat were the most important cereal crops. Bajra and jowar were grown as unirrigated crops, while nearly 98 per cent area of wheat was irrigated. Among pulses, gram and lentil were the most important crops. Both gram and lentil were mainly grown as unirrigated crops. Among oilseeds, rapeseed-mustard was the only important crop. The area under groundnut, soybean and sunflower was negligible.

2.5.2 Kota district

Kota district is located in the eastern side of the State and in Central Plateau and Hills region agro climatic zone. It has 23 per cent of reporting area under forest and hence average rainfall of the district is somewhat higher than state average.

Nearly 23 per cent of the total geographical area is covered by forest and only 51.5 per cent area is available for cultivation. From the total population of 20.5 lakh, nearly 70 per cent is depending upon agricultural sector. Cropping intensity is 145.03 per cent.

The average annual consumption of chemical fertilisers per hectare of GCA has moved up from 27.0 kg. in 1980-83 to 46.5 kg. in 1987-90 and to 158.0 kg. in 1997-98.

Wheat and bajra were the main cereal crops. In the district, soybean and rapeseed mustard were the two most important crops. The majority area of rape mustard was irrigated, while 22.0 per cent area under soybean was irrigated. This suggests that agricultural economy of the district is relying heavily on the oilseed crops. This district is a leading producer of soybean.

Among oilseeds, the district is a leading producer of soybean and nearly one-fourth soybean production of state is by the Kota district. Thus as far as production of oilseeds is concerned, this district is holding a prime position in the state.

2.6 Uttar Pradesh - Not given.

2.6.1 Jhanshi district

Jhansi is the agriculturally most progressive district of Bundelkhand region of Uttar Pradesh. It is located in the south-west part of the state. It is divided into two parts according to its geophysical situation i.e. (a) Plain tract (b) Rocky area. The soil exhibited great heterogenity. The ground water is available at a great depth. Out of total reporting area of 5,02,758 hect. 3,14,280 hect. (62.51 per cent) was under cultivation in 1994-95.

Most parts of the district are still semi irrigated because only 51 per cent of the net sown area was irrigated during 1994-95. Major sources of irrigation are canals (54.32 per cent) followed by wells (33.68 per cent) and tubewells (3.36 per cent). The gross cropped area was 3.56 lakh hectares giving a cropping intensity of only 113.38 per cent as against the state average of 148.64 per cent in 1994-95. The pulse crops accounted for 46.98 per cent, cereals (37.02 per cent) and oilseeds (14.68 per cent) of the gross cropped area during 1994-95. However, the productivity of oilseeds and pulses is lower than the productivity of other districts of the state. The cause of the shortfall in productivity of gram, lentil, moong, urd and arhar of pulse group crops and in the group of oilseeds namely groundnut, soybean and sunflower was the non-availability of certified seeds timely and adequately. The reason for the non-availability of different classes of seeds of oilseeds and pulses in this district was due to mismanagement in the supply system/ channels.

2.6.2 Agra district

Agra district belongs to semi-arid zone and comes in western region of the Uttar Pradesh having saline and oily water which requires special attention in the implementation of new techniques of agriculture. The district is divided in three distinct parts on the basis of its geophysical situations.

I. Tract of North Yamuna

This is very fertile and productive tract of the district.

II. Tract of South Yamuna

This part in mostly ravine belt of Yamuna and watertable is very deep. The water of this part is very saline, hampering growth of crops.

III. Rock Tract

This part of the district is spread over the range of Aravali-Hills. The soil contains stony particles and water table is very deep, hence the installation of tube wells are very difficult and costly affair. The sources of irrigation are canals and ponds/ tanks. The soil of the district is generally alkaline and ph. ranges between 8 to 9.

The total geographical area of the district is 4.04 lakh hectares of which 71.06 per cent was available for cultivation in 1994-95. Out of total cultivable land in 1994-95, 29.65 per cent, 67.89 per cent and 2.46 per cent and 2.46 per cent area were utilized in kharif, rabi and summer seasons respectively. The net irrigated area was 77.56 per cent of the net area sown of 2.90 lakh hectares during the same period. Wheat and jowar are the principal crops and jointly accounted for 27.88 per cent of the total cropped area, while pulses and oilseeds claimed 4.94 per cent and 32.18 per cent to total cropped area in the corresponding years. Among the pulses, gram accounted for highest share 58.87 per cent followed by arhar (26.67), pea (7.75) and urd (2.63) and lentil (0.68) of total area under pulses in 1994-95.

Among the oilseeds mustard occupied most area (97.22 per cent) followed by til (02.49 per cent) in 1994-95. The prospects of groundnut and soybean are not bright in this district because of salinity. However, sunflower has been picking up slowly in the irrigated tract of the district.

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CHAPTER - III

DEMAND SUPPLY GAPs IN BREEDERS, FOUNDATION AND CERTIFIED SEED IN SELECTED STATES & DISTRICTS

Demand of seed requirement is calculated on the basis of various factors such as experience in previous years, performance of different varieties, farmers' preferences and the likely availability of seed. Besides these the climatic factors also influence the demand of seed.

In the following pages the demand estimation as has been made by the department of agriculture has been given. Against this the quantities of different seeds as made available by different agencies has been compared. The difference between the two quantities is the demand supply gap. The gap can be positive or negative. If the demand is more than the supply the difference is known as positive gap. When the supply is more than the quantity demanded the gap is termed as negative.

In the following pages the demand and supply gaps have been narrated for different crops in the selected districts of states.

3.1 Distribution of Breeder's Seed in 1996-97

3.1.1 Andhra Pradesh

The study is confined to three oilseed crops viz. sunflower, groundnut and soybean and five pulse crops viz. gram, urad, moong, lentil and arhar. In 1996-97 the total quantity of seed allotment for these crops together was 97.97 quintals. Against this the quantity of seed lifted was 86.90 quintals or gap of 11.30 per cent between the quantity allotted and quantity lifted. In the case of sunflower and groundnut the quantity allotted and quantity lifted was the same. In the case of all other crops the quantity lifted was less than the quantity allotted (Table 3.1).

Table 3.1 Demand supply gap between quantity allocated and lifted, breeder's seed, Andhra Pradesh, 1996-97

(Quantity - quintals)

S. No.	Crop	Quantity allocated	Quantity lifted	Percentage of gap between qty. allotted and lifted.
1	Sunflower	2.65	2.65	---
2	Groundnut	59.10	59.00	--
3	Soybean	15.00	11.00	73.33
4	Gram	1.00	---	100.00
5	Urad	10.50	6.00	57.14
6	Moong	7.05	6.45	51.49
7	Lentil	--	--	--
8	Arhar	2.77	1.80	64.98
	Total	**97.97**	**86.90**	**11.30**

3.1.2 Gujarat

The total quantity indented for all the selected crops was 658.93 quintals. Against this the quantity allocated was 550.95 quintals or a gap of 16.39 per cent. The quantity lifted was 500.92 quintals or a gap of 23.98 per cent between quantity indented and quantity lifted and 9.08 per cent between quantity allocated and lifted. The maximum gap was identified in the case of groundnut, which was 26.94 per cent between quantity indented and quantity allocated and 34.89 per cent between quantity indented and lifted and again 10.88 per cent between quantity allocated and lifted. In the case of other crops viz. gram, urad and arhar the quantity allocated was more than the quantity lifted. The quantity lifted was more than the quantity indented in the case of urad, gram and arhar, and it was less than the quantity allocated for these crops.

The quantity lifted was less than the quantity allocated in most of the crops viz. groundnut, gram, urad, and arhar. In the case of soybean the quantity lifted and allocated was same, and it was higher in the case of moong (Table 3.2)

Table 3.2 Demand supply gap between quantity indented, allocated and lifted of breeder's seed, Gujarat, 1996-97

(Quantity - quintals)

S. No.	Crop	Quantity indented	Quantity allocated	Percentage of demand supply gap between qty. indented & allocated	Quantity lifted	Percentage of gap between qty. indented & lifted.	Percentage of gap between qty. allocated & lifted.
1	Sunflower	---	---	---	---	---	---
2	Groundnut	550.25	402.00	26.94	358.27	34.89	10.88
3	Soybean	12.25	11.00	10.20	11.00	10.20	---
4	Gram	43.50	51.75	(-) 18.97	49.35	(-) 3.45	4.63
5	Urad	3.78	36.40	(-) 862.96	31.30	(-) 728.04	14.01
6	Moong	30.20	28.25	6.46	29.70	31.46	(-) 5.13
7	Lentil	--	--	--	--	--	--
8	Arhar	18.95	21.55	(-) 13.72	21.30	(-) 12.40	1.16
	Total	**658.93**	**550.95**	**16.39**	**500.92**	**23.98**	**9.08**

3.1.3 Madhya Pradesh

As mentioned earlier the study is confined to three oilseed crops viz. sunflower, groundnut and soybean and five pulse crops viz. gram, urad, moong, lentil and arhar. In 1996-97 the total quantity of seed indented for these crops together was 499.49 quintals. Against this the quantity of seed allocated to the state was 391.55 quintals or a gap of 21.61 per cent between demand and supply. However, the quantity lifted was 2,697.72 quintals. Thus, the gap was (-) 440.09 per cent between the quantity indented and quantity lifted. It was (-) 588.98 per cent of the quantity allocated. In the case of sunflower and gram the quantity lifted was less than the quantity indented. In the case of all other crops the quantity lifted was more than the quantity indented and quantity allocated. In the case of groundnut, soybean and lentil no quantity was indented or allocated. The M.P. State Seeds and Farms Development Corporation managed to lift the quantity from different sources (Table 3.3).

Table 3.3 Demand supply gap between quantity indented, allocated and lifted, breeder's seed, Madhya Pradesh, 1996-97

(Quantity - quintals)

S. No.	Crop	Quantity indented	Quantity allocated	Percentage of demand supply gap between qty. indented & allocated	Quantity lifted	Percentage of gap between qty. indented & lifted.	Percentage of gap between qty. allocated & lifted.
1	Sunflower	1.70	1.70	---	1.65	2.94	2.94
2	Groundnut	---	---	---	24.00	---	---
3	Soybean	---	---	---	2,204.18	---	---
4	Gram	485.00	380.76	21.49	410.49	15.36	(-) 7.81
5	Urad	3.10	2.25	27.42	7.75	(-) 50.00	(-) 244.44
6	Moong	3.25	3.25	---	10.80	(-) 232.31	(-) 232.31
7	Lentil	---	---	---	18.20	---	---
8	Arhar	6.44	3.59	44.25	20.65	(-) 220.65	(-) 475.20
Total		**499.49**	**391.55**	**21.61**	**2,697.72**	**(-) 440.09**	**(-) 588.98**

3.1.4 Maharashtra : Not given.

3.1.5 Rajasthan

It is evident that during 1996-97, against the allocated quantity, lifting of breeder seed was lower for all crops except urad and lentil. It was (-) 596.55 per cent in the case of urad. However, the Corporation lifted 0.96 qtls. although there was no allotment for lentil crop. The widest gap was 53.02 per cent between quantity allotted and lifted in the case of soybean followed by 31.59 per cent in the case of gram. The narrowest gap of 11.11 per cent was in the case of arhar (Table 3.4)

Table 3.4 Demand supply gap between quantity allocated and lifted, breeder's seed, Rajasthan, 1996-97

(Quantity - quintals)

S. No.	Crop	Quantity allotted	Quantity lifted	Percentage of gap between qty. allotted and lifted.
1	Sunflower	--	--	--
2	Groundnut	184.50	151.17	18.06
3	Soybean	225.20	105.80	53.02
4	Gram	189.60	129.70	31.59
5	Urad	1.45	10.10	(-) 596.55
6	Moong	15.16	9.83	35.16
7	Lentil	---	0.96	---
8	Arhar	0.45	0.40	11.11
Total		**616.36**	**407.96**	**33.81**

3.1.6 Uttar Pradesh

The quantity allocated for all the crops was lower than the quantity indented except in sunflower. The widest demand supply gap was 80.95 per cent in the case of arhar, followed by 44.16 per cent in lentil and narrowest gap was 10.53 per cent in soybean. The quantity allocated was more than the quantity indented in the case of sunflower and the gap was (-) 3.49 per cent (Table 3.5).

Table 3.5 Demand supply gap between quantity indented and allocated, breeder's seed, Uttar Pradesh, 1996-97

(Quantity - quintals)

S. No.	Crop	Quantity indented	Quantity allocated	Percentage of demand supply gap between qty. indented & allocated
1	Sunflower	33.50	34.67	(-) 3.49
2	Groundnut	78.00	44.34	43.15
3	Soybean	95.00	85.00	10.53
4	Gram	252.00	168.44	33.16
5	Urad	11.20	7.50	22.84
6	Moong	4.10	2.50	39.02
7	Lentil	16.26	9.08	44.16
8	Arhar	2.10	0.40	80.95
	Total	**492.16**	**351.93**	**28.49**

3.2 Distribution of Breeder Seed in 1997-98

3.2.1 Andhra Pradesh

In 1997-98 the total quantity of seed allocated for all the crops was 48.75 quintals. Against this the quantity lifted was 23.75 quintals or a gap of 51.28 per cent between quantity allocated and quantity lifted. The widest gap was 87.88 per cent in the case of moong followed by 27.78 per cent in arhar. The narrowest gap was 14.71 per cent in the case of sunflower (Table 3.6).

Table 3.6 Demand supply gap between quantity allocated and lifted, breeder's seed, Andhra Pradesh, 1997-98

(Quantity - quintals)

S. No.	Crop	Quantity allocated	Quantity lifted	Percentage of gap between qty. allotted and lifted.
1	Sunflower	1.70	1.45	14.71
2	Groundnut	25.00	20.00	20.00
3	Soybean	9.00	--	--
4	Gram	--	--	--
5	Urad	3.00	--	--
6	Moong	8.25	1.00	87.88
7	Lentil	--	--	--
8	Arhar	1.80	1.30	27.78
	Total	**48.75**	**23.75**	**51.28**

3.2.2 Gujarat

The total quantity indented for all the selected crops was 896.45 quintals. Against this the quantity allocated was 842.47 quintals or a gap of 6.02 per cent. The quantity lifted was 605.91 quintals or a gap of 32.41 per cent between quantity indented and quantity lifted and 28.08 per cent between quantity allocated and lifted. The quantity allocated was more than the quantity indented in most of the crops viz. gram, urad and arhar. However, it was less in the case of groundnut and soybean. The maximum gap between quantity indented and quantity allocated was 31.43 per cent in the case of soybean followed by 10.50 per cent in the case of groundnut. The quantity lifted was less than the quantity indented in all the crops viz. groundnut, gram, urad and arhar except moong. In the case of soybean although the quantity indented was 8.75 quintals, no quantity was lifted. The widest gap was 66.28 per cent in the case of urad and 34.00 per cent in the case of groundnut. The narrowest gap was 2.38 per cent between quantity indented and quantity lifted. In the case of gap between quantity allocated and lifted the maximum gap was 75.25 per cent in the case of urad and narrowest gap was 8.00 per cent in the case of gram (Table 3.7).

Table 3.7 Demand supply gap between quantity indented, allocated and lifted, breeder's seed, Gujarat, 1997-98

(Quantity - quintals)

S. No.	Crop	Quantity indented	Quantity allocated	Percentage of demand supply gap between qty. indented & allocated	Quantity lifted	Percentage of gap between qty. indented & lifted.	Percentage of gap between qty. allocated & lifted.
1	Sunflower	---	---	---	---	---	---
2	Groundnut	776.50	694.95	10.50	512.49	34.00	26.26
3	Soybean	8.75	6.00	31.43	--	--	--
4	Gram	32.75	34.75	(-) 6.11	31.97	2.38	8.00
5	Urad	29.95	40.80	(-) 36.23	10.10	66.28	75.25
6	Moong	29.30	43.80	(-) 49.49	36.60	(-) 24.91	16.44
7	Lentil	---	---	---	---	---	---
8	Arhar	19.20	22.17	(-) 15.47	14.75	23.17	33.47
Total		**896.45**	**842.47**	**6.02**	**605.91**	**32.41**	**28.08**

3.2.3 Madhya Pradesh

In 1997-98 the total quantity indented for all the selected crops was 5,380.00 quintals. Against this the quantity allocated was 3,407.05 quintals or a gap of 36.67 per cent. The quantity lifted was 3,218.63 quintals or a gap of 40.18 per cent between quantity indented and lifted and 5.53 per cent between quantity allocated and lifted. There was significant variation between different crops. In the case of urad, moong and arhar no quantity was either indented or allocated. However, the M.P. State Seeds and Farms Development Corporation managed to lift the quantity needed from different sources. In the case of sunflower the quantity indented, the quantity allocated and quantity lifted was same (2.00 quintals). In the case of other crops the quantity allocated was less than the quantity indented. Of these crops quantity lifted was higher than the quantity indented and allocated in the case of groundnut and lentil. In the case of soybean the quantity lifted was lower than the quantity indented and allocated. In the case of gram although the quantity lifted was lower than the quantity indented, it was higher than the quantity allocated (Table 3.8).

Table 3.8 Demand supply gap between quantity indented, allocated and lifted, breeder's seed, Madhya Pradesh, 1997-98

(Quantity - quintals)

S. No.	Crop	Quantity indented	Quantity allocated	Percentage of demand supply gap between qty. indented & allocated	Quantity lifted	Percentage of gap between qty. indented & lifted.	Percentage of gap between qty. allocated & lifted.
1	Sunflower	2.00	2.00	--	2.00	--	--
2	Groundnut	80.00	40.00	50.00	128.95	(-) 61.19	(-) 222.38
3	Soybean	4,560.00	2,839.85	37.72	2,348.59	48.50	17.30
4	Gram	728.00	524.20	28.00	668.50	8.17	27.53
5	Urad	--	--	--	13.65	--	--
6	Moong	--	--	--	1.09	--	--
7	Lentil	10.00	1.00	90.00	27.20	(-) 172.00	(-) 2,620.00
8	Arhar	--	--	--	28.65	--	--
	Total	**5,380.00**	**3,407.05**	**36.67**	**3,218.63**	**40.18**	**5.53**

3.2.4 Maharashtra

The quantity allocated for all the selected crops was 3,224.17 quintals. Against this the quantity lifted was 1,543.03 quintals or a gap of 52.14 per cent. The quantity lifted was less than the quantity allocated for all the crops. The widest gap was 73.30 per cent in the case of groundnut followed by 62.55 per cent in the case of sunflower. The narrowest gap was 8.37 per cent in the case of arhar (Table 3.9).

Table 3.9 Demand supply gap between quantity allocated and lifted, breeder's seed, Maharashtra, 1997-98

(Quantity - quintals)

S. No.	Crop	Quantity allocated	Quantity lifted	Percentage of gap between qty. allotted and lifted.
1	Sunflower	27.48	10.29	62.55
2	Groundnut	1,833.00	489.50	73.30
3	Soybean	774.30	639.34	17.43
4	Gram	508.38	336.40	33.83
5	Urad	27.33	19.85	27.37
6	Moong	27.65	23.80	13.92
7	Lentil	---	---	---
8	Arhar	26.03	23.85	8.37
	Total	**3,224.17**	**1,543.03**	**52.14**

3.2.5 Rajasthan

The total quantity of allotment for all the crops was 459.61 quintals. Against this the quantity lifted was 390.26 quintals or a gap of 15.09 per cent. Among oilseeds the quantity lifted was lower than the quantity allotted for groundnut and soybean. The quantity lifted was more than the quantity allotted in the case of gram, urad and moong. It was lower in the case of lentil and arhar. The widest gap was 65.11 per cent in the case of groundnut and 56.67 per cent in the case of lentil. The narrowest gap was 6.61 per cent in the case of soybean (Table 3.10).

Table 3.10 Demand supply gap between quantity allocated and lifted, breeder's seed, Rajasthan, 1997-98

(Quantity - quintals)

S. No.	Crop	Quantity allotted	Quantity lifted	Percentage of gap between qty. allotted and lifted.
1	Sunflower	---	---	---
2	Groundnut	93.90	32.76	65.11
3	Soybean	224.06	209.26	6.61
4	Gram	128.75	129.38	(-) 0.49
5	Urad	2.75	4.50	(-) 63.64
6	Moong	8.45	13.12	(-) 55.27
7	Lentil	0.60	0.26	56.67
8	Arhar	1.10	0.98	10.91
	Total	**459.61**	**390.26**	**15.09**

3.2.6 Uttar Pradesh

The total quantity indented for all the crops was 709.63 quintals. Against this the quantity allocated was 377.26 quintals or a gap of 46.84 per cent. The quantity allocated was less than the quantity indented in all the crops except sunflower. The percentage of demand supply gap between quantity

quantity indented and quantity allocated was (-)488.00 in the case of sunflower. The widest gap was 80.17 per cent in the case of lentil followed by 78.10 per cent in the case of arhar. The narrowest gap was 8.07 per cent in the case of groundnut (Table 3.11).

Table 3.11 Demand supply gap between quantity indented and allocated, breeder's seed, Uttar Pradesh, 1997-98

(Quantity - quintals)

S. No.	Crop	Quantity indented	Quantity allocated	Percentage of demand supply gap between qty. indented & allocated
1	Sunflower	5.00	29.40	(-) 488.00
2	Groundnut	71.25	65.50	8.07
3	Soybean	137.30	67.50	50.84
4	Gram	385.00	180.80	53.04
5	Urad	22.00	10.70	51.36
6	Moong	14.60	8.48	41.92
7	Lentil	69.00	13.68	80.17
8	Arhar	5.48	1.20	78.10
Total		**709.63**	**377.26**	**46.84**

3.3 Distribution of Foundation Seed in 1996-97

3.3.1 Andhra Pradesh

The quantity available for foundation seed for 1996-97 was 10,841.38 quintals. Against this the quantity utilised was 8,630.80 quintals or a gap of 20.39 per cent. Of the various crops arhar had the widest gap (90.62 per cent) and soybean had narrowest gap (6.59 per cent). The percentage gap in other crops was 72.77 in the case of sunflower and 42.11 per cent in urad (Table 3.12).

Table 3.12 Demand supply gap between quantity utilised and quantity available, foundation seed in Andhra Pradesh, 1996-97

(Quantity- Quintals)

S. No.	Crop	Quantity available	Quantity Utilised	Percentage of demand supply gap between quantity available and utilised.
1	Sunflower	539.79	147.00	72.77
2	Groundnut	5,396.70	4,800.00	11.06
3	Soybean	1,343.60	1,255.00	6.59
4	Gram	1,037.00	954.00	8.00
5	Urad	1,243.75	720.00	42.11
6	Moong	1,014.14	729.80	28.04
7	Lentil	---	---	---
8	Arhar	266.40	25.00	90.62
Total		**10,841.38**	**8,630.80**	**20.39**

3.3.2 Gujarat

The estimated requirement for foundation seed was 3,503.00 quintals. Against this the quantity available was 11,929.00 quintals or a demand supply gap of (-) 240.54 per cent. In all the crops the quantity available was more than the quantity required. The percentage of such surplus was lowest (48.50) in gram and highest (292.61 per cent) in groundnut. The percentage of surplus in moong was 269.16 per cent and in arhar 138.13 per cent (Table 3.13).

Table 3.13 Demand supply gap between quantity required and quantity available, foundation seed in Gujarat, 1996-97

(Quantity - Quintals)

S.No.	Crop	Estimated requirement	Quantity available	Percentage of demand supply gap between quantity available and required.
1	Sunflower	---	---	---
2	Groundnut	2,125	8,343	(-) 292.61
3	Soybean	N.A.	71	---
4	Gram	200	297	(-) 48.50
5	Urad	270	495	(-) 83.33
6	Moong	428	1,580	(-) 269.16
7	Lentil	---	---	---
8	Arhar	480	1,143	(-) 138.13
Total		**3,503**	**11,929**	**(-) 240.54**

3.3.3 Madhya Pradesh

The estimated requirement for foundation seed for 1996-97 was 30,455.01 quintals. Against this the quantity available was 23,853.00 quintals or a demand supply gap was 21.68 per cent. Of the various crops urad had the narrowest gap (2.79 per cent) between demand and supply and gram had widest gap (61.14 per cent), followed by groundnut, 25.41 per cent. For moong, lentil and arhar the quantity available was more than estimated requirement (Table 3.14).

Table 3.14 Demand supply gap between quantity required and quantity available, foundation seed in Madhya Pradesh, 1996-97

(Quantity - Quintals)

S.No.	Crop	Estimated requirement	Quantity available	Percentage of demand supply gap between quantity available and required.
1	Sunflower	26.00	20.00	---
2	Groundnut	670.33	500.00	25.41
3	Soybean	25,000.00	21,048.00	15.81
4	Gram	4,300.00	1,671.00	61.14
5	Urad	90.01	87.50	2.79
6	Moong	91.67	107.00	(-) 16.72
7	Lentil	155.00	210.00	(-) 35.48
8	Arhar	128.00	209.50	(-) 63.67
	Total	**30,455.01**	**23,853.00**	**21.68**

3.3.4 Maharashtra

The estimated requirement for 1996-97 was 20,750.41 quintals. Against this the quantity available was 19,398.60 quintals or a gap of 6.51 per cent. Of the various crops soybean had the narrowest gap (10.37 per cent) and arhar had widest gap (63.57 per cent) and moong had 22.37 per cent gap. In three crops viz., sunflower, groundnut and urad the quantity available was more than the quantity required. The percentage of such surplus was lowest (4.89) in groundnut and highest (19.83) per cent in urad. The percentage of surplus in sunflower was 9.95 per cent (Table 3.15).

Table 3.15 Demand supply gap between quantity required and quantity available, foundation seed in Maharashtra, 1996-97

(Quantity - Quintals)

S.No.	Crop	Estimated requirement	Quantity available	Percentage of demand supply gap between quantity available and required.
1	Sunflower	477.50	525.00	(-) 9.95
2	Groundnut	5,925.00	6,215.00	(-) 4.89
3	Soybean	8,579.00	7,689.00	10.37
4	Gram	2,713.91	2,378.20	12.37
5	Urad	1,331.00	1,595.00	(-) 19.83
6	Moong	894.00	694.00	22.37
7	Lentil	---	---	---
8	Arhar	830.00	302.40	63.57
	Total	**20,750.41**	**19,398.60**	**6.51**

3.3.5 Rajasthan

The total estimated requirement was 4,021.00 quintals. Against this the quantity available was 2,241.19 quintals or a gap of 44.26 per cent. Of the various crops gram had the narrowest gap (15.19 per cent) between quantity available and estimated requirement and urad had widest gap (93.78 per cent). Moong had 87.19 per cent gap and arhar had 84.00 per cent gap (Table 3.16).

Table 3.16 Demand supply gap between quantity required and quantity available, foundation seed in Rajasthan, 1996-97

(Quantity - Quintals)

S.No.	Crop	Estimated requirement	Quantity available	Percentage of demand supply gap between quantity available and required.
1	Sunflower	---	---	---
2	Groundnut	990.00	268.60	72.87
3	Soybean	1,538.00	1,060.40	31.05
4	Gram	1,006.00	853.22	15.19
5	Urad	93.00	5.78	93.78
6	Moong	360.00	46.11	87.19
7	Lentil	4.00	2.28	43.00
8	Arhar	30.00	4.80	84.00
	Total	**4,021.00**	**2,241.19**	**44.26**

3.3.6 Uttar Pradesh

The total estimated requirement was 9,165.00 quintals. Against this the quantity available was 7,018.20 quintals. The percentage of gap between quantity available and quantity required was 23.42. Of the various crops groundnut had the narrowest gap (19.80 per cent), and sunflower had widest gap (88.89 per cent), lentil had 60.54 per cent gap. In the four crops viz. soybean, urad, moong and arhar the quantity available was more than the estimated requirement. The percentage of such surplus was lowest (52.50) in urad and the highest (223.81) in arhar and (103.77) in soybean (Table 3.17).

Table 3.17 Demand supply gap between quantity required and quantity available, foundation seed in Uttar Pradesh, 1996-97

(Quantity - Quintals)

S.No.	Crop	Estimated requirement	Quantity available	Percentage of demand supply gap between quantity available and required.
1	Sunflower	450.00	50.00	88.89
2	Groundnut	490.00	393.00	19.80
3	Soybean	1,114.00	2,270.00	(-) 103.77
4	Gram	6,060.00	2,918	51.84
5	Urad	320.00	488.00	(-) 52.50
6	Moong	195.00	329.00	(-) 68.72
7	Lentil	410.00	161.80	60.54
8	Arhar	126.00	408.00	(-) 223.81
	Total	**9,165.00**	**7,018.20**	**23.42**

3.4 Distribution of Foundation Seed in 1997-98

3.4.1 Andhra Pradesh

The quantity available for foundation seed for 1997-98 was 22,206.87 quintals. Against this the quantity utilised was 12,649.00 quintals or percentage gap between quantity utilised and available was 43.04. Of the various crops soybean had narrowest gap (6.04 per cent) and urad had the widest gap (78.42 per cent) The percentage gap in arhar was 63.74, sunflower 55.56 and moong, 45.31 (Table 3.18).

Table 3.18 Demand supply gap between quantity available and quantity utilised, foundation seed in Andhra Pradesh, 1997-98

(Quantity- Quintals)

S. No.	Crop	Quantity available	Quantity Utilised	Percentage of demand supply gap between quantity available and utilised.
1	Sunflower	2,432.45	1,081.00	55.56
2	Groundnut	13,962.57	8,321.00	40.40
3	Soybean	1,655.00	1,555.00	6.04
4	Gram	537.70	505.00	6.08
5	Urad	2,247.22	485.00	78.42
6	Moong	1,109.93	607.00	45.31
7	Lentil	---	---	---
8	Arhar	262.00	95.00	63.74
	Total	**22,206.87**	**12,649.00**	**43.04**

3.4.2 Gujarat

The estimated requirement for 1997-98 was 3,952,00 quintals. Against this the quantity available was 7,045 quintals or a demand supply gap of (-) 78.26 per cent. Of the various crops arhar had the narrowest gap (39.02 per cent) and urad had the widest gap (69.36 per cent). In the remaining three crops viz. groundnut, gram and moong the quantity available was more than the quantity of estimated requirement. The percentage of such surplus was lowest (45.14) in groundnut and the highest (733.33 per cent) in moong. The percentage surplus in gram was 311.79. Although there was no estimated requirement for soybean, the quantity available was 665.00 quintals (Table 3.19).

Table 3.19 Demand supply gap between quantity required and quantity available, foundation seed in Gujarat, 1997-98

(Quantity - Quintals)

S.No.	Crop	Estimated requirement	Quantity available	Percentage of demand supply gap between quantity available and required.
1	Sunflower	----	----	----
2	Groundnut	2,800.00	4,064.00	(-) 45.14
3	Soybean	----	665.00	----
4	Gram	195.00	803.00	(-) 311.79
5	Urad	297.00	91.00	69.36
6	Moong	132.00	1,100.00	(-) 733.33
7	Lentil	----	----	----
8	Arhar	528.00	322.00	39.02
	Total	**3,952.00**	**7,045.00**	**(-) 78.26**

3.4.3 Madhya Pradesh

The estimated requirement for 1997-98 was 37,091.64 quintals. Against this the quantity available was 19,136.00 quintals or a gap of 48.41 per cent. Of the various crops the narrowest gap was 10.18 per cent in sunflower and the widest gap was 60.74 per cent in gram. In the remaining five crops viz. groundnut, urad, moong, lentil and arhar the quantity available was more than

the estimated requirement. The percentage of such surplus was lowest (21.49) in moong and the highest (172.47) in arhar. The percentage of such gap was 89.02 in urad, 88.50 per cent in groundnut and 49.19 in lentil (Table 3.20).

Table 3.20 Demand supply gap between quantity required and quantity available, foundation seed in Madhya Pradesh, 1997-98

(Quantity - Quintals)

S.No.	Crop	Estimated requirement	Quantity available	Percentage of demand supply gap between quantity available and required.
1	Sunflower	16.70	15.00	10.18
2	Groundnut	62.60	118.00	(-) 88.50
3	Soybean	29,625.00	15,625.00	47.26
4	Gram	7,050.00	2,768.00	60.74
5	Urad	66.66	126.00	(-) 89.02
6	Moong	66.67	81.00	(-) 21.49
7	Lentil	124.00	185.00	(-) 49.19
8	Arhar	80.01	218.00	(-) 172.47
	Total	**37,091.64**	**19,136.00**	**48.41**

3.4.4 Maharashtra

The total estimated requirement for 1997-98 was 24,030.00 quintals. Against this the quantity available was 30,281.29 quintals or the demand supply gap between quantity available and estimated requirement was (-) 26.01 per cent. In all the crops the quantity available was more than the estimated requirement except in groundnut. In the case of groundnut the demand supply gap was 29.47 per cent. Of the various crops the percentage of such surplus was lowest (0.90) in urad and highest (111.40) in gram. The percentage surplus in arhar was 84.98, in sunflower 46.61, and in soybean 36.32 (Table 3.21).

Table 3.21 Demand supply gap between quantity required and quantity available, foundation seed in Maharashtra, 1997-98

(Quantity - Quintals)

S.No.	Crop	Estimated requirement	Quantity available	Percentage of demand supply gap between quantity available and required.
1	Sunflower	161.65	237.00	(-) 46.61
2	Groundnut	5,019.00	3,540.00	29.47
3	Soybean	12,526.00	17,075.00	(-) 36.32
4	Gram	2,336.50	4,939.29	(-) 111.40
5	Urad	2,331.00	2,352.00	(-) 0.90
6	Moong	1,250.00	1,387.00	(-) 10.96
7	Lentil	----	----	----
8	Arhar	406.00	751.00	(-) 84.98
	Total	**24,030**	**30,281.29**	**(-) 26.01**

3.4.5 Rajasthan

The total estimated requirement for 1997-98 was 3,594.00 quintals. Against this the quantity available was 2,729.99 quintals or demand supply gap between quantity available and estimated requirement was 24.04 per cent. Of the various crops the narrowest gap was 28.71 per cent in soybean. The percentage gap was 89.70 in lentil and 60.15 in groundnut. The quantity available was more than the quantity of estimated requirement in the case of gram (Table 3.22).

Table 3.22 Demand supply gap between quantity required and quantity available, foundation seed in Rajasthan, 1997-98

(Quantity - Quintals)

S.No.	Crop	Estimated requirement	Quantity available	Percentage of demand supply gap between quantity available and required.
1	Sunflower	----	----	----
2	Groundnut	930.00	370.60	60.15
3	Soybean	1,240.00	884.00	28.71
4	Gram	1,237.00	1,400.00	(-) 13.18
5	Urad	44.00	29.89	32.07
6	Moong	108.00	44.47	58.82
7	Lentil	10.00	1.03	89.70
8	Arhar	25.00	---	----
	Total	**3,594.00**	**2,729.99**	**24.04**

3.4.6 Uttar Pradesh

The total estimated requirement was 7,180.00 quintals. Against this the quantity available was 10,625.00 quintals or a gap of (-) 47.98 per cent. Of the various crops the narrowest gap was 3.63 per cent in groundnut and the widest gap (26.29 per cent) in sunflower. The percentage gap was 25.32 in urad and 24.13 in lentil. In the remaining four crops viz. soybean, gram, moong and arhar the quantity available was more than the estimated requirement. The percentage of such surplus was lowest (13.20) in moong and the highest (112.11) in arhar. The percentage of such surplus was 76.06 in gram and 53.09 in soybean (Table 3.23).

Table 3.23 Demand supply gap between quantity required and quantity available, foundation seed in Uttar Pradesh, 1997-98

(Quantity - Quintals)

S.No.	Crop	Estimated requirement	Quantity available	Percentage of demand supply gap between quantity available and required.
1	Sunflower	175.00	129.00	26.29
2	Groundnut	331.00	319.00	3.63
3	Soybean	1,667.00	2,552.00	(-) 53.09
4	Gram	3,435.00	6,048.00	(-) 76.06
5	Urad	624.00	466.00	25.32
6	Moong	356.00	403.00	(-) 13.20
7	Lentil	402.00	305.00	24.13
8	Arhar	190.00	403.00	(-) 112.11
	Total	**7,180.00**	**10,625.00**	**(-) 47.98**

3.5 Distribution of Certified Seed 1996-97

Certified seed is one which is produced on the selected farmers' fields and is certified by Seed Certification Agency (SCA).

3.5.1 Andhra Pradesh

The quantity available of certified seed for 1996-97 was 5,18,175.00 quintals. The quantity distributed was 4,46,900.00 quintals. Thus, the percentage gap between quantity available and quantity distributed was 13.76.

Of the various crops the percentage gap between quantity available and quantity distributed was narrowest (2.17) in the case of arhar and widest (60.47) in the case of moong. For sunflower the gap was 59.39, for gram 40.95 and for urad 34.33 (Table 3.24).

Table 3.24 Demand supply gap between quantity available and quantity distributed of certified seed, Andhra Pradesh, 1996-97

(Quantity - Quintals)

S. No.	Crop	Quantity available	Quantity distributed	Percentage of gap between quantity available and quantity distributed.
1	Sunflower	49,990.00	20,300.00	59.39
2	Groundnut	3,70,000.00	3,57,100.00	3.49
3	Soybean	11,985.00	15,300.00	(-) 27.66
4	Gram	10,500.00	6,200.00	40.95
5	Urad	33,500.00	22,000.00	34.33
6	Moong	43,000.00	17,000.00	60.47
7	Lentil	--	--	--
8	Arhar	9,200.00	9,000.00	2.17
	Total	**5,18,175.00**	**4,46,900.00**	**13.76**

3.5.2 Gujarat

The total quantity of certified seed required was 83,950.00 quintals. The quantity available was 71,106.00 quintals or there was a gap of 15.30 per cent. The quantity actually distributed was 32,675.00 quintals resulting in the percentage gap of 61.08 between quantity required and quantity distributed and 54.05 between quantity available and quantity distributed.

The quantity available was more than the quantity required in the case of soybean, gram, urad, moong and arhar. In groundnut quantity available was less than quantity required. The gap was 67.55 per cent. The surplus was almost negligible (0.13), in the case of soybean and highest (350.08) in the case of moong and 120.94 in the case of arhar. The percentage of gap between quantity required and quantity distributed was narrowest (8.58) in gram. The gap was widest (80.85) in groundnut. In soybean the gap was 25.92 per cent.

In the case of urad, moong and arhar the quantity distributed was more than quantity required. The percentage gap between quantity available and quantity distributed was narrowest (26.02) in the case of soybean and widest (69.20) in the case of moong. In arhar the gap was 53.94 per cent, in gram 50.58 per cent and in groundnut 40.99 per cent (Table 3.25).

Table 3.25 Demand supply gap between quantity required, quantity available and quantity distributed of certified seed, Gujarat, 1996-97

(Quantity - Quintals)

S. No.	Crop	Quantity required	Quantity available	Percentage of demand supply gap between quantity required and quantity available.	Quantity distributed	Percentage of gap between quantity required and quantity distributed	Percentage of gap between quantity available and quantity distributed
1	Sunflower	--	--	--	--	--	--
2	Groundnut	65,875.00	21,379.00	67.55	12,616.00	80.85	40.99
3	Soybean	760.00	761.00	(-) 0.13	563.00	25.92	26.02
4	Gram	2,750.00	5,087.00	(-) 84.98	2,514.00	8.58	50.58
5	Urad	2,850.00	4,211.00	(-) 47.75	2,858.00	(-) 0.28	32.13
6	Moong	6,040.00	27,185.00	(-) 350.08	8,374.00	(-) 38.64	69.20
7	Lentil	---	---	---	---	---	---
8	Arhar	5,650.00	12,483.00	(-) 120.94	5,750.00	(-) 1.77	53.94
	Total	**83,950.00**	**71,106.00**	**15.30**	**32,675.00**	**61.08**	**54.05**

3.5.3 Madhya Pradesh

The quantity of certified seed required was 2,07,154 quintals. Against this the quantity available was 1,38,451 quintals. Thus, the demand supply gap was 33.17 per cent. The actual quantity distributed was 1,29,030 quintals. Thus percentage of demand supply gap between quantity required and quantity distributed came to 37.71. However, there was very small gap between the quantity available and quantity distributed (6.80 per cent).

The percentage of demand supply gap between the quantity available and quantity required was narrowest (0.52) in the case of gram and widest (85.30) in the case of moong. For sunflower the gap was 81.72, for lentil 66.72, for urad 41.15 and for soybean 38.39. The percentage of demand supply gap between quantity required and quantity distributed was narrowest (16.74) in the case of gram and widest in the case of moong (88.74). In sunflower the gap was 87.00 per cent, in lentil 67.95 per cent, in urad 42.23 per cent and in soybean 40.79 per cent. The percentage of demand supply gap between quantity available and quantity distributed was narrowest (1.82) in the case of urad and widest 28.92 in the case of sunflower. It will thus be observed, that the demand supply gap between the quantity required and quantity available and also in quantity required and quantity distributed was narrowest in gram. It was widest in both these cases in moong. As far as the distribution of seed against the quantity available was concerned the situation was worst in sunflower (Table 3.26).

Table 3.26 Demand supply gap between quantity required, quantity available and quantity distributed of certified seed, Madhya Pradesh, 1996-97

(Quantity - Quintals)

S. No.	Crop	Quantity required	Quantity available	Percentage of demand supply gap between quantity required and quantity available.	Quantity distributed	Percentage of gap between quantity required and quantity distributed	Percentage of gap between quantity available and quantity distributed
1	Sunflower	454.00	83.00	81.72	59.00	87.00	28.92
2	Groundnut	636.00	447.00	29.72	400.00	37.11	10.52
3	Soybean	1,68,697.00	1,03,932.00	38.39	99,889.00	40.79	3.89
4	Gram	31,232.00	31,069.00	0.52	26,005.00	16.74	16.39
5	Urad	1,492.00	878.00	41.15	862.00	42.23	1.82
6	Moong	1,163.00	171.00	85.30	131.00	88.74	23.39
7	Lentil	1,788.00	595.00	66.72	573.00	67.95	3.70
8	Arhar	1,692.00	1,276.00	24.59	1,111.00	34.34	12.93
	Total	**2,07,154.00**	**1,38,451.00**	**33.17**	**1,29,030.00**	**37.71**	**6.80**

3.5.4 Maharashtra

The total quantity of certified seed required was 4,43,082 quintals. The quantity available was 4,29,276 quintals or a gap of 3.12 per cent between the demand and supply.

Of the various crops the percentage of gap between quantity required and quantity available was narrowest (7.31) in groundnut. The gap was widest (14.25) in moong. In gram the gap was 11.05 per cent, and in sunflower 7.41 per cent. In soybean, urad and arhar the quantity available was more than the quantity required. The surplus was lowest (9.08 per cent) in the case of soybean and highest (41.04 per cent) in the case of arhar (Table 3.27).

Table 3.27 Demand supply gap between quantity required and quantity available of certified seed, Maharashtra, 1996-97

(Quantity - Quintals)

S. No.	Crop	Quantity required	Quantity available	Percentage of demand supply gap between quantity required and quantity available.
1	Sunflower	24,647.00	22,821.00	7.41
2	Groundnut	44,400.00	41,155.00	7.31
3	Soybean	1,58,550.00	1,72,950.00	(-) 9.08
4	Gram	67,935.00	60,430.00	11.05
5	Urad	64,750.00	71,526.00	(-) 10.46
6	Moong	43,200.00	37,045.00	14.25
7	Lentil	---	---	---
8	Arhar	39,600.00	23,349.00	(-) 41.04
	Total	**4,43,082.00**	**4,29,276.00**	**3.12**

3.5.5 Rajasthan

The quantity of certified seed required was 44,700 quintals. Against this, the quantity available was 45,461 quintals. Thus the demand supply gap was (-) 1.70 per cent.

The quantity available was more than the quantity required in all the crops except in groundnut. In groundnut the gap was 10.26 per cent between demand and supply. The surplus was lowest (31.43 per cent) in moong and the surplus was highest 66.67 per cent in arhar, gram 51.15 per cent and in soybean 36.36 per cent (Table 3.28).

Table 3.28 Demand supply gap between quantity required and quantity available of certified seed, Rajasthan, 1996-97

(Quantity - Quintals)

S. No.	Crop	Quantity required	Quantity available	Percentage of demand supply gap between quantity required and quantity available.
1	Sunflower	---	---	---
2	Groundnut	3,900.00	3,500.00	10.26
3	Soybean	11,000.00	15,000.00	(-) 36.36
4	Gram	14,000.00	21,161.00	(-) 51.15
5	Urad	1,200	700.00	41.67
6	Moong	3,500	4,600	(-) 31.43
7	Lentil	---	---	---
8	Arhar	300.00	500.00	(-) 66.67
	Total	**44,700.00**	**45,461.00**	**(-) 1.70**

3.5.6 Uttar Pradesh

The total quantity of certified seed required was 74,355 quintals. The quantity available was 51,353 quintals or there was a gap of 30.94 per cent between the demand and supply. The quantity distributed was 50,328 quintals resulting in the percentage gap of 32.31 between quantity required and quantity distributed and 2.00 per cent between quantity available and quantity distributed.

Among different crops the percentage gap between quantity required and quantity available was narrowest (7.31 per cent) in moong. The gap was widest (62.12 per cent) in arhar. In groundnut the gap was 49.65 per cent, in sunflower 42.60 per cent and in soybean 39.15 per cent. The percentage of demand supply gap between quantity required and quantity distributed was narrowest

(0.48 per cent) in the case of groundnut and widest in the case of arhar (62.15 per cent). In sunflower the gap was 48.37 per cent, in soybean 39.75 per cent and in urad 36.96 per cent. The percentage of demand supply gap between quantity available and quantity distributed was narrowest (0.08 per cent) in the case of arhar and widest in the case of sunflower (10.06 pr cent). In groundnut the percentage gap was 4.07, in gram, 2.05 and in moong 2.01 (Table 3.29).

Table 3.29 Demand supply gap between quantity required, quantity available and quantity distributed of certified seed, Uttar Pradesh, 1996-97

(Quantity - Quintals)

S. No.	Crop	Quantity required	Quantity available	Percentage of demand supply, gap between quantity available and quantity required	Quantity distributed	Percentage of gap between quantity required and quantity distributed	Percentage of gap between quantity available and quantity distributed
1	Sunflower	5,040.00	2,893.00	42.60	2,602.00	48.37	10.06
2	Groundnut	2,000.00	1,007.00	49.65	966.00	0.48	4.07
3	Soybean	21,400.00	13,022.00	39.15	12,893.00	39.75	0.99
4	Gram	27,000.00	22,845.00	15.39	22,377.00	17.12	2.05
5	Urad	5,325.00	3,387.00	36.39	3,357.00	36.96	0.89
6	Moong	3,500.00	3,244.00	7.31	3,180.00	9.14	2.01
7	Lentil	3,400.00	2,421.00	28.79	2,421.00	28.79	---
8	Arhar	6,690.00	2,534.00	62.12	2,532.00	62.15	0.08
	Total	**74,355.00**	**51,353.00**	**30.94**	**50,328.00**	**32.31**	**2.00**

3.6 Distribution of certified seed in 1997-98

3.6.1 Andhra Pradesh

The total quantity of certified seed available for 1997-98 was 5,38,067 quintals. The quantity distributed was 1,27,610 quintals or there was a gap of 76.28 per cent between the quantity available and quantity distributed.

Among different crops the percentage gap between quantity available and quantity distributed was narrowest (2.17 per cent) in arhar and the widest gap (60.07 per cent) in moong. In sunflower the gap was 60.00 per cent, in urad 34.29 per cent, in gram 31.40 per cent and in soybean 9.09 per cent (Table 3.30)

Table 3.30 Demand supply gap between quantity available and quantity distributed of certified seed, Andhra Pradesh, 1997-98

(Quantity - Quintals)

S. No.	Crop	Quantity available	Quantity distributed	Percentage of gap between quantity available and quantity distributed.
1	Sunflower	50,500.00	20,200.00	60.00
2	Groundnut	3,73,700.00	3,60,570.00	3.51
3	Soybean	17,160.00	15,600.00	9.09
4	Gram	10,600.00	7,272.00	31.40
5	Urad	33,815.00	22,221.00	34.29
6	Moong	43,000.00	17,170.00	60.07
7	Lentil	---	---	---
8	Arhar	9,292.00	9,090.00	2.17
	Total	**5,38,067.00**	**1,27,610.00**	**76.28**

3.6.2 Gujarat

The total quantity of certified seed required was 49,550 quintals. Against this the quantity available was 63,489 quintals. Thus the demand supply gap between quantity required and quantity available was (-) 28.13 per cent. The gap between the quantity required and quantity distributed was 28.27 per cent and 44.02 per cent between the quantity available and quantity distributed.

Of the various crops the percentage of gap between quantity required and quantity available was 20.62 existed only in gram. On the other hand, in all the remaining crops the gap was in the negative as the quantity available was more than the quantity required. The lowest surplus was 6.26 in the case of groundnut and the highest (145.87) per cent in the case of arhar, 46.79 per cent in the case of moong and 7.39 per cent in the case of urad. The percentage of demand supply gap between quantity required and quantity distributed was narrowest (22.31 per cent) in urad and widest in the case of gram (56.76 per cent) and 52.08 per cent in groundnut. In the case of moong and arhar the gap was in the negative. The percentage of demand supply gap between quantity available and quantity distributed was narrowest (12.86 per cent) in moong and the widest gap (59.11 per cent) in arhar, 52.08 per cent in groundnut, 45.53 per cent in gram and 27.65 per cent in urad (Table 3.31).

Table 3.31 Demand supply gap between quantity required, quantity available and quantity distributed of certified seed, Gujarat, 1997-98

(Quantity - Quintals)

S. No.	Crop	Quantity required	Quantity available	Percentage of demand supply gap between quantity required and quantity available.	Quantity distributed	Percentage of gap between quantity required and quantity distributed	Percentage of gap between quantity available and quantity distributed
1	Sunflower	---	---	---	---	---	---
2	Groundnut	28,750.00	30,550.00	(-) 6.26	14,641.00	52.08	52.08
3	Soybean	---	---	---	114.00	---	---
4	Gram	2,900.00	2,302.00	20.62	1,254.00	56.76	45.53
5	Urad	3,600.00	3,866.00	(-) 7.39	2,797.00	22.31	27.65
6	Moong	8,525.00	12,514.00	(-) 46.79	10,904.00	(-) 27.91	12.86
7	Lentil	---	---	---	---	---	---
8	Arhar	5,775.00	14,257.00	(-) 145.87	5,830.00	(-) 0.95	59.11
	Total	**49,550.00**	**63,489.00**	**(-) 28.13**	**35,540.00**	**28.27**	**44.02**

3.6.3 Madhya Pradesh

The total quantity of certified seed required was 2,05,159 quintals. The quantity available was 1,25,725 quintals or there was a gap of 38.72 per cent between the demand and supply. The quantity distributed was 1,10,701 quintals resulting in the percentage gap of 46.04 between quantity required and quantity distributed and 11.95 between quantity available and quantity distributed.

Among different crops the percentage of gap between quantity required and quantity available was narrowest (11.65) in arhar. The gap was widest (76.90) in sunflower. In moong the gap was 66.29 per cent, in urad 58.52 per cent, in soybean 40.72 per cent and in lentil 29.40 per cent. The percentage gap between quantity required and quantity distributed was narrowest (37.30) in the case of gram and widest (85.76) in the case of sunflower. As regards percentage gap between the quantity available and quantity distributed it was narrowest (0.67 per cent) in the case of moong and widest (38.36 per cent) in the case of sunflower (Table 3.32).

Table 3.32 Demand supply gap between quantity required, quantity available and quantity distributed of certified seed, Madhya Pradesh, 1997-98

(Quantity - Quintals)

S. No.	Crop	Quantity required	Quantity available	Percentage of demand supply gap between quantity required and quantity available.	Quantity distributed	Percentage of gap between quantity required and quantity distributed	Percentage of gap between quantity available and quantity distributed
1	Sunflower	316.00	73.00	76.90	45.00	85.76	38.36
2	Groundnut	474.00	339.00	28.48	285.00	39.87	15.93
3	Soybean	1,69,150.00	1,00,267.00	40.72	89,107.00	47.32	11.13
4	Gram	29,992.00	21,740.00	27.51	18,805.00	37.30	13.50
5	Urad	1,092.00	453.00	58.52	378.00	65.38	16.56
6	Moong	890.00	300.00	66.29	298.00	66.52	0.67
7	Lentil	1,769.00	1,249.00	29.40	871.00	50.76	30.26
8	Arhar	1,476.00	1,304.00	11.65	912.00	38.21	30.06
Total		**2,05,159.00**	**1,25,725.00**	**38.72**	**1,10,701.00**	**46.04**	**11.95**

3.6.4 Maharashtra Not given

3.6.5 Rajasthan

The total quantity of certified seed required was 33,150 quintals. Against this, the quantity available was 38,065 quintals. The gap between demand and supply was (-) 14.83 per cent.

The quantity available was more than the quantity required in all the crops except in groundnut. The gap was 12.80 per cent in groundnut. The surplus was lowest (1.37 per cent) in moong and the highest surplus was 69.29 per cent in arhar, in gram 51.79 per cent in urad 15.42 per cent and in soybean 4.19 per cent (Table 3.33).

Table 3.33 Demand supply gap between quantity required and quantity available of certified seed, Rajasthan, 1997-98

(Quantity - Quintals)

S. No.	Crop	Quantity required	Quantity available	Percentage of demand supply gap between quantity required and quantity available.
1	Sunflower	---	---	----
2	Groundnut	4,500.00	3,924.00	12.80
3	Soybean	14,900.00	15,525.00	(-) 4.19
4	Gram	8,000.00	12,143.00	(-) 51.79
5	Urad	1,200.00	1,385.00	(-) 15.42
6	Moong	3,850.00	3,903.00	(-) 1.37
7	Lentil	---	---	---
8	Arhar	700.00	1,185.00	(-) 69.29
Total		**33,150.00**	**38,065.00**	**(-) 14.83**

IV. Uttar Pradesh

The total certified seed requirement was 83,650 quintals. The quantity available was 44,937 quintals. The gap between the requirement and quantity available was 46.28 per cent The quantity distributed was lower than the quantity required and quantity available. The quantity distributed was 41,000 quintals. Thus, the gap between the quantity required and quantity distributed was 50.99 per cent and between the quantity available and quantity distributed was 8.76 per cent.

The gap between quantity required and quantity available was narrowest (17.19 per cent) in sunflower and the widest (97.59) in urad, in groundnut 38.95 per cent, in soybean 52.83 per cent and in gram 52.09 per cent. The demand supply gap between quantity required and quantity distributed was narrowest (25.94 per cent) in sunflower and widest gap was 56.48 per cent in gram. The gap between quantity available and quantity distributed was narrowest (2.40 per cent) in soybean and was widest (23.49) per cent in lentil (Table 3.34).

Table 3.34 Demand supply gap between quantity required, quantity available and quantity distributed of certified seed, Uttar Pradesh, 1997-98

S. No.	Crop	Quantity required	Quantity available	Percentage of demand supply gap between quantity available and quantity required	Quantity distributed	Percentage of gap between quantity required and quantity distributed	Percentage of gap between quantity available and quantity distributed
1	Sunflower	3,450.00	2,857.00	17.19	2,555.00	25.94	10.57
2	Groundnut	2,000.00	1,221.00	38.95	1,047.00	47.65	14.25
3	Soybean	20,000.00	9,435.00	52.83	9,209.00	53.96	2.40
4	Gram	31,000.00	14,851.00	52.09	13,491.00	56.48	9.16
5	Urad	9,000.00	4,555.00	97.59	4,272.00	52.53	6.21
6	Moong	5,700.00	3,181.00	44.19	2,944.00	48.35	7.45
7	Lentil	5,500.00	4,333.00	21.22	3,315.00	39.73	23.49
8	Arhar	7,000.00	4,524.00	35.37	4,167.00	40.47	7.89
	Total	**83,650.00**	**44,937.00**	**46.28**	**41,000.00**	**50.99**	**8.76**

3.7 Distribution of Certified Seed in Selected Districts

3.7.1 Andhra Pradesh

3.7.1.1 Anantpur District

In 1996-97 in groundnut the total estimated requirement was 10,235 quintals. Against this the quantity distributed was 8,835 quintals or there was a gap of 13.68 per cent.

In 1997-98 the estimated requirement of groundnut was 34,485 quintals. The quantity distributed was 26,185 quintals. The percentage gap between quantity required and quantity distributed was 24.07 (Table 3.35)

Table 3.35 Quantity required and quantity distributed of certified seed, groundnut, Anantpur district, Andhra Pradesh 1996-97 and 1997-98

(Quantity- Quintals)

Year	Quantity required	Quantity distributed	Percentage of demand supply gap
1996-97	10,235	8,835	13.68
1997-98	34,485	26,185	24.07

3.7.1.2 Kurnool District

In 1996-97 the quantity procured of arhar seed was 1,08,688 quintals. The quantity distributed was 1,06,054 quintals. Thus the gap was 2.42 per cent.

In the case of gram the quantity procured was 5,95,037 quintals. Of this 5,92,079 quintals were distributed resulting in the percentage gap of 0.50.

In the case of urad the quantity procured was 3,501 quintals. Of this quantity, the distribution was 2,132 quintals or a gap of 39.10 per cent (Table 3.36).

Table 3.36 Procurement and distribution of certified seed, Kurnool district, Andhra Pradesh, 1996-97

(Quantity-Quintals)

Crop	Quantity Procured	Quantity Distributed	Percentage gap between quantities Procured and distributed
Arhar	1,08,688	1,06,054	2.42
Gram	5,95,037	5,92,079	0.50
Urad	3,501	2,132	39.10
Total	**7,07,226**	**7,00,265**	**0.98**

In 1997-98 the quantity of arhar procured was 2,27,192 quintals. Against this, the quantity distributed was 73,142 quintals. The gap between the quantity procured and quantity distributed was 67.81 per cent.

The entire quantity of 10,000 quintals of moong procured was distributed. Similarly the entire quantity of 1,345 quintals of urad was distributed.

In the case of gram the quantity of seed procured was 1,47,625 quintals. Of this quantity 1,03,745 quintals were distributed leaving a gap of 29.72 per cent.(Table 3.37)

Table 3.37 Procurement and distribution of certified seed in Kurnool district Andhra Pradesh,1997-98

(Quantity-Quintals)

Crop	Quantity Procured	Quantity Distributed	Percentage gap between quantities procured and distributed
Arhar	2,27,192	73,142	67.81
Grm	10,000	10,000	--
Urad	1,345	1,345	--
Gram	1,47,625	1,03,745	29.72
Total	**3,86,162**	**1,88,232**	**51.26**

3.7.2 Madhya Pradesh

3.7.2.1 Indore District

In 1996-97 the total quantity of certified seed of all crops required stood at 4,401.40 quintals. Against this the quantity available was 1,533.00 quintals resulting in the demand supply gap of 65.17 per cent. The quantity distributed was 1449.80 quintals. Thus nearly 95.00 per cent of the quantity available was distributed.

In the case of sunflower and groundnut no demand was made nor there was any quantity available. In the case of gram, urad and moong the quantity available was more than the required quantity resulting in negative demand

supply gap. The demand supply gap was highest in soybean (70.16 per cent) followed by lentil (66.67 per cent) As regards distribution it was observe that entire quantity of available seed of urad, moong, lentil and arhar was distributed. In soybean and gram also nearly entire quantity of available seed was distributed (Table 3.38).

Table 3.38 Demand supply gap between quantity required, quantity available and quantity distributed, certified seed, Indore district, Madhya Pradesh, 1996-97

(Quantity – quintals)

Crop	Quantity required	Quantity available	Percentage of demand supply gap between qty. required and quantity available	Quantity distributed	Percentage of demand supply gap between qty. required and quantity distributed	Percentage of demand supply gap between qty. available and quantity distributed
1 Sunflower	--	--	--	--	--	--
2 Groundnut	--	--	--	--	--	--
3 Soybean	4,150.00	1,238.40	70.16	1,209.20	70.86	2.36
4 Gram	240.00	284.00	(-)18.33	270.00	(-)12.50	4.93
5 Urad	1.20	2.00	(-)66.67	2.00	(-)66.67	--
6 Moong	1.20	2.00	(-)66.67	2.00	(-)66.67	--
7 Lentil	3.00	1.00	66.67	1.00	66.67	--
8 Arhar	6.00	5.60	6.67	5.60	6.67	--
Total	**4,401.40**	**1,533.00**	**65.17**	**1,449.80**	**67.06**	**5.43**

In 1997-98 the total quantity of seed required for all the crops was 4,106.00 quintals. The quantity available, on the other hand, was 1,293.40 quintals. This resulted in the demand supply gap of 68.50 per cent. The quantity distributed was 1,235.20 quintals. Thus, the gap between the quantity required and quantity distributed was 69.92 per cent It may, however, be mentioned that nearly 95.00 per cent of the quantity available was distributed.

Among different crops the demand supply gap was highest (71.72 per cent) for soybean. This was followed by arhar (70.00 per cent). The demand supply gap in gram was 15.90 per cent. While nearly 97.00 per cent of the available soybean seed was distributed, the percentage of distributed seed was

not satisfactory in the case of gram where 17.68 per cent of the available seed remained to be distributed. In arhar also 13.33 per cent of the available seed was not distributed (Table 3.39).

Table 3.39 Demand supply gap between quantity required, quantity available and quantity distributed, certified seed, Indore district, Madhya Pradesh, 1997-98

(Quantity – quintals)

Crop	Quantity required	Quantity available	Percentage of demand supply gap between qty. required and quantity available	Quantity distributed	Percentage of demand supply gap between qty. required and quantity distributed	Percentage of demand supply gap between qty. available and quantity distributed
1 Sunflower	---	---	---	---	---	---
2 Groundnut	---	---	---	---	---	---
3 Soybean	3,900.00	1,126.40	71.12	1,097.60	71.86	2.56
4 Gram	195.00	164.00	15.90	135.00	30.77	17.68
5 Urad	---	---	---	---	---	---
6 Moong	---	---	---	---	---	---
7 Lentil	1.00	---	---	---	--	---
8 Arhar	10.00	3.00	70.00	2.60	74.00	13.33
Total	**4,106.00**	**1,293.40**	**68.50**	**1,235.20**	**69.92**	**4.50**

3.7.2.2 Narsinghpur District

In 1996-97 the total quantity of seed required was 6,240.00 quintals. The quantity available was more than the quantity required (6,658.13 quintals). Therefore, the demand supply gap was (-) 6.70 per cent. However, the quantity distributed was 5,705.96 quintals resulting in the gap of 8.56 per cent between the quantity required and quantity distributed. The gap between the quantity available and quantity distributed was 14.30 per cent.

In the case of urad only the quantity was mentioned. The quantity available and quantity distributed was not mentioned and therefore the demand supply gap could not be calculated. In the case of soybean, lentil and arhar the quantity available was more than the quantity required and therefore the resultant negative gap between demand and supply. The percentage of demand

supply gap was highest (60.00) in the case of sunflower. In the case of gram the gap was 15.79 per cent and in moong it was 2.60 per cent. Nearly entire quantity of seed available was distributed in the case of soybean and arhar. However, a large gap existed (88.91 per cent) between quantity available and quantity distributed in the case of moong and 38.71 per cent in the case of gram (Table 3.40).

Table 3.40 Demand supply gap between quantity required, quantity available and quantity distributed, certified seed, Narsinghpur district, Madhya Pradesh, 1996-97

(Quantity – quintals)

Crop	Quantity required	Quantity available	Percentage of demand supply gap between qty. required and quantity available	Quantity distributed	Percentage of demand supply gap between qty. required and quantity distributed	Percentage of demand supply gap between qty. available and quantity distributed
Sunflower	5.00	2.00	60.00	2.00	60.00	--
Groundnut	--	--	--	--	--	--
Soybean	3,350.00	4,126.00	(-) 23.16	4,089.60	(-) 22.08	0.88
Gram	2,735.00	2,303.10	15.79	1,411.50	48.39	38.71
Urad	25.00	--	--	--	--	--
Moong	25.00	24.35	2.60	2.70	89.20	88.91
Lentil	20.00	108.36	(-) 441.80	108.36	(-) 41.80	--
Arhar	80.00	94.32	(-) 17.90	91.80	(-) 14.75	2.67
Total	**6,240.00**	**6,658.13**	**(-) 6.70**	**5,705.96**	**8.56**	**14.30**

In the year 1997-98 the demand supply gap between quantity required and quantity available was 9.66 per cent. The gap was in the negative in the case of sunflower, gram and lentil. The demand supply gap was highest (96.00 per cent) in urad followed by arhar (28.58 per cent) and soybean (15.45 per cent), While, the entire quantity of urad was distributed, nearly 90.00 per cent of soybean seed was distributed. On the other hand very large quantities of groundnut, sunflower and moong remained to be distributed (Table 3.41).

Table 3.41 Demand supply gap between quantity required, quantity available and quantity distributed, certified seed, Narsinghpur district, Madhya Pradesh, 1997-98

(Quantity – quintals)

Crop	Quantity required	Quantity available	Percentage of demand supply gap between qty. required and quantity available	Quantity distributed	Percentage of demand supply gap between qty. required and quantity distributed	Percentage of demand supply gap between qty. available and quantity distributed
Sunflower	3.00	7.11	(-) 137.00	1.83	39.00	74.26
Groundnut	--	6.60	--	1.50	--	77.27
Soybean	4,925.00	4,164.00	15.45	3,744.00	23.98	10.09
Gram	1,260.00	1,376.70	(-) 9.26	1,058.20	16.02	23.14
Urad	10.00	0.40	96.00	0.40	96.00	---
Moong	10.00	9.53	4.70	3.28	67.20	65.58
Lentil	52.00	114.60	(-) 120.38	84,70	(-) 62.88	26.09
Arhar	125.00	89.28	28.58	41.55	66.76	53.46
Total	**6,385.00**	**5,768.22**	**9.66**	**4,935.46**	**22.70**	**14.43**

3.7.3 Maharashtra

3.7.3.1 Sangli District

In 1996-97 in this district the total quantity available was 7,376.23 quintals. Of this quantity 7342.11 quintals were distributed indicating that the entire quantity available except 0.46 per cent was distributed. For soybean, gram, urad and arhar entire quantity was distributed. In the case of moong except 3.72 per cent, an in groundnut except 2.89 per cent the rest of the quantity was distributed. In sunflower the quantity remained to be distributed was only 0.69 per cent (Table 3.42).

Table 3.42 Demand supply gap between quantity available and quantity distributed, Sangli district, Maharashra, 1996-97

(Quantity- quintals)

Crop	Quantity available	Quantity distributed	Percentage of gap between quantity available and quantity distributed
Sunflower	169.08	167.91	0.69
Groundnut	1,098.60	1,066.80	2.89
Soybean	5,630.57	5,630.57	--
Gram	262.10	262.10	--
Urad	117.95	117.95	--
Moong	30.94	29.79	3.72
Arhar	66.99	66.99	--
Total	**7,376.23**	**7,342.11**	**0.46**

In 1997-98 the quantity available was 7,854.56 quintals and the quantity distributed was 7464.25 quintals leaving a gap of 4.97 per cent between the quantity available and quantity distributed. The entire quantity of soybean available was distributed. In the case of urad the gap was highest (56.87 per cent) followed by moong (29.25 per cent). In groundnut the gap was 15.08 per cent. In sunflower, gram and arhar the percentage gap was less than 5.00 per cent (Table 3.43).

Table 3.43 Demand supply gap between quantity available and quantity distributed, Sangli district, Maharashra, 1997-98

(Quantity- quintals)

Crop	Quantity available	Quantity distributed	Percentage of gap between quantity available and quantity distributed
Sunflower	155.28	148.08	4.64
Groundnut	1,092.00	927.30	15.08
Soybean	5,769.90	5,769.90	--
Gram	351.10	344.50	1.88
Urad	316.00	136.30	56.87
Moong	100.00	70.75	29.25
Arhar	70.28	67.42	4.07
Total	**7,854.56**	**7,464.25**	**4.97**

3.7.3.2 Amravati District

In 1996-97 in this district the quantity available was 8,713.00 quintal and the quantity distributed was 7,962.00 quintals leaving a gap of 8.62 per cent. In the case of soybean the quantity distributed was more (0.11 per cent) than the quantity available. The gap was highest (54.82 per cent) in the case of sunflower followed by moong (38.23 per cent) and urad (14.29 per cent) In the case of arhar the gap was 7.95 per cent and in the case groundnut and gram the gap was less than 5.00 per cent (Table 3.44).

Table 3.44 Demand supply gap between quantity available and quantity distributed, Amravati district, Maharashra, 1996-97

(Quantity- quintals)

Crop	Quantity available	Quantity distributed	Percentage of gap between quantity available and quantity distributed
Sunflower	197.00	89.00	54.82
Groundnut	387.00	375.00	3.10
Soybean	5,474.00	5,480.00	(-) 0.11
Gram	584.00	562.00	3.77
Urad	245.00	210.00	14.29
Moong	1436.00	887.00	38.23
Arhar	390.00	359.00	7.95
Total	**8,713.00**	**7,962.00**	**8.62**

In 1997-98, in the district the quantity available was 15,272.00 quintals and the quantity distributed was 14,298.00 quintals. The gap between the quantity available and quantity distributed came to 6.38 per cent. In the case of soybean, as in 1996-97 the quantity distributed was higher than quantity available. The gap was largest (46.05 per cent) in moong followed by arhar (24.51 per cent), urad (23.37 per cent) and sunflower (20.24 per cent). The gap was very meagre (0.33 per cent) in the case of gram (Table 3.45)

Table 3.45 Demand supply gap between quantity available and quantity distributed, Amravati district, Maharashra, 1997-98

(Quantity- quintals)

Crop	Quantity available	Quantity distributed	Percentage of gap between quantity available and quantity distributed
Sunflower	84.00	67.00	20.24
Groundnut	418.00	418.00	--
Soybean	9,447.00	9,837.00	(-) 4.13
Gram	1,812.00	1,806.00	0.33
Urad	398.00	305.00	23.37
Moong	2,252.00	1,215.00	46.05
Arhar	861.00	650.00	24.51
Total	**15,272.00**	**14,298.00**	**6.38**

3.7.4 Distribution/ Sales of certified seed in Gujarat

3.7.4.1 Panchmahals District

The total distribution of certified seed in the district in 1996-97 was 5,763.00 quintals. Of this the major share (48.91 per cent) was of wheat followed by groundnut (22.56 per cent) and gram (10.93 per cent) (Table 3.46).

Table 3.46 Distribution of certified seed, Panchmahals district, 1996-97

Crop	**Quantity** (Quintals)	**% to total**
Bajra	42.00	0.73
Wheat	2,819.00	48.91
Paddy	242.00	4.20
Maize	79.00	1.37
Moong	145.00	2.52
Urad	127.00	2.20
Arhar	159.00	2.76
Gram	630.00	10.93
Groundnut P	220.00	3.82
K	1,300.00	22.56
Total	**5,763.00**	**100.00**

P = Pods, K= Kernel

In 1997-98 of the total quantity of seed distributed Wheat seed formed 41.49 per cent and groundnut seed 30.36 per cent. Moong seed formed 7.90 per cent and gram seed 6.62 per cent. Seed of other crops formed less than 5.00 per cent each (Table 3.47).

Table 3.47 Distribution of certified seed, Panchmahals district, 1997-98

Crop	**Quantity** (Quintals)	**% to total**
Bajra	35.38	0.56
Wheat	2,619.20	41.49
Paddy	312.50	4.95
Maize	156.34	2.48
Moong	498.60	7.90
Urad	121.54	1.92
Arhar	99.88	1.58
Gram	417.75	6.62
Groundnut P	135.00	2.14
K	1,916.80	30.36
Total	**6,312.99**	**100.00**

P = Pods, K= Kernel

3.7.4.2 Bhavnagar District

In 1996-97 the total quantity of seed distributed was 1,368.00 quintals. Of the total quantity wheat formed 34.36 per cent followed by bajra (34.21 per cent). Groundnut seed formed 18.06 per cent and moong seed 11.04 per cent. Seed of other crops formed less than 5 per cent each of the total seed distributed (Table 3.48).

Table 3.48 Distribution of certified seed, Bhavnagar district, 1996-97

Crop	**Quantity** (Quintals)	**% to total**
Bajra	468.00	34.21
Wheat	470.00	34.36
Moong	151.00	11.04
Urad	5.00	0.36
Arhar	6.00	0.44
Gram	21.00	1.53
Groundnut P	247.00	18.06
Total	**1,368.00**	**100.00**

P = Pods,

In 1997-98 the total quantity of seed distributed was 2,869.25 quintals. In that year also wheat seed formed highest (73.11) per cent of the total seed distributed. Bajra seed formed 11.43 per cent and groundnut seed 9.94 per cent. The percentage contribution of other crops seed was negligible (Table 3.49).

Table 3.49 Distribution of certified seed, Bhavnagar district, 1997-98

Crop	**Quantity** (Quintals)	**% to total**
Bajra	327.90	11.43
Wheat	2,097.60	73.11
Moong	101.18	3.53
Urad	22.22	0..77
Arhar	14.30	0.50
Gram	20.75	0.72
Groundnut P	285.30	9.94
Total	**2,869.25**	**100.00**

P = Pods,

3.7.5 Uttar Pradesh

3.7.5.1 Jhansi District

The total requirement of certified seed of pulses in the district in 1996-97 was 930.00 quintals. Against this the available seed was 1,429.00 quintals or 53.66 per cent more than the requirement. In gram and moong the available seed was more than requirement. In lentil the available seed was equal to requirement. In urad the percentage of gap was 47.78 and that in arhar, 25.00. In both the oilseeds of groundnut and soybean the available quantity was more than requirement to the extent of 134.70 and 26.87 per cent respectively (Table 3.50).

Table 3. 50 Requirement and availability of certified seed of pulses and oilseeds in Jhansi district, 1996-97

(Quantity – Quintals)

Crop	Requirement	Available	% of available to requirement
Gram	500.00	1,058.00	(-) 211.60
Lentil	230.00	230.00	100.00
Moong	70.00	88.00	(-) 125.71
Urad	90.00	43.00	47.78
Arhar	40.00	10.00	25.00
Total Pulses	**930.00**	**1,429.00**	**(-) 153.66**
Groundnut	50.00	117.00	(-) 234.70
Soybean	1,500.00	1,903.00	(-) 26.87
Total	**1,550.00**	**2,020.00**	**(-) 130.32**

In 1997-98 also the quantity of available seed was more than requirement. It was 11.74 per cent more in the case of pulses and 197.27 per cent more in the case of oilseeds. Among pulses the gap was largest in the case of moong (51.67 per cent). In the case of both the oilseeds of groundnut and soybean the quantities available were more than those required (Table 3.51).

Table 3.51 Requirement and availability of certified seed of pulses and oilseeds in Jhansi district, 1997-98

(Quantity – Quintals)

Crop	Requirement	Available	% of available to requirement
Gram	985.00	1,115.00	(-) 113.20
Lentil	250.00	250.00	--
Moong	60.00	29.00	51.67
Urad	70.00	66.00	5.61
Arhar	40.00	110.00	(-) 275.00
Total Pulses	**1,405.00**	**1,570.00**	**(-) 111.74**
Groundnut	50.00	99.00	(-) 198.00
Soybean	500.00	1,536.00	(-) 307.20
Total oilseeds	**550.00**	**1,635.00**	**(-) 297.27**

3.7.5.2 Agra district

In this district the seed of pulses available was only about 5 per cent less than that required. Among oilseeds sunflower seed availability was very acute as only 10 per cent of the required seed quantity was available. In the case of groundnut the situation was much better as 88.00 per cent of the required quantity was available. While in the case of arhar and lentil about 2/3 of the quantity required was available, in the case of gram the situation was better as 83.46 per cent of the requirement was met. (Table 3.52).

Table 3.52 Requirement and availability of certified seed of pulses and oilseeds, Agra district, 1996-97

(Quantity – Quintals)

Crop	Requirement	Available	% of available to requirement
Gram	260.00	217.00	83.46
Lentil	30.00	20.00	66.67
Moong	--	43.90	--
Urad	--	23.59	--
Arhar	90.00	58.00	64.44
Total pulses	**380.00**	**362.49**	**95.39**
Groundnut	85.00	74.80	88.00
Sunflower	100.00	9.90	9.90
Total oil seeds	**185.00**	**84.70**	**45.78**

In 1997-98 the availability of pulses seed was quite satisfactory as 94.08 per cent of the requirement was met. As far as oilseeds 85.58 per cent of the requirement was met by the available seed. In lentil, moong, urad and arhar the quantities available were more than the estimated requirement. In the case of gram, however, the quantity available was 52.00 per cent of the estimated requirement (Table 3.53).

Table 3.53 Requirement and availability of certified seed of pulses and oilseeds, Agra district, 1997-98

(Quantity – Quintals)

Crop	Requirement	Available	% of available to requirement
Gram	300.00	156.00	52.00
Lentil	50.00	57.00	(-) 114.00
Moong	50.00	53.00	(-) 112.00
Urad	20.00	56.00	(-) 280.00
Arhar	560.00	600.00	(-) 107.14
Total Pulses	**980.00**	**922.00**	**94.08**
Groundnut	100.00	99.90	99.90
Sunflower	43.80	23.16	52.88
Total oilseeds	**143.80**	**123.06**	**85.58**

3.8 Seed Replacement Ratio (SRR)

The Government of India has prescribed minimum SRR for various crops. Accordingly the seeds of different crops are required to be replaced. The replacement rate for hybrid crops is fixed at 100 per cent as the seeds have to be replaced every year. For other crops the rate is 5 to 15 per cent depending upon the nature of crops.

It was generally observed that SRR has generally been lower than the target.

The seed replacement ratio is calculated by following formula.

$$SRR = \frac{\text{Certified seed used}}{\text{Total seed used}} \times 100$$

On the selected farms of Indore district of Madhya Pradesh the SRR for soybean was 43.33 per cent. In Narsinghpur district of M.P., SRR for gram was 49.18 per cent. However, the SRR for total sample (both the districts) was less. The SRR for soybean was 25.33 per cent and that for gram was 48.70 per cent.

In Maharashtra SRR for gram for 1997-98 for the state as a whole was 3.55per cent. For Sangli district it was 3.18 per cent and for Amarvati district it was 1.28 per cent. For arhar the SRR for the state was 5.70 per cent. For the selected districts it was 1.00 and 2.83 per cent. In the case of moong the SRR for the state was 12.32 per cent. It was 0.68 and 10.63 per cent respectively for Sangli and Amaravati districts (Table 3.54).

Table 3.54 Seed Replacement Ratio (SRR) in selected districts and Maharastra state for different crops 1997-98

(Figures- Per cent)

Crop	Sangli district	Amarawati District	Maharashtra State
Gram	3.18	1.28	3.55
Arhar	1.00	2.83	5.70
Moong	0.68	10.63	12.32
Urad	0.67	7.74	29.01
Groundnut	2.67	1.67	2.16
Sunflower	10.55	12.05	12.84
Soybean	13.13	5.57	9.65

In Rajasthan the formula for calculating SRR was –

$$SRR = \frac{\text{Quantity of seed used of a crop}}{\text{Total area under the crop x Recommended seed rate}}$$

In the case of hybrids the seed should be replaced every year. In the case of non hybrids the seed should be replaced after 3 years. For cross pollinated crops the seed should be replaced every 4 years.

It was noted that targeted SRR was not achieved for any crop for any year. Non availability of quality seed in time was the main reason of low SRR. Another reason was high cost of quality seed. Some farmers thought that no significant gain is achieved from the replacement of seed. The conversion ratio of seed of breeders seed to foundation seed for 1997-98 for groundnut was 1:9.24. For soybean it was 1:14.42 and for mustard it was 1:38.00 (Table 3.55).

Table 3.55 Conversion ratio of breeder seed into foundation seed Rajasthan, 1997-98

S.No.	Crop	Conversion ratio
1	Groundnut	1:9.24
2	Soybean	1:14.42
3	Mustard	1:38.00
4	Urad	1:21.28
5	Moong	1:12.35
6	Arhar	1:15.92
7	Gram	1:36.20

The reasons for low conversion ratio were :

1. Crop damage due to climatic conditions.
2. Lack of irrigation
3. Non application of desired levels of inputs.
4. Bad quality of seed.
5. Non adoption of recommended practices.

In Uttar Pradesh, the target of SRR for VIII plan for urad was 17.92. Against this SRR in 1997-98 was 5.38. The target SRR for moong in VIII plan was 26.27. The SRR achieved was 12.69 In arhar the target SRR for VIII plan was 15.00 but the achievement was 5.97. In gram against the target of 4.00 per cent fixed during VIII plan the achievement in 1997-98 was 1.91 per cent. As

regards lentil the target of SRR for VIII plan was 5.00 per cent but the achievement was only 1.31 per cent Similar situation existed in the case of other crops of groundnut, soybean and sunflower. Against the SRR fixed of 3.00, 70.00 an 100.00 per cent the achievement was 0.75, 21.72 and 65.51 per cent respectively (Table 3.56)

Table 3.56 Target SRR fixed for VIII plan and achievement of SRR for different crops in 1997-98, Uttar Pradesh

Crop	Seed Replacement Ratio	Target of SRR in VIII plan
Urad	5.38	17.92
Moong	12.69	26.27
Arhar	5.97	15.00
Gram	1.91	4.00
Lentil	1.31	5.00
Groundnut	0.75	3.00
Soybean	21.72	70.00
Sunflower	65.51	100.00

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CHAPTER IV

LINKAGES BETWEEN DIFFERENT SEED PRODUCING AGENCIES, MONITORING AND SUGGESTIONS

The State Agriculture Departments and State Seeds and Farms Development Corporations are mainly concerned with production and distribution of quality seeds. In this chapter linkages between the production of breeders' seed, foundation seed and certified seed are studied.

4.1 Breeders' Seed

Breeders' seed is the first stage of production of seed. High genetic purity in breeders seed is essential as even small amount of mistaken genetic identity will be greatly magnified to certified seed. The State Agricultural Universities produce breeders' seed besides other institutions. The breeders' seed plot is monitored by a team of specialists consisting of Senior Scientist, Breeder, representative of State Seed and Farms D.C., State Seed Certification Agency and Department of Agriculture. However, the State Government can not procure the breeders' seed from the Universities. The State Government assesses the requirement of certified seed. From the requirement of certified seed the requirement of foundation seed is assessed. Lastly on the basis of requirement of foundation seed the demand for breeders seed is assessed cropwise and variety wise and submitted to the Ministry of Agriculture, Govt. India, New Delhi.

To assess the demand for different types (certified, foundation and breeders' seed) of seed a meeting is convened by the State Government every year. In this meeting officials of concerned departments and institutions like State Agricultural Universities, State Agricultural Marketing Federation, National Seed Corporation, Farmers' Association, State Seeds and Farms Development Corporation, etc. participate.

While putting up the demand for cropwise and varietywise of certified seed factors like capacity of the state farms and farms of the State Seeds & F.D.C. for producing foundation seed, demand for foundation seed, and seed replacement ratio etc. are considered. Breeders' seed to the state is also allotted from other states.

After the allotment the breeders' seed is lifted by state department of agriculture. Many a times the entire breeders seed is not lifted.

These problems w.r.t. breeders seed can be solved by proper planning and more importantly by better coordination between breeder's seed producing agencies and foundation seed producing agencies and the state department of agriculture.

4.2 Foundation Seed

This is the second stage in the linkage. The foundation seed is produced by state department farms and the farms of State Seeds & F.D.C., etc. Frequent visits to the farms by concerned authorities are needed specially at the time of sowing, harvesting and processing.

The reasons for demand supply gap in foundation seed are : natural calamities like rainfall (shortage and excess), lower seed multiplication ratio (SMR), pests and diseases, shortage in availability of breeders' seed and above all farm management efficiency.

5. Certified Seed

This is the third and final stage in linkage. The State Seed Certification Agency and seed testing laboratories are mainly concerned with certified seed

production besides the certified seed growers. Certified seed production must not exceed two generations beyond foundation seed so as to maintain genetic purity and identity.

At the certified seed farmer's level factors like availability of infrastructure facilities like irrigation, equipments, fertilisers, pesticides, seed storage facilities, seed multiplication ratio (SMR) etc. contribute to the success or failure. Besides these following factors are also responsible for better quality of certified seed.

1) The crop should be grown in a field which satisfied the prescribed land requirement as to previous crops to prevent contamination by volunteer plants and disease spread by pathogens.

2) The crop should be raised from seed whose source is approved.

3) The crop should be provided with the prescribed isolation.

4) The crop should be properly rogued

5) The crop should be harvested properly to avoid mechanical admixure

4.4 Monitoring of Seed Supply

Monitoring of certified seed supply is done by the State Department of Agriculture in close coordination with State Seeds and F.D.C. and State Seed Certification Agency alongwith seed testing laboratories. The extent of achievement of SRR prescribed by Ministry of Agriculture can be termed as one of the indications of extent of monitoring. It was observed that SRR in most of the crops was lower in the states. The reasons for non achieving of SRR were weather and soil conditions.

However, defective management of seed multiplication at different stages is not completely ruled out.

In the chain of supply of seed time factor is very important. Time gap between placement of indent and supply of seed, or late lifting of seed, and late supply of foundation seed to growers affect production.

The selling points of certified seed should be near to the villages. Farmers hesitated to go to far away selling points to avoid transportation cost. The subsidy offered by government should be increased.

Due to lack of proper communication and coordination between producing and supplying agencies many varieties do not get popularity. Two fulfledged meetings are convened at the state headquarters to review the production and distribution of various kinds of seeds and plan for next year. All the concerned departments, divisions/ Institutes/ universities are invited to attend these meetings.

We suggest that the meetings be more frequently held so that all the participants in the meeting would know the stage and condition of the selected crops in between sowing and harvesting.

In addition to above mentioned state level meetings, workshops and seminars be arranged of 2 to 3 days duration at different seed production units so that all concerned get the first hand knowledge of crop conditions in particular division of the state.

Two meetings are held at all India level at New Delhi. These meetings serve as tool to monitoring the programme in different states. We suggest that additional meetings, seminars and workshops be held so that scientists of a state know more about the programme implemented in other states and also get the knowledge, seed production techniques used by their counterparts in other states.

4.5 Suggestions

In the process of seed production attention must be paid to maintenance of genetic purity and other qualities of the varieties. The crop varieties are being grown under different environmental influences with regard to ecological conditions. It is essential to go for rogueing operations. It is essential to maintain the genetic purity of seed stock in large scale multiplications and ensuring conformity to the original types. One has to retain the relationships of small amount of nucleus seed with that originally selected by plant breeders and the certified seed marketed to the farmers. The entire seed production programme should be in the hands of qualified plant breeders and highly skilled technical personnel. Genotype x environment interaction may also affect the maintenance of genetic purity of a variety. If the crop varieties are grown in environment other than that where varieties have been selected will affect the genetic purity of variety. Environment also has major effect on population behaviour and varietal maintenance. The factors influencing fast progress of seed sector are following.

1. Administrative Coordination

The Directors of Agriculture of states should act as nodal officers for the state. He should have a control of public and private agencies involved in seed industry. Fortnightly meetings should be arranged with all the agencies to

discuss production, marketing, availability and distribution of seeds of all crops. The indented quantities of breeder/ foundation seed should be available to private sector with the condition that the seed would be multiplied and sold in the state itself. Changes in governments and personnel resulted in new policies and strategies which weakned the seed sector.

There is a need for closer coordination between plant breeders, scientists of crop research, extention officials, leaders of farmers' organisations, Managers of Seed Corporations, Oil Federation, Certification Officers, Seed Growers, Seed retailars and farmers.

2. Varietal Replacement

Varietal replacement component is very weak in crops like wheat, paddy, maize, etc. There is need to bring awareness among farmers with respect to recently released varieties. There is need for the production of identified varieties before their release and notification. In the normal course, after identification, varieties are released and notified. The seed production chain starts from the purification of improved varieties to meet the seed certification standards of genetic purity. Later on nucleus, breeder, foundation and certified seeds are produced. The variety development programme itself requires minimum 10 to 13 years. The breeder pays more attention to the development of variety and its release but not to the genetic purity of the variety that is being given for the production of breeder seed. Premature release of varieties creates problem in seed production chain.

3. Personnel Development and Training Alternatives

Human resource development is the most important factor in strengthening the seed sector. Attention must be paid to the selection of people for their training.

The seed sector needs physical, financial and human resources to grow and develop.

Steps to be taken by state Governments

A strong support is needed from the State Govt. to develop a dynamic seed sector. Crop research can strengthen or weaken a seed sector.

Following steps be taken-

1) Develop a quick system for release and introduction of new varieties

2) Detailed description be given of varieties under seed production chain

3) Early exchange of germ plasm with other states, countries, etc.

4) Import of best planting material for testing and multiplication

5) Increased cooperation with private seed sector in crop research to deal with specific problems.

6) Seed Replacement Rates :

The seed replacement rates fixed by the experts group is up to 15% and for hybrids, 100%. National Commission on Agriculture fixed the target of seed replacement rate of 33% and for hybrids, 100%. However, the seed replacement rate for all the selected states is low in all the crops. Efforts should be made to increase the seed replacement rates in all the major crops. This will increase production and productivity.

7) The Conversion factor :

The conversion factor of breeder seed to certified seed is extremely low for majority of crops. There is need to increase the conversion factor so

that the valuable breeder seed is properly utilised and reaches the farmers in adequate quantities. The low seed multiplication rates at the level of foundation/ certified seed will create recurring short falls in the seed distribution.

8) Make available breeder seed to seed multipliers

9) Good technical (extension) support to all concerned by imparting training.

10) Favourable credit for infrastructure and working capital

11) Use of equipments and storage facilities

12) Increasing the use of good seed of improved varieties requires coordination among research, extension and seed sector.

13) The pricing of seed is critical for the better use of seed. The most successful method of pricing of seed includes all costs of production and allow for profits so that industry can invest for its growth.

14) Inadequate financial support to seed sector results in weak programme and low staff moral. There is need to establish review teams representing all facets of seed sector. These review teams should develop long term plans for seed sector so that goals can be set and measures to achieve the goals can be planned. The measures become the policy guidelines. Review teams should assess the seed programme from time to time and make recommendations.

15) Seed programme often suffers from lack of continuity in goals, policies and strategies. This weakness results from changes in the government or changes in personnel. There is no basic/ fundamental structure to assure needed continuity such as State Seed Board. This should be established.

16) The demand of breeder seed should be based on adequate feed back from villages and districts.

17) Efforts be made to lift the entire produce of breeder seed.

18) A joint monitoring mechanism under the chairmanship of Director of Agriculture be set up.

19) In order to ensure proper, timely and adequate supply of certified seed there should be close coordination between SAUs, ICAR, NSC, SFCI and Directorate of Agriculture of States.

20) These institutions should be well acquainted with the current choice of farmers.

21) Frequent workshops in different parts of the states should be held. Training be imparted in processing, packing and storage to avoid wastage of costly seed.

22) The scientists need training in foreign countries and collaboration with these countries.

23) Exchange of information and experience among the different research stations involved in producing new varieties will be useful. More number of seminars, meetings and workshops should be organised.

24) During transportation of seed particularly soybean, utmost care should be taken so that seed quality is not adversely affected due to breakage etc.

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CHAPTER- V
ANALYSIS OF DATA OF SELECTED FARMS

As mentioned earlier this coordinated report gives findings of six states and 12 districts surveyed by six Agro-Economic Research Centres.

This chapter analyses data of selected farmers, giving their economic characteristics, requirement and availability of certified seeds, sources of seeds, and difficulties faced by them and suggestions offered.

5.1 Size of Holdings

The average size of holdings for participants of Anantpur district was 3.83 hectares. It was 3.43 hectares for non- participants. In Kurnool district the average size for participants was 5.88 hectares and that for non participants, 6.70 hectares. The largest size of holding was noted in Maharashtra. While the average size for participants of Sangli district was 9.80 hectares that of non-participants was 9.83 hectares. In Amaravati district the average size for both participants and non-participants was 11.00 hectares (Table 5.1).

Table 5.1 Average size of holdings

(Area - hectares)

Total operated area	**Anantpur**		**Kurnool**	
	Participants	Non-participants	Participants	Non-participants
Andhra Pradesh	3.83	3.43	5.88	6.70
	Sangli		**Amravati**	
Maharashtra	9.80	9.83	11.00	11.00
	Indore		**Narsinghpur**	
Madhya Pradesh	3.53	3.11	1.68	3.07
	Kota		**Bharatpur**	
Rajasthan	5.39	4.99	4.67	6.15

5.2 Cropping Pattern

The crops were grouped into four classes of cereals, pulses, oilseeds and others. It was generally noted that the cropping pattern was cereals and pulses oriented. In Gujarat the cropping pattern in Panchmahals district was cereals oriented. In Bhavnagar district, however, cereals and oilseeds shared about equal percentage each (31 to 37 per cent) (Table 5.2).

Table 5.2 Cropping pattern of participant and non- participant farms, selected farms, Gujarat

(Figures - percentage)

Crop group	Panchmahals		Bhavnagar	
	Participants	Non-participants	Participants	Non-participants
Cereals	58.61	73.83	37.08	36.58
Pulses	17.90	07.07	11.93	03.82
Oilseeds	12.96	17.66	32.02	31.57
Others	10.63	1.44	18.96	28.03
Total	**100.00**	**100.00**	**100.00**	**100.00**

In Maharashtra in Sangli district the percentage of area under "other" crop group was more than 70.00. In Amarawati district while the percentage of area under other crop group was between 57 to 59 that under pulses was 37 (Table 5.3).

Table 5.3 Cropping pattern of participant and non- participant farms, selected farms, Maharashtra

Crop group	Sangli		Amravati	
	Participants	Non-participants	Participants	Non-participants
Pulses	7.96	15.57	36.42.00	37.36
Oilseeds	21.61	11.51	4.26	5.02
Others	70.43	72.92	59.32	57.62
Total	**100.00**	**100.00**	**100.00**	**100.00**

In Madhya Pradesh in Indore district area under oilseeds contributed around 48.00 per cent, that under cereals in the case of participant was 31.00 and under others under non-participants was 37.00. In Narsinghpur district cropping pattern on participants and non-participants varied considerably. While on participants area under pulses contributed 47.00 per cent that on non-participants oilseeds contributed 50.01 per cent (Table 5.4).

Table 5.4 Cropping pattern on participant and non- participant farms, selected farms, Madhya Pradesh

(Figures - percentage)

Crop group	Indore		Narsinghpur	
	Participants	Non-participants	Participants	Non-participants
Cereals	31.03	12.00	20.34	27.59
Pulses	11.32	2.46	47.23	22.40
Oilseeds	48.36	48.23	31.70	50.01
Others	9.29	37.31	10.73	---
Total	**100.00**	**100.00**	**100.00**	**100.00**

In Rajasthan in Bharatpur district the cropping pattern of participants and non participants was about same with cereals contributing more than 50.00 per cent of area and pulses contributing between 25.00 to 32.00 per cent of the area. In Kota district participant farms had as high as 64.17 per cent of the cropped area under oilseeds. On the non participant farms, on the other hand, cereals and oilseeds contributed about 45.00 per cent each (Table 5.5).

Table 5.5 Cropping pattern on participant and non- participant farms, selected farms, Rajasthan

(Figures - percentage)

Crop group	Bharatpur		Kota	
	Participants	Non-participants	Participants	Non-participants
Cereals	51.44	57.75	29.97	42.37
Pulses	31.82	24.56	2.54	2.06
Oilseeds	13.42	11.15	64.17	47.22
Others	3.32	6.54	3.32	8.35
Total	**100.00**	**100.00**	**100.00**	**100.00**

In Uttar Pradesh on participant farms cereals occupied 44.28 per cent and pulses occupied 34.51 per cent. On the non-participant farms while cereals occupied 47.22 per cent of the area pulses and oilseeds occupied 24.06 and 22.42 per cent respectively (Table 5.6).

Table 5. 6 Cropping pattern on participant and non- participant farms, selected farms, Uttar Pradesh

(Figures - percentage)

Crop group	Participants	Non-participants
Cereals	44.28	47.22
Pulses	34.51	24.06
Oilseeds	14.60	22.42
Others	6.61	6.30
Total	**100.00**	**100.00**

5.3 Average yield of Study Crops

In Gujarat the average yield of arhar for the state was 749 kg. per ha. On the participant farms of Panchmahals district the yield was more than one and half times the state average. On non-participant farms the yield on irrigated farms was lower than the state average but that on unirrigated farms was higher. The yield of gram for the state as a whole was 801 kg. per ha. On the selected farms the yield was higher than the state figure for both Panchmahals and Bhavnagar districts. The yield of groundnut for the state was 1,358 kg./ ha. The yield on selected farms was lower in Bhavnagar district for both participant and non-participant farms. The yield was higher than the state only for participant irrigated farms of Panchmahals district (Table 5.7).

Table 4.7 Average yield of study crops participant and non participant farms, selected farms, Gujarat

(Figures - Kg. per ha.)

Crop	Panchmahals				Bhavnagar				Average yield for the state
	Participants		Non-participants		Participants		Non-participants		
	Irrigated	Un-irrigated	Irrigated	Un-irrigated	Irrigated	Un-irrigated	Irrigated	Un-irrigated	
Arhar	1,209	1,768	366	847	--	--	--	--	749
Moong	715	738	706	--	875	592	881	494	---
Urad	596	--	--	--	1,000	578	607	625	--
Gram	815	--	1,042	--	--	1,006	---	---	801
Groundnut	1,805	--	1,090	643	1,294	1,065	1,275	1,049	1,358

In Maharashtra for groundnut the average yield for the state was 1,063 kg. per ha. On both participant and non participant farms the yield was much higher than the state. In the case of soybean also the yield on participant and non-participant farms was more than double that of state average. In the case of arhar and gram also the yields on participants and non-participant farms were manifold that of state average (Table 5.8).

Table 5.8 Average yield of study crops, participant and non-participant farms, selected farms, Maharashtra

(Figures- kg. per ha.)

Crop	Participant	Non- participant	State
Groundnut	1,375	1,533	1,063
Soybean	2,975	2,392	988
Arhar	2,425	1,985	353
Gram	1,270	985	407

In Rajasthan the average yield of gram for the state was 869 kg.per ha.. In both districts of Bharatpur and Kota the yields on both participants and non participants farms of non participants were higher than the state average except un irrigated farms of non participants of Bharatpur district, In the case of soybean the yield in Kota district on participant and non participant irrigated farms was higher than the state average. However the yield on unirrigated participant farms was lower than the state average (Table 5.9),

Table 5.9 Average yield of study crops, participant and non-participant farms, selected farms, Rajasthan

(Figures- kg.per ha.)

Crop	Bharatpur				Kota				State average
	Participant		Non- participant		Participant		Non- participant		
	Irrigated	Un-irrigated	Irrigated	Un-irrigated	Irrigated	Un-irrigated	Irrigated	Un-irrigated	
Gram	1,890	1,640	1,050	860	1,530	--	1,050	---	869
Lentil	1,930	--	1,410	---	--	---	1,110	---	---
Moong	---	680	---	---	770	---	---	---	---
Arhar	---	770	---	740	--	1,360	---	---	---
Urad	---	930	---	---	1,250	---	880	---	---
Soybean	---	---	---	---	1,880	1,030	1,410	---	1,265

In Uttar Pradesh the average yield for the state for arhar was 1,032 kg. per ha. On both participant and non-participant farms the yield was more than one and half times that of the state average. Similarly the yield of gram on both participant on non-participant farms was nearly one and half times that of state average. While, soybean was grown only on participant farms, groundnut was grown only by non-participant farms. In both the cases the yields were much higher than the state average (Table 5.10).

Table 5.10 Average yield of study crops, participants and non-participant farms, selected farms, Uttar Pradesh

(Figures - kg. per ha.)

Crop	Participant	Non-participant	Average yield for the state
Moong	484	487	---
Urad	347	475	---
Arhar	1,620	1,503	1,032
Gram	1,240	1,120	847
Lentil	887	600	---
Groundnut	---	1,384	874
Soybean	1,556	---	989

5.4 Requirement and availability of Certified Seed

In Maharashra the total requirement of seed was 1,832 kg. The quantity available equalled the total requirement. Therefore, the entire requirement was easily met by seed available (Table 5.11).

Table 5.11 Requirement and availability of quality seeds of pulses and oilseeds on selected farms, Maharashtra

(Seed - Qty in kg.)

Crop	Total seed required	Total seed available	Percentage of seed available to total seed required.
Gram	534.00	534.00	100.00
Tur	270.00	270.00	100.00
Groundnut	180.00	180.00	100.00
Soybean	848.00	848.00	100.00
Total	**1,832.00**	**1,832.00**	**100.00**

In Uttar Pradesh the total seed requirement on participant farms was 12,613 kg. Against this, the quantity of seed available was 7,296 kg. Thus, the percentage of quantity of seed available to quantity required was 57.85. Among different crops the availability was very good for arhar and soybean seed. While the entire quantity of seed required for arhar was made available, 98.02 per cent of the soybean seed required was available. The availability of gram seed was comparatively poor (36.67 per cent). On the non participant farms of the total quantity required of 5,745 kg. no quantity was made available (Table 5.12).

Table 5.12 Requirement and availability of certified seed of pulses and oilseeds on participant and non-participant farms, selected farms, Uttar Pradesh

(Seed- Qty. in kg.)

Crop	Participant			Non- participant		
	Total seed required	Total seed available	Percentage of total seed available to total seed required	Total seed required	Total seed available	Percentage of total seed available to total seed required
Gram	5,748	2,108	36.67	2,776	---	---
Lentil	852	675	79.23	6	---	----
Moong	586	---	---	180	---	---
Urad	824	---	---	678	---	---
Arhar	69	69	100.00	115	---	---
Soybean	4,534	4,444	98.02	---	---	---
Groundnut	---	----	----	1,990	---	---
Total	12,613	7,296	57.85	5,745	----	---

5.5 Sources of Seed Supply

The main sources of seed are : owned, exchanged, borrowed and purchased. Among the quantity purchased part of it was certified seed and partly purchased from other sources. The certified seed was obtained from either Govt. recognised agencies or cooperatives.

In Indore district of Madhya Pradesh on participant farms 81.70 per cent was owned seed. About 17.00 per cent was purchased seed shared equally by certified seed supplied by government agencies and private suppliers.

In the case of soybean 51.78 per cent of seed was owned and 43.33 per cent was certified seed purchased from government and cooperative agencies. In the case of gram 82.39 per cent of the seed was owned and the remaining 17.61 per cent was from other sources. In the case of wheat 96.47 per cent was owned seed and only 1.92 per cent was certified seed (Table 5.13).

Table 5.13 Sources of seed supply, participant selected farms, Indore district, M.P. 1997-98

(Quantity - Kg.)

Crop	Owned	Exchanged	Borrowed	Purchased		Total
				Certified Govt. agencies	From other sources	
Soybean	4,770.00 (51.78)	250.00 (2.71)	---	3,992.00 (43.33)	200.00 (2.17)	9,212.00 (100.00)
Gram	1,310.00 (82.39)	---	---	---	280.00 (17.61)	1,590.00 (100.00)
Lentil	30.00 (100.00)	---	---	---	---	30.00 (100.00)
Total selected Crops	6,110.00 (56.41)	250.00 (2.31)	---	3,992.00 (36.85)	480.00 (4.43)	10,832.00 (100.00)
Jowar (Fodder)	10.00 (100.00)	---	---	--	---	10.00 (100.00)
Maize	44.00 (100.00)	---	---	---	---	44.00 (100.00)
Marigold	0.850 (100.00)	---	---	---	---	0.850 (100.00)
Wheat	6,010.00 (96.47)	100.00 (1.61)	---	120.00 (1.92)	---	6,230.00 (100.00)
Pea (Arkil)	--- ---	--- ---	--- ---	25.00 (50.00)	25.00 (50.00)	50.00 (100.00)
Potato (Jyoti)	20,620.00 (85.49)	---	---	---	3500.0024 (14.51)	24,120.00 (100.00)
Garlic	100.00 (100.00)	---	---	---	---	100.00 (100.00)
Total other Crops	32,794,85 (89.04)	200.00 (0.54)	---	265.00 (0.72)	2,530.00 (19.60)	36,789.85 (100.00)
Grand Total	38,904.85 (81.70)	450.00 (0.94)	---	4,257.00 (8.94)	4,010.00 (8.42)	47,621.85 (100.00)

(Figures in parentheses are percentages)

On non participant farms of Indore district 26.51 per cent of the seed was owned and 73.49 per cent of the seed was purchased from other sources. Among different crops, larger percentage of seed purchased from other sources

was for vegetable crops like potato (78.95), garlic (78.45) and other vegetables (100.00). Similarly, seed of berseem was totally purchased from other sources. Soybean seed was owned to the extent of 76.41 per cent and gram seed was totally owned (Table 5.14).

Table 5.14 Sources of seed supply, non participant selected farms, Indore district, M.P. 1997-98

(Quantity - kg.)

Crop	Owned	Exchanged	Borrowed	Purchased		Total
				Certified	From other sources	
Soybean	5,005.00 (76.41)	---	---	---	1,545.00 (23.59)	6,550 (100.00)
Gram	225.00 (100.00)	---	---	---	---	225.00 (100.00)
Total selected Crops	5,230.00 (77.20)	---	---	---	1,545.00 (22.80)	6,775.00 (100.00)
Jowar	10.00 (100.00)	---	---	---	---	10.00 (100.00)
Wheat	1,565.00 (83.91)	---	---	---	300.00 (16.09)	1,865.00 (100.00)
Potato	16,500 (21.05)	---	---	---	61,900.00 (78.95)	78,400.00 (100.00)
Garlic	500.00 (21.55)	---	---	---	1,820,00 (78.45)	2,320.00 (100.00)
Other vegetable crops	---	---	---	---	428.00 (100.00)	428.00 (100.00)
Berseem		---	---	---	5.00 (100.00)	5.00 (100.00)
Total other Crops	18,575.00 (22.37)	---	---	---	64,453.00 (77.63)	83,028.00 (100.00)
Grand Total	23,805.00 (26.50)	---	---	---	65,998.00 (73.49)	89,803.00 (100.00)

In Narsinghpur district on participant farms 50.00 per cent of the seed used was owned seed and 28.05 per cent was seed exchanged. The certified seed purchased from government and cooperative agencies formed 20.62 per cent. In the case of soybean 59.86 per cent was owned and 36.71 per cent was exchanged. In the case of gram nearly half (49.18 per cent) of the seed was certified seed purchased from government and cooperative agencies. While owned seed formed 29.69 per cent, exchanged seed formed 21.13 per cent. Jowar and wheat seeds were mainly owned and exchanged (Table 5.15).

Table 5.15 Sources of seed supply, participant selected farms, Narsinghpur district, M.P. 1997-98

(Quantity - kg.)

Crop	Owned	Exchanged	Borrowed	Purchased		Total
				Certified	From other sources	
Soybean	1,745.00 (59.86)	1,070 (36.71)	100.00 (3.43)	---	---	2,915 (100.00)
Gram	815.00 (29.69)	580.00 (21.13)	---	1,350.00 (49.18)	---	2,745.00 (100.00)
Urad	10.00 (90.91)	1.00 (9.09)	---	---	---	11.00 (100.00)
Moong	15.00 (93.75)	1.00 (6.25)	---	---	---	16.00 (100.00)
Lentil	15.00 (100.00)	---	---	---	---	15.00 (100.00)
Arhar	51.00 (92.73)	4.00 (7.27)	---	---	---	55.00 (100.00)
Total selected crops	2,651.00 (46.05)	1,656.00 (28.76)	100.00 (1.74)	1,350.00 (23.45)	---	5,757.00 (100.00)
Jowar	12.00 (85.71)	2.00 (14.29)	---	---	---	14.00 (100.00)
Wheat	1,015.00 (60.96)	450.00 (27.03)	---	200.00 (12.01)	---	1,665.00 (100.00)
Batri	80.00 (100.00)	---	---	---	---	80.00 (100.00)
Tomato	---	---	---	---	0.300 (100.00)	0.300 (100.00)
Other crops	1,107.00 (62.92)	452.00 (25.69)	---	200.00 (11.37)	0.300 (0.02)	1,759.300 (100.00)
Grand Total	3,758.00 (50.00)	2,108.00 (28.05)	100.00 (1.33)	1,550.00 (20.62)	0.300 (0.03)	7,516.300 (100.00)

On non- participant farms of Narsinghpur district as high as 92.83 per cent was owned seed and 5.59 per cent was exchanged seed. In the case of soybean, lentil, wheat and paddy more than 75.00 per cent of seed was owned and the remaining was exchanged. Gram, urad, arhar and sun flower seeds were totally owned (Table 5.16).

In Panchmahals district of Gujarat, on participant farms all the farmers growing moong, used seed from private traders. In the case of groundnut 66.67 per cent of the farmers purchased seed from private traders, 23.81 per cent farmers took seed from village cooperatives.

Table 5.16 Sources of seed supply, non participants, selected farms, Narsinghpur district, M.P. 1997-98

(Quantity - kg.)

Crop	Owned	Exchanged	Borrowed	Purchased		Total
				Certified	From other sources	
Soybean	52.95 (89.82)	4.00 (6.79)	---	---	2.00 (3.39)	58.95 (100.00)
Gram	26.90 (100.00)	---	---	---	---	26.90 (100.00)
Urad	0.05 (100.00)	---	---	----	---	0.05 (100.00)
Lentil	0.61 (75.31)	0.20 (24.69)	----	---	---	0.81 (100.00)
Arhar	0.04 (100.00)	---	---	---	---	0.04 (100.00)
Sunflower	0.40 (100.00)	---	---	---	---	0.40 (100.00)
Wheat	35.20 (93.37)	2.50 (6.63)	---	---	----	37.70 (100.00)
Paddy	1.65 (80.49)	0.40 (19.51)	---	---	2.00 (1.58)	126.00 (100.00)
Grand Total	117.80 (92.83)	7.10 (5.59)	---	---	2.00 (1.58)	126.90 (100.00)

In Panchmahals district of Gujarat, on participant farms, all the farmers growing moong used seed from private traders. In the case of groundnut 66.67 per cent of the farmers purchased seed from private traders, 23.81 per cent farmers took seed from village cooperatives.

On non- participant farms all the farmers growing arhar used own seed and 90.91 per cent farmers growing groundnut used owned seed (Table 5.17).

Table 5.17 Number of farmers purchasing seeds sourcewise, Panchmahals district, Gujarat

(Figures- number)

Crop	Participant				Non-participant		
	Taluka Sangh	Village cooperative	Private traders	Total	Owned	Purchased	Total
Arhar	03 (23.08)	---	10 (76.92)	13	14 (100.00)	---	14
Moong	---	---	22 (100.00)	22	01 (100.00)	---	01
Urad	02 (28.57)	---	5 (71.43)	07	---	---	---
Gram	---	2.00 (20.00)	8 (80.00)	10	01 (100.00)	---	01
Groundnut	02 (9.52)	05 (23.81)	14 (66.67)	21 (100.00)	10 (90.91)	01 (9.09)	11 (100.00)

In Bhavnagar district of Gujarat among participants, 75.00 per cent farmers growing moong used seed took from Taluka Sangh, 60.00 per cent farmers growing urad used seed purchased from private traders and 40.00 per cent of the farmers took seed from Taluka Sangh. In the case of gram the proportion of farmers taking seed from private traders was 66.67 and that of farmers taking seed from Taluka Sangh was 33.33 per cent. In the case of non-participant farmers those growing moong and urad were mainly dependent on seed taken from private agencies, (Table 5.18).

Table 5.18 Number of farmers purchasing seeds sourcewise, Bhavnagar district, Gujarat

(Figures - Number)

Crop	Participant				Non- participant		
	Taluka sangh	Village coop.	Private traders	Total	Owned	Purchased	Total
Moong	06 (75.00)	---	02 (25.00)	08	02 (15.38)	11 (84.62)	13
Urad	02 (40.00)	---	03 (60.00)	05	01 (25.00)	03 (75.00)	04
Gram	01 (33.33)	---	02 (66.67)	03	---	---	---
Groundnut	---	11 (47.83)	12 (52.17)	23	08 (53.33)	07 (46.67)	15

In Sangli district of Maharashtra more than 75.00 per cent of the adopter farmers took seed from government agencies and the remaining farmers took it from the private traders.

In the case of non adopters 86.67 per cent of the groundnut growing farmers used owned seed and 57.14 per cent of the soybean growing farmers did so (Table 5.19).

Table 5.19 Sourcewise use of seed by the sample farmers in Sangli district, Maharashta

(Figures - Number)

Crop	Adopters			Non- Adopters		
	Government	Traders	Total	Cooperative	Owned	Total
Groundnut	06 (75.00)	02 (25.00)	08	02 (13.33)	13 (86.67)	15
Soybean	24 (80.00)	06 (20.00)	30	03 (42.86)	04 (57.14)	07

In Amravati district more than 75.00 per cent of the arhar and gram growing farmers depended on government agencies. The remaining farmers depended on private traders.

In the case of non-adopters all the farmers growing arhar used own seed and 75.00 per cent of the gram growing farmers did so (Table 5.20).

Table 5.20 Sourcewise use of seed by the sample farmers in Amravati district, Maharashta

(Figures - Number)

Crop	Adopters			Non- Adopters		
	Government	Traders	Total	Cooperatives	Owned	Total
Arhar	22 (81.48)	05 (18.52)	27	---	17 (100.00)	17
Gram	20 (76.92)	06 (23.08)	26	04 (25.00)	12 (75.00)	16

In the case of participants of Bharatpur district of Rajasthan majority of the farmers depended on private traders for seeds of gram, arhar, lentil and moong.

In the case of non-participant farmers majority of them used owned seed (Table 5.21).

Table 5.21 Sourcewise use of seed by the participant and non-participant farmers, Bharatpur district, Rajasthan

(Figures - Number)

Crop	Participant					Non- participant				Total
	Owned	Borrowed/ Exchanged	Cooperatives	Private traders	Total	Owned	Borrowed/ Exchanged	Cooperatives	Private traders	
Gram	07 (38.89)	04 (22.22)	01 (5.56)	06 (33.33)	18 (100.00)	07 (43.75)	03 (18.75)	---	06 (37.50)	16 (100.00)
Arhar	03 (42.85)	---	---	04 (57.15)	07 (100.00)	02 (50.00)	01 (25.00)	---	01 (25.00)	04 (100.00)
Lentil	04 (44.44)	---	01 (11.11)	04 (44.45)	09 (100.00)	---	01 (33.33)	---	02 (66.67)	03 (100.00)
Moong	---	---	01 (50.00)	01 (50.00)	02 (100.00)	---	---	---	---	---

In the case of Kota district of Rajasthan on participant farms, the share of farmers using owned seed and those using seed from private traders was equal. The second major source was cooperatives. On non participant farms the percentage of farmers using seed of private traders was 46.2 and of those using owned seed was 34.6. About 20.00 per cent farmers used borrowed or exchanged seed (Table 5.22).

Table 5.22 Sourcewise use of seed by participant and non participant farmers, Kota district, Rajasthan

(Figures - Number)

Crop	Participant					Non- participant				Total
	Owned	Borrowed/ Exchanged	Coopera-tive	Private traders	Total	Owned	Borrowed/ Exchanged	Coopera-tive	Private traders	
Soybean	09 (25.0)	04 (11.1)	14 (38.9)	09 (25.0)	36 (100.0)	06 (27.3)	05 (22.7)	---	11 (50.0)	22 (100.0)
Arhar	01 (33.3)	---	01 (33.3)	01 (33.3)	03 (100.0)	---	---	---	---	---
Gram	---	---	02 (100.0)	---	02 (100.0)	01 (50.0)	---	---	01 (50.0)	02 (100.0)
Urad	01 (50.0)	---	---	01 (50.0)	02 (100.0)	01 (50.0)	---	---	01 (50.0)	02 (100.0)
Lentil	---	---	---	---	---	01 (100.0)	---	---	---	01 (100.0)
Moong	---	---	01 (100.0)	---	01 (100.0)	---	---	---	---	01 (100.0)
Total	11 (25.00)	04 (9.1)	18 (40.9)	11 (25.0)	44 (100.0)	09 (34.6)	05 (19.2)	---	12 (46.2)	26 (100.0)

5.6 Adopter Farmers Opinions about Certified Seed

Almost all the selected farmers realised the importance of sowing the certified seed. The adopter farmers sowing these gave following reasons for adoption.

1. Higher yield
2. Better germination
3. Resistance to pests and diseases
4. Better grain quality
5. Higher market price

Non Adopter Farmers

On the other hand the non adopter farmers gave following reasons for non adoption of certified seed.

1. Non availability
2. Higher price of seed
3. Lower proportion of market price fetched as compared to higher price of seed.
4. Non significant difference between yields
5. Non-availability of irrigation and other costly inputs like fertilisers to grow certified seed
6. Timely supply of seed was not obtained
7. In adequate subsidy for the purchase of seed
8. Although the seed was pests and disease resistant, soil health maintenance was difficult.
9. Certified seed supplying agencies were located at limited number of centres and at long distances from villages. Farmers located in interior villages had to incur expenditure on transport charges, etc.
10. Certified seed had to be purchased against cash, whereas, private traders offered seed on credit.
11. Small and Marginal farmers wanted seed in small packets.
12. Non availability of desired quality in desired quantity at proper time.

5.7 Farmers' Suggestions about Certified Seed

1. The certified seed should be available of desired quality, in required quantity and at proper time.
2. The price of the certified seed should be lower and should be available against subsidy.

3. Alongwith seed, arrangement should be made for the supply of irrigation water, fertilisers and pesticides, preferably at subsidised prices.

4. The certified seed supplying agencies should increase the number of centres catering the certified seed. More centres are needed specially in remote areas.

5. The price of the produce of the certified seed should be increased as the cost of production of such varieties is more.

6. The certified seed supplying agencies should supply seed on credit.

7. The certified seed should be made available in small packets particularly for marginal and small farmers so that it is in the reach of their affordable income.

8. Publicity is needed about availability of different varieties of seed in seed stores.

9. The availability should be ensured well in advance of sowing time.

10. The certified seed should be of short duration.

11. Mobile seed sale points should be developed.

12. Farmers should be asked to use organic manures and bio fertilisers and should not be dependent on chemical fertilisers only.

13. They should be encouraged to adopt crop rotations and should not raise mono crop.

14. Larger quantity of certified seed should be supplied for demonstrations and the seed should be pre-tested for germination.

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CHAPTER - VI
POLICY IMPLICATIONS

6.1 The pulse crops studied were gram, lentil, arhar, moong and urad. The oilseed crops studied were groundnut, soybean and sunflower. It was observed that seed replacement ratios (SRRs) in most of these crops in most of the states were far lower. This was the main reason for low yields of these crops resulting in low production. The State governments should take immediate step to increase the SRRs of these crops to increase productivity and production.

(Attention : Departments of Agriculture of State Govts.)

6.2 The reason for gap between breeders seed, foundation seed and certified seed was lower lifting of breeders seed by state govts. The state governments are, therefore, advised that timely lifting of breeders seed and in sufficient quantities is necessary for the proper linkages between, breeders seed, foundation seed and certified seed.

(Attention : Departments of Agriculture of State Govts.)

6.3 In some states under the label of truthfully labelled seed malpractices are done by some private agencies. To safeguard the interests of farmers, the sale of truthfully labelled seed should be stopped and indulgence of private traders in this business should be discouraged as far as possible.

(Attention : Seed Certification Agencies of State Govts., Ministry of Agriculture, Govt. of India)

6.4 In the opinions and suggestions of the farmers some important points emerged. These were :

1. The price of certified seed was higher
2. It was not available in adequate quantity
3. The sale points of certified seeds are not easily accessible
4. The certified seed is not available well in advance of sowing time.

It follows that state governments should ensure :

1. Lower price of certified seed.
2. Larger quantity of certified seed should be made available, and,
3. These should be available at larger number of sale points especially in remote areas.
4. The seed should be available well before the sowing time.

(Attention: State Departments of Agriculture, NSC)

6.5 In the estimation of requirement of different kinds of seed SRR and SMR are mainly considered. However, following factors also contribute to increased or decreased demand of different kinds of seed.

1. Weather factors including rainfall
2. Change in price of seed and product
3. Change in cropping pattern.

(Attention: SAUs, Departments of Agriculture of State Govts., Ministry of Agriculture, Govt. of India)

It is, therefore, suggested that above mentioned factors be considered to arrive at the demand of seed of different crops.

6.6 For higher production the use of quality certified seed only is not enough. The whole set of recommended practices including related inputs has to be followed. The state Govts. are therefore suggested to see that alongwith certified seed other recommended package of practices are followed to achieve the desired and expected yields and production.

(Attention: Departments of Agriculture of State Govts.)

6.7 The basic issue in the management of seed supply is supply of breeders, foundation and certified seed in adequate quantity,of desired quality and at proper time. In order to ensure this a Memorandum Of Understanding

need to be got signed between different producing and supplying agencies with regard to production. lifting, multiplication and distribution etc. **(Attention SAUs, NSC, SFCI, State Departments of Agriculture).**

6.8 Hybrid seed producing technology needs to be developed on scientific lines **(SAUs and Institutes of ICAR)**

6.9 New storages and storage techniques need to be developed in the states and particularly far flung interior areas **(State Departments of Agriculture)**

6.10 Short duration varieties are the demand of farmers to adjust these in the innovative crop patterns **(Breeders at SAUs, Institutes of ICAR).**

6.11 The conversion of breeders seed into foundation seed may be assigned to SAUs and for that purpose the SAUs should be suitably strengthened by additional infrastructure for seed processing, packing, grading, storage, etc. (SAUs, State Departments of Agriculture).

6.12 Better coordination among evaluation and monitoring bodies is needed to avoid delays in release of varieties. (Seed Certification Agencies SAUS & Departments of Agriculture and ICAR).

6.13 Subsidy on certified seed and related inputs like fertilisers, pesticides etc should be given to the farmers **(Attention: Ministry of Agriculture Govt. of India).**

6.14 Seed production and marketing should be recognised as an industry and should get facilities like other industries **(Attention : Ministry of Agriculture Govt. of India, ICAR & Departments of Agriculture of State Govts.)**

6.15 Minimum Support Prices of different crops should be declared well in advance before sowing for farmers to plan cropping pattern (Costs & Prices Commission, Govt. of India, Ministry of Agriculture).

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CHAPTER VII

SUMMARY AND CONCLUSIONS

7.1 Oilseeds and pulses supply essential elements of human diet. While oils also supply raw material for industries pulses are integral part of Indian diet. Seed is the basic and vital input in attaining sustained growth in agricultural productivity and production. Quality seeds have better germination percentage and respond positively to the inputs like fertilisers and irrigation. Good quality seeds result in plants which are resistant to droughts, pests and diseases. Although the government is trying to supply good quality high yielding and latest varieties of seed, the seed replacement ratio has remained low. There are three types of seeds.

i) Breeder seed,

ii) Foundation seed, and,

iii) Certified seed

While the breeders seed is produced from nucleus seed by the SAUs / Breeders, the foundation seed is the progeny of the breeders seed and is produced by Seed Corporations, State Departments of Agriculture Farms and Others. Certified seed is the progeny of the foundation seed. It is produced by State Department of Agriculture and Seed Farmers.

For the proper administration of the Oilseeds Production Programme (OPP), National Pulses Development Project (NPDP), Technology Mission on Oilseeds and Pulses (TMOP), was constituted under the Department of Agriculture, Government of India.

In 1998-99 out of the total allocation of Rs.134.60 crores for (OPP), the allocation for Madhya Pradesh was highest. In the case of NPDP also the share of Madhya Pradesh was highest. The componentwise distribution of allocation showed that distribution of sprinkler set had the highest priority and the seed component was the second most important. In the case of allocation for NPDP seed component claimed highest percentage of amount.

This study has following objectives :

i) To find out the reasons for short supply of certified / quality seed in oilseeds & pulses.

(ii) To find out the demand supply gap in the requirement and availability of seeds of oilseeds and pulses variety wise in the concerned states.

(iii) To establish the proper linkages between the breeder's seed producing agencies/ ICAR/ SAUs and foundation seed producing agencies in the concerned state as also the central agencies like NSC and SFCI.

(iv) To study whether proper monitoring and evaluation is done to strengthen the chain of breeder's seed to foundation seed and from foundation seed to certified seed.

The crops considered were groundnut, soybean and sunflower among oilseeds and gram, lentil, arhar, moong, and urad among pulses.

Six states viz. Andhra Pradesh, Gujarat, Madhya Pradesh, Maharashtra, Uttar Pradesh and Rajasthan were selected for the study. Five Agro- Economic Research Centres viz. Waltair, Vallabh Vidyanagar, Jabalpur, Pune and Allahabad conducted the study.

In each state two districts were selected and in each district two development blocks were selected. From these two blocks five villages were selected. From each village 10 farmers were selected. Of the 50 farmers so selected 30 farmers were participants using certified seed and 20 farmers were non- participants not using certified seeds. While the secondary data was collected for two years viz. 1996-97 and 1997-98, the primary data from selected farmers was collected for the year 1997-98.

7.2 In Andhra Pradesh, Anantapur and Kurnool districts were selected. In the State oilseeds and pulses accounted for 20.66 and 12.55 per cent respectively of the gross cropped area. In Anantapur district oilseeds accounted for 76.39 per cent of the gross cropped area and groundnut was the major oilseed. In Kurnool district pulses accounted for 8.43 per cent of the area. The major pulses were gram and arhar.

In Gujarat, Panchmahals and Bhavnagar districts were selected. The eastern part of Panchmahals district was hilly and western part was plain country. Around 16.00 per cent of the gross cropped area was under pulses. Urad and arhar were the major pulses.

In Bhavnagar district 35.00 per cent of the gross cropped area was under cereals. Cereals, pulses and groundnut were the important crop groups/ crops and were grown without irrigation.

The state of Madhya Pradesh with 149 persons per square kilometre had a low density of population. The literacy percentage of the state was 35.45 and the female literacy was still lower. The irrigation percentage was only 24.60 of the gross cropped area. About 50.00 per cent of the gross cropped area was occupied by cereals and about 21.00 per cent by pulses. The productivity of most of the crops was lower than the average for the country. Wells and tube wells were the major sources of irrigation commanding 55.02 per cent. The second important sources were canals (28.61 per cent). Rice and wheat were the most important crops of the state.

Indore district is actually urban district with only 30.58 per cent rural population. It has a comparatively higher literacy percentage of 54.96. The district has a comparatively high percentage of irrigated area. Irrigation was mainly done with tube wells and wells. Soybean was the most important crop occupying 45.25 per cent of the gross cropped area. Wheat and gram were also important crops. Fodder crops and potato were also important.

Narsinghpur district had a literacy percentage of 45.33. The average rainfall of the district was 1,300 mm. Pulses dominated the cropping pattern occupying 44.94 per cent of the gross cropped area. Oilseeds occupied 21.48 per cent. Gram was the major pulse crop.

Of the two selected districts of Maharashtra, Sangli district was smaller in size than Amravati district. The percentage of irrigated area was 19.51 in Sangli and 5.36 in Amravati. Food grain crops accounted

for nearly 73.00 per cent in Sangli district, whereas, the same occupied 35.00 per cent in Amravati. While, Sangli district grew sugarcane, Amravati district grew cotton crop. Pulses were more important in Amravati district, whereas, oilseeds were more important in Sangli district.

The most important characteristics of Rajasthan was development of irrigation facilities. The percentage of gross irrigated area to gross cropped area went up from 12.52 in 1958-59 to 32.88 in 1996-97. This was possible due to various canal development projects. Bajra and jowar were the major kharif rainfed crops of the state. Wheat was the most important rabi irrigated crop. Among oilseeds rapeseed mustard, sunflower, soybean, sesamum and groundnut were important. In Bharatpur district, bajra, jowar and wheat were the important cereals. Among pulses gram and lentil were important.

In Kota district, wheat and bajra were important cereal crops. Among oilseeds soybean and rape seed, mustard were important.

Jhansi was agriculturally most progressive district of Bundelkhand. The main sources of irrigation were canals, wells and tube wells. The pulse crop accounted for 46.98 per cent of the gross cropped area. The productivity of pulses was quite lower in the district as compared to other districts because of short fall of the quality certified seeds.

Agra district belonged to semiarid zone having saline and oily water. The net irrigated area was 77.56 per cent of the net sown area. Wheat and jowar were the important crops. Among pulses, gram, arhar, pea, urad and lentil were important. Among oilseeds mustard and seasamum were important. Recently sunflower was emerging as important oilseed in irrigated area.

7.3 In the following paragraphs the demand supply gaps between different kinds of seed in various states has been described. The description of breeder seed follows.

In Andhra Pradesh, in 1996-97 the total quantity of seed allotted was 97.97 quintals. Against this the quantity lifted was 86.90 quintals or a gap of 11.30 per cent. In the case of Gujarat the total quantity indented was 658.93 quintals and the quantity allocated was 550.95 quintals. Thus the gap between the quantity indented and allocated resulted was16.39 per cent. In Madhya Pradesh the total quantity of seed indented for selected crops was 499.49 quintals. Against this the quantity of seed allocated to the state was 391.55 quintals or a gap of 21.61 per cent between demand and supply. In Rajasthan against the quantity allotted of 616.36 quintals the quantity lifted was 407.96 quintals resulting in the gap of 33.81 per cent between the quantity allotted and lifted. In Uttar Pradesh against the quantity indented of 492.16 quintals the quantity allocated was 351.93 quintals. Thus the percentage of demand supply gap between the quantity indented and allocated came to 28.49.

In 1997-98 in Andhra Pradesh the quantity allocated was 48.95 quintals, nearly half of 1997-98. Against this the quantity lifted was 23.75 quintals or a percentage gap of 51.28, five times of the previous year. In Gujarat the total quantity indented was 896.45 quintals and the quantity allocated was 842.47 quintals or a narrow gap of 6.02 per cent between the quantity indented and allocated. In Madhya Pradesh the total quantity of breeders seed indented was 5,380.00 quintals. Against this the quantity allocated was 3,407.05 quintals resulting in the gap of

36.67 per cent between the quantity indented and allocated. In Maharashtra, the quantity allocated for all the selected crops was 3,224.17 quintals. The percentage of demand supply gap was 52.14 because the quantity lifted was 1,543.03 quintals. In the case of Rajasthan while the quantity allotted was 459.61 quintals the quantity lifted was 390.26 quintals. As a result, the percentage of gap between quantity allotted and lifted was 15.09. In Uttar Pradesh, whereas, the quantity indented was 709.63 quintals the quantity allocated was 377.26 quintals. The gap was 46.84 per cent.

As regards distribution of foundation seed in 1996-97 Andhra Pradesh had 10,841.38 quintals of seed available. On the other hand the quantity utilised was 8,630.80 quintals, leaving a gap of 20.39 per cent between quantity available and utilised. In Gujarat the estimated requirement of foundation seed was 3,503.00 quintals. However, the quantity available was much more (11,929.00 quintals). This resulted in negative gap of (-) 240.54 per cent between the demand and supply. In Madhya Pradesh the estimated requirement was 30,455.01 quintals. But the quantity available was 23,853.00 quintals having a gap of 21.68 per cent between quantity available and quantity required. In Maharashtra, against the estimated requirement of 20,750.41 quintals the quantity available was 19,398.60 quintals or a gap of 6.51 per cent. In the case of Rajasthan the percentage of demand supply gap between the quantity available and required was 44.26. This percentage in the case of Uttar Pradesh was 23.42.

As regards distribution of foundation seed in 1997-98 in Andhra Pradesh the percentage between the quantity available and quantity utilised was 43.04. In Gujarat the percentage of demand supply gap between quantity available and required was in the negative and stood at 78.26. In Madhya Pradesh the percentage of demand supply gap between quantity available and quantity required came to 48.41 and that in Maharashtra it was in the negative and was 26.01. In Rajasthan the percentage of demand supply gap between quantity available and required was 24.04. This percentage in the case of state of Uttar Pradesh was in the negative and was (-) 47.98.

In the case of distribution of certified seed in 1996-97 in Andhra Pradesh the percentage of gap between quantity available and quantity distributed was 13.76. In Gujarat the percentage of demand supply gap between quantity available and quantity required stood at 15.30. This percentage in the case of Madhya Pradesh was more than double and stood at 33.17. For the state of Maharashtra, the demand supply gap between quantity required and quantity available was very meagre (3.12 per cent). In Rajasthan, the percentage of demand supply gap between quantity required and quantity available although was in the negative came to only (-) 1.70. This type of gap in the case of Uttar Pradesh was quite high and noted to be 30.94 per cent.

As regards distribution of certified seed in 1997-98 in Andhra Pradesh, it was noted that the percentage of gap between quantity available and quantity distributed was as high as 76.28. In Gujarat, the gap between quantity required and quantity available was in the negative

as the latter was 28.13 per cent more than the former. In the case of Madhya Pradesh this percentage was 38.72. In Rajasthan the percentage turned out to be in the negative (-) 14.83 as the quantity available was more than the quantity required. However, in Uttar Pradesh the percentage of demand supply gap between quantity available and quantity required was 46.28.

The gap between the demand and supply of certified seed in selected districts was studied for 2 years viz.1996-97 and 1997-98. In Anantpur district of Andhra Pradesh the gap between the quantity required and quantity distributed was 13.68 percent and that for 1997-98, 24.07 per cent.

In Kurnool district in 1996-97 the percentage gap between the quantity procured and distributed was very thin (0.98). On the other hand this gap in 1997-98 was quite high (51.26). In Indore district of Madhya Pradesh in 1996-97 the gap between quantity required and quantity available was 65.17 per cent. This gap in 1997-98 was equally wide (68.50). In Narsinghpur district of Madhya Pradesh the demand supply gap in 1996-97 was in the negative (-6.72). In 1997-98 the gap was positive but was below 10.00 per cent (9.66). In Sangli district of Maharashtra the percentage gap between quantity available and distributed was quite thin (0.46). In 1997-98 the gap slightly increased and was 4.97 per cent. In Amravati district of the same state in 1996-97 the percentage gap between quantity available and quantity distributed was 8.62. It decreased marginally in 1997-98 to 6.38. In Jhansi district

of Uttar Pradesh in 1996-97 and in 1997-98 the situation was quite different. In both these years the percentage of quantity available to the quantity requirement was in the negative. While, in 1996-97 it was (-) 130.32 in 1997-98 it was (-) 297.27. In Agra district of the same state in 1996-97 the percentage of quantity required to quantity available of pulses was 95.39 per cent and that for oilseeds it was 45.78 per cent. In 1997-98 the percentage of availability to requirement of pulses was 94.08 and that for oilseeds it was 85.58.

The Government of India has prescribed that the seed replacement ratio for hybrid crops should be 100.00 per cent. For other crops it should be between 5 to 15 per cent depending upon the nature of crops.

On the selected farms of Indore district of Madhya Pradesh the SRR for soybean was 43.33 per cent. In Narsinghpur district the SRR for gram was 49.18 per cent. In Maharashtra the SRR for gram for 1997-98 for the state was 3.55 per cent. For arhar the SRR for the state was 5.70 per cent. In the case of moong the SRR for the state was 12.32 per cent.

The reasons for non achieving of targetted SRR was the non availability of quality seed in time. Another reasons was high cost of quality seed. Some farmers also said that no significant gain is achieved from the replacement of seed.

It was also noted that the conversion ratios of breeders seed into foundation seed in Rajasthan were low for most of the crops. The reasons given were,

1. Crop damage due to climatic conditions,
2. Lack of irrigation,
3. Non application of desired level of inputs,
4. Non adoption of recommended practices.

It was also noted that in Uttar Pradesh the targetted SRR for eighth plan for most of the crops was not achieved.

7.4 Breeders seed is the first stage of production of seed. The state SAUs produce breeders seed besides other institutions. The breeders' seed plot is monitored by a team of specialists consisting of senior scientist, breeder, representative of State Seed and Farm D.C., State Seed Certification Agency and Department of Agriculture. The State Governments, on the basis of assessment of certified seed assess the requirement of foundation seed. On the basis of requirement of foundation seed demand for breeders seed is assessed and submitted to the Ministry of Agriculture Government of India. The second stage in the linkage is foundation seed. It is produced by State Department Farms and State Seed and F.D.C. The third and final stage in linkage is certified seed. The State Seed Certification Agencies and Seed Testing Laboratories are mainly concerned with certified seed. At the certified farmers level factors like availability of infrastructure facilities like irrigation, equipments, fertilisers, pesticides, seed storage facilities, seed multiplication ratio (SMR) etc. are responsible for success or failure. Monitoring of certified seed supply is done by State Department of Agriculture in close coordination with State Seed and F.D.C., and State Seed Certification Agencies alongwith Seed Testing Laboratories. Two

meetings are convened at the State Headquarters to review production and distribution of various kinds of seed and plan for next year. Two meetings are convened at all India level at New Delhi.

Following suggestions were made by farmers, various Govt. Officials, SAU Scientists and knowledgeable persons.

i) The seeds production programme should be in the hands of qualified Plant Breeders and highly skilled technical personnel.

ii) Directors of Agriculture of States should act as nodal officers.

iii) They should have control on public and private agencies involved in seed industries.

iv) Farmers should be made aware of recently released varieties.

v) The scientists at the SAUs and other State Govt. Officials should be sent frequently for training.

vi) Early exchange system of germ plasm with other states and countries should be developed.

vii) The State Departments of Agriculture should make all efforts to increase Seed Replacement Ratios (SRRs) for all the major crops.

viii) The conversion factor of breeder seed to foundation seed to certified seed should be increased so that the valuable nuclear and breeder seed is fully utilised.

ix) State Departments of Agriculture should make all efforts to lift entire produce of breeders seed allotted.

x) In order to ensure proper, timely and adequate supply of certified seed there should be close coordination between SAUs, ICAR, NSC, SFCI and Directors of Agriculture of States.

xi) Frequent workshops for scientists and State Department officials be held in different parts within the states and different states of India.

xii) Care should be taken of seed during transportation to avoid damage to the seed.

7.5 The average size of holdings for participants of Anantapur district was 3.83 hectares. It was 3.43 hectares for non-participants. In Kurnool district the average size was 5.88 and 6.70 hectares respectively. The largest size of holdings was noted in Maharashtra.

The cropping patterns were cereals and pulses oriented. While Panchmahals district had cereals oriented cropping pattern, in Bhavnagar district cereals and oilseeds shared equal percentage. Indore district had oilseeds oriented cropping pattern, whereas, Narsinghpur district had predominantly pulses crops.

In Gujarat the average yield of arhar for the state was 749 kg. per hectare. The yields were generally higher on the selected farms than the state average. While the yield of gram was generally higher than the state average on selected farms, the yield of groundnut was lower than the state average. In Maharashtra the yields of groundnut, soybean, arhar and gram were higher on selected farms than the state average. In Rajasthan also the yields of gram and soybean were generally higher on the selected farms then the state average. In Uttar Pradesh the yields of arhar, gram, soybean and groundnut were higher on the selected farms than the state average.

As regards requirement and availability of certified seed, in Maharashtra, both requirement and availability were equal. In Uttar Pradesh the percentage of quantity of seed available to quantity required was 57.85. Among different crops the availability was very good for arhar and soybean. The availability for gram was quite poor.

The main sources of supply of seed were owned, exchanged, borrowed and purchased. In Indore district of Madhya Pradesh participant farmers had 81.70 per cent was owned seed and 17.00 per cent was purchased seed. In the case of soybean 51.78per cent seed was owned and 43.33 per cent was certified seed. In the case of wheat97.00 per cent seed was owned and only 3.00 per cent was certified seed.

On non participant farms 26.51 per cent seed was owned and 73.49per cent was purchased seed from other sources. Vegetables and berseem seed was mostly purchased. In Narsinghpur district on participant farms 50.00 per cent of the seed was owned and 28.05 per cent was exchanged seed. The certified seed was 20.62 per cent. On non participant farms 93.00 per cent seed was owned and the remaining was exchanged. In Panchmahals district of Gujarat all the farmers growing moong used seed from private traders. In the case of groundnut 67.00 per cent of the farmers purchased seed from traders and 24.00 per cent farmers took seed from cooperatives. On non-participant farms more than 90.00 per cent of the farmers growing arhar and groundnut used owned seed. In Sangli district of Maharashtra, more than 75.00 per cent of the adopter farmers took seed from government and the remaining

farmers took it from the private traders. In Amravati district more than 75.00 per cent of the arhar and gram growing farmers depended on government agencies. The remaining farmers depended on private traders. In Bharatpur district of Rajasthan majority of farmers depended on private traders for seeds of gram, arhar, lentil and moong. In Kota district of Rajasthan on participant farms the share of farmers using owned seed and those using seed from private traders was equal. The second source was cooperatives.

The adopter farmers gave following reasons for the adoption of certified seed;

i) Higher yield
ii) Better germination
iii) Resistance to pests and diseases.
iv) Better grain quality.
v) Higher market price.

The non adopter farmers gave following reasons for non adoption of certified seed.

i) Non availability
ii) Higher price of seed
iii) Lower proportion of market price fetched as compared to higher price of seed.
iv) Non availability of irrigation and other costly inputs like fertilisers to grow certified seed.
v) Timely supply of seed was not obtained.

vi) Certified seed supplying agencies were located at limited number of centres and at long distances from villages. Farmers located in interior villages had to incur expenditure on transport charges, etc.

vii) Certified seed had to be purchased against cash, whereas, private traders offered seed on credit.

viii) Non availability of desired quality in desired quantity at proper time.

The farmers gave following suggestions w.r.t. supply of certified seeds.

(i) The certified seed should be available of desired quality, in required quantity at proper time.

(ii) The price of certified seed should be lower and should be available against subsidy.

(iii) Alongwith seed, arrangement should be made for the supply of irrigation water, fertilisers and pesticides, preferably at subsidised prices.

(iv) The certified seed supplying agencies should increase the number of centres catering the certified seed. More centres are needed especially in remote areas.

(v) The price of the produce of the certified seed should be increased as the cost of production of such varieties is more

7.6 Among the policy implications the foremost is that the Seed Replacement Ratios in most of the selected crops in most of the states were far lower resulting in low yields and low production. The State Departments of Agriculture should take immediate steps to increase the SRRs. It was observed that due to lower lifting of breeders seed the gaps between demand and supply of seed widened. The State Departments of Agriculture are advised to take

the entire quantity of breeders seed offered to them. The distribution of truthfully lebelled seed should be discouraged as far as possible. The selected farmers opined that the price of certified seed was higher and was not available in sufficient quantity. The sale points of certified seed should be increased and seed should be available well before the sowing time. Alongwith the certified seed the farmers should be advised to follow the whole set of recommended practices including all related inputs. Hybrid seed producing technology needs to be developed on scientific lines. New storages and storage techniques should be developed. The SAUs should be strengthened with additional infrastructure for seed processing, packing, grading and storage, etc. Better Coordination among evaluation and monitoring bodies is needed to avoid delays in release of varieties.

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EXECUTIVE SUMMARY

1. Introduction

Oilseeds and pulses supply essential elements of human diet. While oils also supply raw material for industries pulses are integral part of Indian diet. Seed is the basic and vital input in attaining sustained growth in agricultural productivity and production. Quality seeds have better germination percentage and respond positively to the inputs like fertilisers and irrigation. Good quality seeds result in plants which are resistant to droughts, pests and diseases. Although the government is trying to supply good quality high yielding and latest varieties of seed, the seed replacement ratio has remained low. There are three types of seeds.

i) Breeder seed,

ii) Foundation seed, and,

iii) Certified seed

While the breeders seed is produced from nucleus seed by the SAUs / Breeders, the foundation seed is the progeny of the breeders seed and is produced by Seed Corporations, State Departments of Agriculture Farms and Others. Certified seed is the progeny of the foundation seed. It is produced by State Department of Agriculture and Seed Farmers.

For the proper administration of the Oilseeds Production Programme (OPP), National Pulses Development Project (NPDP), Technology Mission on Oilseeds and Pulses (TMOP), was constituted under the Department of Agriculture, Government of India.

In 1998-99 out of the total allocation of Rs.134.60 crores for (OPP), the allocation for Madhya Pradesh was highest. In the case of NPDP also the share of Madhya Pradesh was highest. The componentwise distribution of allocation

showed that distribution of sprinkler set had the highest priority and the seed component was the second most important. In the case of allocation for NPDP seed component claimed highest percentage of amount.

2. Objectives

This study has following objectives :

i) To find out the reasons for short supply of certified / quality seed in oilseeds & pulses.

(ii) To find out the demand supply gap in the requirement and availability of seeds of oilseeds and pulses variety wise in the concerned states.

(iii) To establish the proper linkages between the breeder's seed producing agencies/ ICAR/ SAUs and foundation seed producing agencies in the concerned state as also the central agencies like NSC and SFCI.

(iv) To study whether proper monitoring and evaluation is done to strengthen the chain of breeder's seed to foundation seed and from foundation seed to certified seed.

3. Methodology and Sample Design

The crops considered were groundnut, soybean and sunflower among oilseeds and gram, lentil, arhar, moong, and urad among pulses.

Six states viz. Andhra Pradesh, Gujarat, Madhya Pradesh, Maharashtra, Uttar Pradesh and Rajasthan were selected for the study. Five Agro- Economic Research Centres viz. Waltair, Vallabh Vidyanagar, Jabalpur, Pune and Allahabad conducted the study.

In each state two districts were selected and in each district two development blocks were selected. From these two blocks five villages were

selected. From each village 10 farmers were selected. Of the 50 farmers so selected 30 farmers were participants using certified seed and 20 farmers were non- participants not using certified seeds. While the secondary data was collected for two years viz. 1996-97 and 1997-98, the primary data from selected farmers was collected for the year 1997-98.

4. Selected States and Districts

In Andhra Pradesh, Anantapur and Kurnool districts were selected. In the State oilseeds and pulses accounted for 20.66 and 12.55 per cent respectively of the gross cropped area. In Anantapur district oilseeds accounted for 76.39 per cent of the gross cropped area and groundnut was the major oilseed. In Kurnool district pulses accounted for 8.43 per cent of the area. The major pulses were gram and arhar.

In Gujarat, Panchmahals and Bhavnagar districts were selected. The eastern part of Panchmahals district was hilly and western part was plain country. Around 16.00 per cent of the gross cropped area was under pulses. Urad and arhar were the major pulses.

In Bhavnagar district 35.00 per cent of the gross cropped area was under cereals. Cereals, pulses and groundnut were the important crop groups/ crops and were grown without irrigation.

The state of Madhya Pradesh with 149 persons per square kilometre had a low density of population. The literacy percentage of the state was 35.45 and the female literacy was still lower. The irrigation percentage was only 24.60 of the gross cropped area. About 50.00 per cent of the gross cropped area was occupied by cereals and about 21.00 per cent by pulses. The productivity of

most of the crops was lower than the average for the country. Wells and tube wells were the major sources of irrigation commanding 55.02 per cent. The second important sources were canals (28.61 per cent). Rice and wheat were the most important crops of the state.

Indore district is actually urban district with only 30.58 per cent rural population. It has a comparatively higher literacy percentage of 54.96. The district has a comparatively high percentage of irrigated area. Irrigation was mainly done with tube wells and wells. Soybean was the most important crop occupying 45.25 per cent of the gross cropped area. Wheat and gram were also important crops. Fodder crops and potato were also important.

Narsinghpur district had a literacy percentage of 45.33. The average rainfall of the district was 1,300 mm. Pulses dominated the cropping pattern occupying 44.94 per cent of the gross cropped area. Oilseeds occupied 21.48 per cent. Gram was the major pulse crop.

Of the two selected districts of Maharashtra, Sangli district was smaller in size than Amravati district. The percentage of irrigated area was 19.51 in Sangli and 5.36 in Amravati. Food grain crops accounted for nearly 73.00 per cent in Sangli district, whereas, the same occupied 35.00 per cent in Amravati. While, Sangli district grew sugarcane, Amravati district grew cotton crop. Pulses were more important in Amravati district, whereas, oilseeds were more important in Sangli district.

The most important characteristics of Rajasthan was development of irrigation facilities. The percentage of gross irrigated area to gross cropped area went up from 12.52 in 1958 -59 to 32.88 in 1996-97. This was possible due to

various canal development projects. Bajra and jowar were the major kharif rainfed crops of the state. Wheat was the most important rabi irrigated crop. Among oilseeds rapeseed mustard, sunflower, soybean, sesamum and groundnut were important. In Bharatpur district, bajra, jowar and wheat were the important cereals. Among pulses gram and lentil were important.

In Kota district, wheat and bajra were important cereal crops. Among oilseeds soybean and rape seed, mustard were important.

Jhansi was agriculturally most progressive district of Bundelkhand. The main sources of irrigation were canals, wells and tube wells. The pulse crop accounted for 46.98 per cent of the gross cropped area. The productivity of pulses was quite lower in the district as compared to other districts because of short fall of the quality certified seeds.

Agra district belonged to semiarid zone having saline and oily water. The net irrigated area was 77.56 per cent of the net sown area. Wheat and jowar were the important crops. Among pulses, gram, arhar, pea, urad and lentil were important. Among oilseeds mustard and seasamum were important. Recently sunflower was emerging as important oilseed in irrigated area.

5. Demand Supply Gaps of Different Seeds in Selected States and Districts

In the following paragraphs the demand supply gaps between different kinds of seed in various states has been described. The description of breeder seed follows.

In Andhra Pradesh, in 1996-97 the total quantity of seed allotted was 97.97 quintals. Against this the quantity lifted was 86.90 quintals or a gap

of 11.30 per cent. In the case of Gujarat the total quantity indented was 658.93 quintals and the quantity allocated was 550.95 quintals. Thus the gap between the quantity indented and allocated resulted was16.39 per cent. In Madhya Pradesh the total quantity of seed indented for selected crops was 499.49 quintals. Against this the quantity of seed allocated to the state was 391.55 quintals or a gap of 21.61 per cent between demand and supply. In Rajasthan against the quantity allotted of 616.36 quintals the quantity lifted was 407.96 quintals resulting in the gap of 33.81 per cent between the quantity allotted and lifted. In Uttar Pradesh against the quantity indented of 492.16 quintals the quantity allocated was 351.93 quintals. Thus the percentage of demand supply gap between the quantity indented and allocated came to 28.49.

In 1997-98 in Andhra Pradesh the quantity allocated was 48.95 quintals, nearly half of 1997-98. Against this the quantity lifted was 23.75 quintals or a percentage gap of 51.28, five times of the previous year. In Gujarat the total quantity indented was 896.45 quintals and the quantity allocated was 842.47 quintals or a narrow gap of 6.02 per cent between the quantity indented and allocated. In Madhya Pradesh the total quantity of breeders seed indented was 5,380.00 quintals. Against this the quantity allocated was 3,407.05 quintals resulting in the gap of 36.67 per cent between the quantity indented and allocated. In Maharashtra, the quantity allocated for all the selected crops was 3,224.17 quintals. The percentage of demand supply gap was 52.14 because the quantity lifted was 1,543.03 quintals. In the case of Rajasthan while the quantity allotted was 459.61 quintals the quantity lifted was 390.26 quintals. As a result, the percentage of gap between quantity allotted and lifted was 15.09. In Uttar Pradesh, whereas, the quantity indented was 709.63 quintals the quantity allocated was 377.26 quintals. The gap was 46.84 per cent.

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6. Linkages Between Different Seed Producing Agencies, Monitoring and Suggestions

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7. Data of Selected Farms and Farmers Opinions and Suggestions

The average size of holdings for participants of Anantapur district was 3.83 hectares. It was 3.43 hectares for non-participants. In Kurnool district the average size was 5.88 and 6.70 hectares respectively. The largest size of holdings was noted in Maharashtra.

The cropping patterns were cereals and pulses oriented. While Panchmahals district had cereals oriented cropping pattern, in Bhavnagar district cereals and oilseeds shared equal percentage. Indore district had oilseeds oriented cropping pattern, whereas, Narsinghpur district had predominantly pulses crops.

In Gujarat the average yield of arhar for the state was 749 kg. per hectare. The yields were generally higher on the selected farms than the state average. While the yield of gram was generally higher than the state average on selected

farms, the yield of groundnut was lower than the state average. In Maharashtra the yields of groundnut, soybean, arhar and gram were higher on selected farms than the state average. In Rajasthan also the yields of gram and soybean were generally higher on the selected farms then the state average. In Uttar Pradesh the yields of arhar, gram, soybean and groundnut were higher on the selected farms than the state average.

As regards requirement and availability of certified seed, in Maharashtra, both requirement and availability were equal. In Uttar Pradesh the percentage of quantity of seed available to quantity required was 57.85. Among different crops the availability was very good for arhar and soybean. The availability for gram was quite poor.

The main sources of supply of seed were owned, exchanged, borrowed and purchased. In Indore district of Madhya Pradesh participant farmers had 81.70 per cent was owned seed and 17.00 per cent was purchased seed. In the case of soybean 51.78per cent seed was owned and 43.33 per cent was certified seed. In the case of wheat97.00 per cent seed was owned and only 3.00 per cent was certified seed.

On non participant farms 26.51 per cent seed was owned and 73.49per cent was purchased seed from other sources. Vegetables and berseem seed was mostly purchased. In Narsinghpur district on participant farms 50.00 per cent of the seed was owned and 28.05 per cent was exchanged seed. The certified seed was 20.62 per cent. On non participant farms 93.00 per cent seed was owned and the remaining was exchanged. In Panchmahals district of Gujarat all the farmers growing moong used seed from private traders. In the case of

groundnut 67.00 per cent of the farmers purchased seed from traders and 24.00 per cent farmers took seed from cooperatives. On non-participant farms more than 90.00 per cent of the farmers growing arhar and groundnut used owned seed. In Sangli district of Maharashtra, more than 75.00 per cent of the adopter farmers took seed from government and the remaining farmers took it from the private traders. In Amravati district more than 75.00 per cent of the arhar and gram growing farmers depended on government agencies. The remaining farmers depended on private traders. In Bharatpur district of Rajasthan majority of farmers depended on private traders for seeds of gram, arhar, lentil and moong. In Kota district of Rajasthan on participant farms the share of farmers using owned seed and those using seed from private traders was equal. The second source was cooperatives.

The adopter farmers gave following reasons for the adoption of certified seed;

i) Higher yield

vi) Better germination

vii) Resistance to pests and diseases.

viii) Better grain quality.

ix) Higher market price.

The non adopter farmers gave following reasons for non adoption of certified seed.

i) Non availability

ix) Higher price of seed

x) Lower proportion of market price fetched as compared to higher price of seed.

xi) Non availability of irrigation and other costly inputs like fertilisers to grow certified seed.

xii) Timely supply of seed was not obtained.

xiii) Certified seed supplying agencies were located at limited number of centres and at long distances from villages. Farmers located in interior villages had to incur expenditure on transport charges, etc.

xiv) Certified seed had to be purchased against cash, whereas, private traders offered seed on credit.

xv) Non availability of desired quality in desired quantity at proper time.

The farmers gave following suggestions w.r.t. supply of certified seeds.

i) The certified seed should be available of desired quality, in required quantity at proper time.

ii) The price of certified seed should be lower and should be available against subsidy.

iii) Alongwith seed, arrangement should be made for the supply of irrigation water, fertilisers and pesticides, preferably at subsidised prices.

iv) The certified seed supplying agencies should increase the number of centres catering the certified seed. More centres are needed especially in remote areas.

x) The price of the produce of the certified seed should be increased as the cost of production of such varieties is more

8. Suggestions and Policy Implications

The pulse crops studied were gram, lentil, arhar, moong and urad. The oilseed crops studied were groundnut, soybean and sunflower. It was observed that seed replacement ratios (SRRs) in most of these crops in most of the states

were far lower. This was the main reason for low yields of these crops resulting in low production. The State governments should take immediate step to increase the SRRs of these crops to increase productivity and production.

(Attention : Departments of Agriculture of State Govts.)

The reason for gap between breeders seed, foundation seed and certified seed was lower lifting of breeders seed by state govts. The state governments are, therefore, advised that timely lifting of breeders seed and in sufficient quantities is necessary for the proper linkages between, breeders seed, foundation seed and certified seed.

(Attention : Departments of Agriculture of State Governments)

In some states under the label of truthfully labelled seed malpractices are done by some private agencies. To safeguard the interests of farmers, the sale of truthfully labelled seed should be stopped and indulgence of private traders in this business should be discouraged as far as possible.

(Attention : Seed Certification Agencies of State Governments, Ministry of Agriculture, Govt. of India)

In the opinions and suggestions of the farmers some important points emerged. These were :

1. The price of certified seed was higher
5. It was not available in adequate quantity
6. The sale points of certified seeds are not easily accessible

The certified seed is not available well in advance of sowing time.

It follows that state governments should ensure :

1. Lower price of certified seed.
5. Larger quantity of certified seed should be made available, and,
6. These should be available at larger number of sale points especially in remote areas.
7. The seed should be available well before the sowing time.
(Attention: State Departments of Agriculture, NSC)

In the estimation of requirement of different kinds of seed SRR and SMR are mainly considered. However, following factors also contribute to increased or decreased demand of different kinds of seed.

1. Weather factors including rainfall
2. Change in price of seed and product
3. Change in cropping pattern.
(Attention: SAUs, Departments of Agriculture of State Govts., Ministry of Agriculture, Govt. of India)

It is, therefore, suggested that above mentioned factors be considered to arrive at the demand of seed of different crops.

For higher production the use of quality certified seed only is not enough. The whole set of recommended practices including related inputs has to be followed. The state Govts. are therefore suggested to see that alongwith certified seed other recommended package of practices are followed to achieve the desired and expected yields and production.

(Attention: Departments of Agriculture of State Governments)

The basic issue in the management of seed supply is supply of breeders, foundation and certified seed in adequate quantity of desired quality and at proper time. In order to ensure this a Memorandum Of Understanding need to

be got signed between different producing and supplying agencies with regard to production. lifting, multiplication and distribution etc.

(Attention SAUs, NSC, SFCI, State Departments of Agriculture).

Hybrid seed producing technology needs to be developed on scientific lines **(SAUs and Institutes of ICAR)**

New storages and storage techniques need to be developed in the states and particularly far flung interior areas **(State Departments of Agriculture)**

Short duration varieties are the demand of farmers to adjust these in the innovative crop patterns **(Breeders at SAUs, Institutes of ICAR).**

The conversion of breeders seed into foundation seed may be assigned to SAUs and for that purpose the SAUs should be suitably strengthened by additional infrastructure for seed processing, packing, grading, storage, etc. (SAUs, State Departments of Agriculture).

Better coordination among evaluation and monitoring bodies is needed to avoid delays in release of varieties. (Seed Certification Agencies SAUS & Departments of Agriculture and ICAR).

Subsidy on certified seed and related inputs like fertilisers, pesticides etc should be given to the farmers

(Attention: Ministry of Agriculture Govt. of India).

Seed production and marketing should be recognised as an industry and should get facilities like other industries

(Attention : Ministry of Agriculture Govt. of India, ICAR & Departments of Agriculture of State Govts.)

Minimum Support Prices of different crops should be declared well in advance before sowing for farmers to plan cropping pattern (Costs & Prices Commission, Govt. of India, Ministry of Agriculture).

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