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**Possibilities and Constraints of increasing Production of
Pulses and Impact of National Food Security Mission on
Pulses in Haryana**

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PREFACE

The present study sponsored by the Ministry of Agriculture, Government of India is aimed at assessing the impact of the National Food Security Mission, pulses (NFSM, pulses) in Haryana on returns from pulses vis-à-vis other important crops, adoption of technology and use fullness of the Mission in solving problems related to pulse production. In order to full fill these objectives, primary as well as secondary sources of data have been used.

The results of the study reveal (i) pulse production in Haryana is declining at an alarming rate due to shrinkage in area and low increase in productivity (ii) selected districts of Bhiwani (NFSM district) and Mahendragarh (non-NFSM district) have tremendous and immense scope for increasing area under pulses in rainfed as well as irrigated conditions (iii) impact of NFSM, pulses on gross returns and net returns per hectare and per quintal of pulses vis-à-vis other important crops indicated that wheat and mustard were found superior than gram in rabi season in Bhiwani. In kharif season, cotton was found superior than moong. In Mahendragarh district, moong provided higher net returns than bajra (iv) improved variety seeds for pulse cultivation are popular among growers due to low yield risk in terms of infestation of insects, pests and diseases. Pulse growers fully adopted sowing and partially adopted seed practices. Especially, number of irrigations applied by farmers in pulse cultivation was below the recommended level.

The NFSM, pulses has completed initial phase of its implementation in Haryana but its impact on pulse farming is not visible due to limited coverage of districts and farmers. In order to make, Mission more effective, following policy measures are suggested. (i) integrating all the on going pulse programmes into one programme with full support to farmers. (ii) popularization of moong in irrigated areas in wheat and rice rotations and to encourage inter cropping of pulses. (iii) effective intervention in pulse marketing through the NAFED operations. (iv) creation of storage facility at the village level.

We are thankful to the Ministry of Agriculture for providing support to complete this study. Thanks are due to the coordinator of study, Dr. C.S.C. Sekhar, Associate Professor, Institute of Economic Growth, Delhi for providing study design and tabulation scheme. Mr. Narinder Singh deserves praise for processing the secondary and primary data for this study. Thanks are due to Mr. Sri Chand for word processing the report.

EXECUTIVE SUMMARY

Possibilities and Constraints of increasing Production of Pulses and Impact of National Food Security Mission on Pulses in Haryana

Introduction:

Pulses have been the major source of protein in India. The review of pulse availability data, however, presents a gloomy picture. The per capita availability has declined from 61.6 gms/day in 1965 to 37.0 gms/day in 2009 primarily due to increasing population and a low increase in production of pulses. Surprisingly, rising prices of pulses have not been able to enthuse farmers to increase pulse production. The government policy of minimum support prices as a safety net and the strategy for pulse crops development through the implementation of National Pulses Development Project under the guidance of Technology Mission and ISOPAM (Integrated Scheme of Oilseeds, Pulses, Oil palm and Maize) have not been too successful. The present scenario is a cause of great concern not only from the point of view of security and quality of food for our growing population but also in respect of soaring pulse prices, import bill and imbalance in the cropping pattern.

Objectives:

The revival of agricultural growth and raising it to 4 per cent per annum has been identified as one of the important strategies for achieving faster and inclusive growth and thereby accomplishing an overall target of 9 per cent gross domestic product (GDP) growth per annum in the 11th Five Year Plan. In order to achieve this objective, allocation of funds to agriculture and allied sectors and for rural development was increased by more than 100 per cent and 118 per cent respectively over the 10th Five Year Plan. In addition, the National Food Security Mission (NFSM) was launched in the agricultural year 2007-08 in 312 identified districts of 17 states covering 136 districts under rice, 141 districts under wheat and 171 districts under pulses. It was proposed that at least 20 million tonnes of additional foodgrains production are to be realized by 2011-12 with a break up of

10 million tonnes of rice, 8 million tonnes of wheat and 2 million tonnes of pulses. The 11th Five Year Plan has entered in its fifth year of operation after passing the initial four years. Since, the National Food Security Mission, pulses has been in operation for almost four years in Haryana, it may be expected that pulse producers might have been by now well acquainted with the (Mission) and farmers might be availing the benefit of incremental income through the assistance provided under the programme. Hence, it would be appropriate to conduct an impact study to assess the benefits of the National Food Security Mission pulses and this study is formulated with this objective in mind.

The decrease in production and shrinkage in area of pulse crops in Haryana in the last few decades, as a consequence of green revolution, is a cause of great concern. Also, the reduction in the production of pulses is undesirable from nutritional point of view since a large population of Haryana is vegetarian. The government launched National Food Security Mission (NFSM), pulses in five districts of Haryana. Under the scheme, assistance is provided for the production and distribution of breeder, foundation and certified seeds, Integrated Nutrient Management (INM) and Integrated Pest Management (IPM). In addition, farmers receive 50 per cent assistance limited to Rs. 15000 on zero till seed drills, multi crop planters, seed drills and rotavators, etc.

With this objective in view, the present study has the following objectives:

- i) to analyse returns from cultivation of pulses vis-a-vis other important crops
- ii) to analyse major problems and prospects for pulse cultivation
- iii) to assess the impact, if any, of NFSM, pulses

Research Methodology:

For this study, both primary and secondary level data were collected and analysed. The primary level data were aimed at eliciting information from farmers and field level officials whereas, secondary level data were collected to obtain state and district level information from the various issues of the Statistical

Abstract of Haryana. The reference period for this study is 2007-08 to 2009-10. The data for the year 2006-07 were not available because funds for the Mission were received late and therefore, could not be implemented in the state during this year.

For primary data, field survey was conducted in two districts: Bhiwani (NFSM district) and Mahendragarh (non-NFSM district). One representative village was selected from these districts and 50 pulse growers in each village were interviewed. Thus, total sample for the study constituted 100 pulse growers. An effort was made to cover marginal, small and SC farmers in the sample.

The analysis included calculation of gross returns, paid out costs and net returns from pulse crops and other major crops. The gross returns were computed by multiplying physical quantity and per unit price of the respective crop and then adding to it the value of by product. The paid out costs included value of purchased seeds, manure, fertilizers, pesticides, wages paid to hired human labour, machinery and irrigation charges incurred in the production of crops. The net returns were estimated by deducting paid out costs from gross returns.

In addition, growth trends of area, production and yield of pulse crops and other important crops in the selected state of Haryana were computed for the period 1997-2007 by using semi log functions. Also, other important data such as GCA, NSA, NIA and GIA were analysed for the state.

Main Findings:

I. Status of Pulse Sector in Haryana

Wheat and rice are the major cereal crops of Haryana and occupied 36.3 and 15.7 per cent of GCA respectively during average of five years (2002-03 to 2006-07). Mustard and cotton crops were next in the order with 10.5 and 8.9 per cent of GCA respectively. Pulse crops however, experienced a poor status in crop pattern of Haryana and only 2.7 per cent of GCA was devoted to pulse sector during this period (Table-1). Gram is the most important pulse crop of the state covering around 60 per cent of total pulse area (Table-2)

There has been significant growth in production and productivity of major cereals in Haryana between 1996-97 and 2006-07. Also, production of commercial crops such as mustard and cotton grew significantly (5.09 and 3.54 per cent per annum) during this period. Performance of pulses in the state however, has been poor. Pulse production declined at an alarming rate of 9.61 per cent per annum. Productivity growth of 1.32 per cent per year during this period was not impressive and therefore, was unable to compensate for continuous decline in area (Table-3).

The scenario of growth performance of pulse crops during the study period in the selected districts of Bhiwani and Mahendragarh was equally poor since pulse production in both areas declined at a high rate. The rate of decline was observed higher in Mahendragarh. However, a silver lining was noticed in case of moong in Bhiwani. Its production grew at the rate of 6.90 per cent per year during the study period due to impressive growth in area and positive growth in yield. In view of this result, it is suggested that yield potential of moong should be realized by implementing specific policy measures such as easy availability of improved seeds to farmers.

II. Crop-structure of Sampled Farms

The cropping pattern of sampled farmers in Bhiwani, (NFSM district) and in Mahendragarh (non-NFSM district) is largely dry crops based due to inadequate availability of irrigation facilities except for wheat which occupied more than 20 per cent of GCA. These districts have tremendous and immense scope for increasing area under pulses. This, however, would be possible only if the existing available improved production technology is extended to the farmers for adoption with availability of crucial inputs both in rainfed and irrigated conditions.

In irrigated conditions, land is generally kept fallow after the harvest of rabi crops. Short duration varieties of summer moong/urad can be easily adjusted in crop rotations in such areas where irrigation facilities are available. In summer, these crops have no competition with the main crops. With increase in irrigation facilities in the coming years, there appears to be a great scope of increasing

summer cultivation of pulse crops. This would add a new dimension in raising acreage under pulses.

In un-irrigated/rainfed conditions, acreage of pulses in these areas can be increased by popularizing the practices of inter-cropping and mixed-cropping. Through these devices, farmers can have two crops with different requirements. In Bhiwani, arhar can be inter-cropped with bajra and cotton. In Mahendragarh, urd can be advantageously accommodated with important crops. Similarly, other crops can be also used for inter-cropping of pulses. The pulse crops besides giving additional income will help farmers in enhancing soil fertility.

III. Returns from Pulses vis-à-vis other Important Crops :

The impact of the National Food Security Mission, pulses in Bhiwani on gross returns and net returns per hectare and per quintal was assessed through appropriate comparison with the non-beneficiary farmers in Mahendragarh district during 2007-08, 2008-09 and 2009-10. Results of sampled survey point out that gross returns per hectare from gram cultivation in Bhiwani district were found higher than Mahendragarh district during all these years but this was not true for net returns during first two years. Farm size variations were common in gross returns and net returns per hectare as well as per quintal. The value of marketed surplus in most cases was positively related to farm size (Table-4).

A comparison of gross returns and net returns with other important crops during the rabi season has exhibited that wheat and mustard were found superior than gram in Bhiwani in terms of net returns per unit of land. The economics of moong, a minor pulse crop grown in these districts was also worked out and profitability was compared vis-à-vis other important crops such as bajra, cotton and gowar. This pulse crop provided higher net returns per hectare in comparison to bajra in both the selected districts. It was observed that cotton is far superior crop than moong and bajra during kharif season in Bhiwani district while profitability of moong was found better in comparison to bajra and gowar in Mahendragarh district. After clubbing all major crops, net returns per hectare were observed higher than gram in Bhiwani but this was not true in case of Mahendragarh district (Table-5 & 6).

IV. Adoption of Technology :

Improved variety seeds for pulse cultivation are popular among farmers due to low yield risk in terms of infestation of insects, pests and diseases. The rate of adoption of improved seeds among sampled farmers was 100 per cent since each one has switched over from traditional variety seeds to improved variety seeds. Further, adoption of full package of recommended practices is essential for realizing good yield. It was observed that pulse growers fully adopted sowing and partially adopted seed practices. Especially, seed rate applied by farmers for gram cultivation in Mahendragarh and seed rate applied for moong cultivation in Bhiwani as well as in Mahendragarh was below the recommended levels. Adoption of other important practices related to application of manure and number of irrigations was partial. Particularly, number of irrigation was below the required number for realizing the potential yield from growing improved varieties of pulses in Haryana.

We had tried to understand the problems of pulse growers in adoption of improved variety seeds through opinion survey. Five options such as non-availability, timely availability, expensive nature of seeds, need of larger doses of other inputs, lower than expected yield and inadequate pest resistance were provided. Inadequate pest resistance of improved seeds and lower than expected yield emerged as the most important problems faced by the growers of gram and moong in sampled districts of Haryana.

Most of the sampled pulse producers sold their produce in the village market. They were not satisfied with the marketing system and prices received. It is essential to provide an alternative marketing system and to ensure remunerative prices to the farmers.

The pulse produce of the farmers should be procured by an integrated agency or cooperative society created for this purpose, eliminating the system of middlemen. This agency should also be entrusted with the task of processing and marketing. In initial years, it could be difficult to implement because of the strong traders' cartel, but gradually with the increase in membership and

volumes, the agency will be able to surmount the obstacles created by traders. The major activities of the agency should be arrangement of auction, processing, storage facilities and providing credit to members against stock. This will ensure reasonable returns to the farmers, saving them from the harassment at the hands of middlemen and traders. The consumers too would get pulses at reasonable rates.

Adequate storage facilities should be created at village level. For this, the Government should provide necessary financial help and technical assistance. Interested pulse growers should be also encouraged to set up small scale processing units and the necessary marketing avenues to be provided to them.

V. Progress of National Food Security Mission, Pulses in Haryana :

The NFSM, pulses has completed the initial phase of its implementation in Haryana. It is making slow progress in the state because coverage of the Mission in terms of pulse producers is limited and insignificant. Only five districts with higher pulse production potential are covered under the Mission. In fact, the Mission has been spread too thinly over the state, with the result that the impact of the Mission is hardly visible in pulse farming. The Mission is making slow progress because it is being implemented through Government channels without involving the farmers at the grass root levels. In addition, undue delay in issue of state level sanctions and release of funds to implementing agencies sometimes hinders the progress. The components such as timely availability of improved variety seeds at affordable prices to farmers and IPM demonstrations need urgent attention.

Policy Implications:

Pulse development in Haryana through the implementation of the NFSM, pulses should aim at arresting the continuous decline in area cultivated and increasing yield to the potential level. The Mission has completed around four years of implementation in the state but its impact on area, production and yield of pulse crops was found to be limited due to low coverage of farmers and lack of

holistic approach in practice. In order to make the Mission more effective, the following policy initiatives are recommended:

1. For arresting the continuous decline in acreage under pulses, these crops should be introduced as inter-crop/mixed-crop/rotational crop in the cropping system. Some financial incentives should be given to the farmers for bringing more area under pulses.
2. The yield of pulses in Haryana has risen between 1996-97 and 2006-07 but it can be further increased to potential levels through wider and full adoption of improved production technology. For popularizing improved pulse production technology among the pulse growers, farmers should be given full support.
3. Proper guidance should be given to the pulse growers about the use of recommended inputs. In particular, guidance is required in the case of use of fertilizers and pesticides.
4. Research should be directed towards evolving improved disease resistant variety seeds of pulses. For this purpose, each pulse should be treated separately and financial backing be given accordingly. Gram is the major pulse crop of the state and its yield rate has increased substantially during the past one decade. It can be further increased if the disease resistant area specific improved variety seeds of gram are evolved and popularized among farmers.
5. In order to provide an alternative marketing system and to ensure remunerative prices to the farmers, pulse produce should be procured by an integrated agency/cooperative society created for this purpose, eliminating the system of middlemen. This agency should also be entrusted with the task of processing and marketing of pulses. It is suggested that pulses should be covered under the Public Distribution System. They should be procured at the minimum support prices. This would benefit both the producers and the consumers. Further, it can be greatly helpful in improving the nutritional standards of the poor people.

At the end, we would like to conclude that the National Food Security Mission, pulses is not a well known Programme across Haryana. It has low coverage in terms of pulse growers and districts. It is urged that, instead of covering only five districts with high potential for pulse production, the entire state should be covered. This, however, is not possible within the currently available funds, which are grossly inadequate for this purpose. It is suggested that financial support for the Mission in Haryana should be increased. Moreover, the success of the Mission depends on its usefulness for the farmers. In order to achieve this goal, each beneficiary must be provided with all the essential components as a package under the programme. In addition, involvement of farmers' organizations at the grass root level can be used to efficiently promote and propel this endeavour.

It appears that there is an urgent need for an integrated pulse programme under which credit, input supply and marketing of produce of cultivators are tackled by a single agency. These facilities may be given through Farmers' Service Societies which would meet all the above requirements of the farmers under one roof.

Table-1
Area under Important Crops in Haryana
(Average of Last Five Years, 2002-03 to 2006-07)

Crop	Area (‘000ha)	Area per cent to GCA
Rice	1006.74	15.7
Wheat	2323.66	36.3
Bajra	590.84	9.2
Total Cereals	4056.18	63.4
Pulses	174.20	2.7
Total Foodgrains	4230.38	66.1
Mustard	670.36	10.5
Cotton	570.06	8.9
Total	5470.80	85.5
Source: Various Issues of Statistical Abstract of Haryana,		

Table-2

Compound Annual Growth Rate (CAGR) of Area, Production and Yield of Important Crops in Haryana, 1996-97 to 2006-07

(per cent)

Crop	Area	Prod	Yield
Rice	1.12	2.93	1.79
Wheat	1.28	1.81	0.52
Bajra	0.39	3.46	3.06
Total Cereals	0.88	2.06	1.17
Pulses	-8.40	-9.61	1.32
Total Foodgrains	0.21	1.83	1.62
Mustard	3.53	5.09	1.51
Cotton	-0.61	3.54	4.17

Source: Ibid

Table-3

**Area Under Important Pulses in Haryana
(Average of Last Five Years, 2002-03 to 2006-07)**

Crop	Area	Total Pulse Area (%)
Gram	104.6	60.1
Moong	19.8	11.3
Massar	5.6	3.2
Other	44.2	25.4
Total	174.2	100.0

Source: Ibid

Table- 4
Profitability of Pulse Farming on Sampled Farms : GRAM (Rs)

District/ Farm-Size	Gross Returns	Paid out costs	Net Returns	Gross Returns per ha	Net Returns per ha	Gross Returns per qtl	Net Returns per qtl	Value of Marketed surplus
BHIWANI								
Marginal								
2007-08	3400	1620	1780	21250	11125	2267	1187	2000
2008-09	4650	1825	2825	29063	17656	2325	1413	3150
2009-10	16100	6515	9585	21184	12612	2147	1278	6450
Small								
2007-08	55025	27025	28000	19652	10000	1897	966	38700
2008-09	51610	26830	24780	19850	9531	2064	991	40200
2009-10	51450	32645	18805	19788	7233	2287	836	25750
Medium								
2007-08	221840	92600	129240	23600	13749	1904	1109	181125
2008-09	275955	116820	159135	26033	15013	2067	1192	242640
2009-10	220335	117468	102867	22483	10497	2283	1066	179685
Large								
2007-08	417950	167285	250665	22231	13333	1926	1155	309800
2008-09	617450	241955	375495	22131	13459	1868	1136	537625
2009-10	522750	142375	380375	32071	23336	2318	1687	320500
Total								
2007-08	698215	288530	409685	22407	13148	1918	1126	531625
2008-09	949665	387430	562235	23017	13627	1934	1145	823615
2009-10	810635	299003	511632	27516	17367	2303	1454	532385
MAHENDRAGARH								
Marginal								
2007-08	81330	34656	46674	23921	13728	2169	1245	66550
2008-09	136650	57072	79578	24845	14469	2152	1253	114450
2009-10	94125	43561	50564	24135	12965	2268	1218	78800
Small								
2007-08	218865	90400	128465	22798	13382	1972	1157	192600
2008-09	252450	110250	142200	23593	13290	2214	1247	209623
2009-10	231755	127215	104540	20879	9418	2179	983	184375
Medium								
2007-08	245100	80260	164840	20425	13737	2060	1385	183800
2008-09	204675	98140	106535	16506	8592	2047	1065	177425
2009-10	252560	88825	163735	22960	14885	2245	1455	184720
Large								
2007-08	288600	94030	194570	18987	12801	2061	1390	255200
2008-09	370750	95650	275100	23766	17635	2168	1609	331500
2009-10	257750	89500	168250	23866	15579	2148	1402	190050
Total								
2007-08	833895	299346	534549	20744	13297	2046	1312	698150
2008-09	964525	361112	603413	21822	13652	2151	1345	832998
2009-10	836190	349101	487089	22723	13236	2198	1281	637945

Source: Field Survey

Table-5
Profitability of other Important Crops on Sampled Farms in Bhiwani (Rs.)
(Wheat+Bajra+Cotton+Mustard)

Farm-Size	Gross Returns	Paid out costs	Net Returns	Gross Returns per ha	Net Returns per ha	Gross Returns per qtl	Net Returns per qtl	Value of Marketed surplus
Marginal								
2007-08	87085	37305	49780	17557	10036	1031	589	44150
2008-09	97600	38835	58765	19677	11848	1091	657	51625
2009-10	75400	29400	46000	23861	14557	1125	687	42700
Small								
2007-08	655010	233835	421175	29773	19144	1422	915	483125
2008-09	821660	281685	539975	34236	22499	1497	984	601700
2009-10	835970	285945	550025	36990	24337	1657	1090	540190
Medium								
2007-08	2868310	969215	1899095	34433	22798	1564	1036	2400115
2008-09	3284713	1113123	2171590	37799	24990	1677	1109	2787035
2009-10	3661510	1210287	2451223	44296	29654	1837	1230	3264910
Large								
2007-08	4573760	1718775	2854985	30800	19225	1609	1004	3938960
2008-09	4401130	1776703	2624427	33596	20034	1665	993	3843260
2009-10	5690760	2040448	3650312	42216	27079	1907	1223	4676410
Total								
2007-08	8184165	2959130	5225035	31628	20193	1567	1001	6866350
2008-09	8605103	3210346	5394757	34858	21854	1642	1029	7283620
2009-10	10263640	3566080	6697560	42199	27537	1850	1207	8524210

Source: Ibid

Table-6
Profitability of other Important Crops in Mahendragarh (Rs.)
(Wheat+Bajra+Gowar+Mustard)

Farm-Size	Gross Returns	Paid out costs	Net Returns	Gross Returns per ha	Net Returns per ha	Gross Returns per qtl	Net Returns per qtl	Value of Marketed surplus
Marginal								
2007-08	200134	79020	121114	21067	12749	1179	714	116304
2008-09	149770	52700	97070	17620	11420	1026	665	87840
2009-10	173285	80105	93180	16662	8960	996	536	91470
Small								
2007-08	722455	296710	425745	21566	12709	1289	759	520200
2008-09	668733	270540	398193	20203	12030	1207	718	481540
2009-10	599350	267600	331750	18329	10145	1150	637	415374
Medium								
2007-08	675775	317240	358535	14918	7915	1249	663	465700
2008-09	623700	290335	333365	13442	7185	1239	662	462050
2009-10	598800	266010	332790	14123	7849	1183	658	424900
Large								
2007-08	1347740	367720	980020	20671	15031	1405	1022	1075650
2008-09	1099870	337670	762200	20831	14436	1262	875	839620
2009-10	937810	317990	619820	15374	10161	1193	789	710690
Total								
2007-08	2946104	1060690	1885414	19193	12283	1321	845	2177854
2008-09	2542073	951245	1590828	18054	11298	1225	767	1871050
2009-10	2309245	931705	1377540	15763	9403	1162	693	1642434

Source: Ibid

CHAPTER - 1

INTRODUCTION

Pulses have been the major source of protein in India. The review of pulse availability data, however, presents a gloomy picture. The per capita availability has declined from 61.6 gms/day in 1965 to 37.0 gms/day in 2009 primarily due to increasing population and a low increase in production of pulses. Surprisingly, rising prices of pulses have not been able to enthuse farmers to increase pulse production. The government policy of minimum support prices as a safety net and the strategy for pulse crops development through the implementation of National Pulses Development Project under the guidance of Technology Mission and ISOPAM (Integrated Scheme of Oilseeds, Pulses, Oil palm and Maize) have not been too successful. The present scenario is a cause of great concern not only from the point of view of security and quality of food for our growing population but also in respect of soaring pulse prices, import bill and imbalance in the cropping pattern.

India is the largest producer of pulses in the world. Its contribution to world pulse production is around 25 per cent. Production of pulses in India has witnessed an erratic growth during the past three decades. The output of pulses fluctuated within a range of 8 to 15 million tonnes. The compound growth rates of area and production during 1990-91 to 1999-00 were estimated -0.60 and 0.59 per cent per annum against the annual growth of 1.7 per cent in population. The declining trend in acreage under pulses is more pronounced in the northern states, i.e. Punjab, Haryana and Western Uttar Pradesh where green revolution has spread widely. The situation has improved after 2000 and the pulse production has grown at the rate of 1.61 per cent per annum. The area as well as yield growth contributed to the production. The compound growth rates of area and production of pulses in this period in Haryana were -3.1 and -0.7 per cent per annum, respectively. Rabi pulses, particularly, gram suffered relatively more than Kharif pulses. The increasing area under irrigation has proved to be a set

back to production of gram. Wheat provided a tough competition to rabi pulses, primarily gram. As a result, production and productivity of major cereals particularly, wheat and rice have shown significant increase but pulses have shown no such trend. The acreage and production of pulses in Haryana has shown a continuous decline. The pattern of growth performance of agriculture has indicated a pronounced shift in favour of wheat-paddy rotation. A major share of crucial inputs (irrigation and fertilizers) became reserved for high profitability cereals.

The productivity aspect of pulses in India is also not encouraging. The yield of pulses in India grew at a fractional rate of 0.93 per cent per annum during 1990-91 and 1999-00. However, its growth improved between 2000-01 and 2009-10. In Haryana, it grew at a moderate rate of 2.5 per cent per annum. As a result of decline in acreage and slow increase in productivity, production of pulses in Haryana has come down from 552 thousand tonnes in 1990-91 to 451 thousand tonnes in 2009-10. The non-adoption of full package of improved technology is cited as a major cause for this situation.

One of the major reasons for stagnation in production of pulses in our country is inadequate investment in this respect. Pulses are grown under un-irrigated conditions on poor soil with low inputs. It has been found that higher productivity can be achieved through the use of bio-fertilizers. Unfortunately, use of this culture is yet to pick up.

Before developing the framework of analysis, it would be pertinent to cite the available literature on the related aspects to pulses. A critical review of the research conducted on this subject reveals that two types of studies are available in the literature. First, there are macro level studies and papers based on secondary data at all India and state levels (Chopra and Swamy, 1975; Chopra, 1982; Sadasivam, 1989, 1993; Deshpande and Chandrasekhar, 1982; Acharya 1988, Satyapriya, 1989; Kelly and Rao, 1994; Dhindsa and Sharma, 1997; Ramesh Chand, 1999; C. Ramaswamy, 2002; Joshi and Saxena, 2002; Sathe and Aggarwal, 2004).

In the second type, one comes across micro level studies based on primary data collected through surveys at village and farm household levels (Acharya, 1988; Sharma and Jodha, 1982; Gangwar, et. al, 1983; Tuteja 1986, 1999, 2008, 2010; Dey and Banerjee, 1991; Tripathi, 1998; Pant 1995; Joshi and Saxena, 2002; Shiyani, 2000; Gupta 1999). Such studies have mostly been carried out by Agricultural Research Institutes like International Crop Research Institute for Semi Arid Tropics (ICRISAT), Indian Agricultural Research Institute and Agricultural Economics Research Centres. They have focused their attention primarily on identification of constraints in the growth of pulse production and productivity at the disaggregated level. Some studies were aimed at evaluating the performance of the National Pulses Development Programme in different states.

All these studies conclude that there is an urgent need to increase pulse production in the country. This is possible by either area expansion and/or realizing yield potential. While the scope of former is limited the second can be achieved if a serious thought is given to adoption of full package of available improved technology. This is possible when farmers get support from the government.

Past programmes to boost pulse production have yielded poor results. The National Pulses Development Programme, Special Foodgrains Production Programme for Pulses, the Technology Mission and ISOPAM could not be successful due to non-availability of quality and certified seeds, inadequate extension services and farmers tendency to shift to more remunerative crops. As a result, pulse cultivation is relegated to marginal lands with poor irrigation facilities, devoid of inputs especially rhizobium culture. The neglect of pulses is reflected in their declining share in total food grains output from over 16 per cent four decades ago to just eight per cent now. Unlike in the case of edible oils, imports are not a feasible option since the availability of pulses in the international market is limited. A solution to the problem of declining per capita availability has, therefore, to come from a rapid improvement in indigenous production levels.

Objectives:

The revival of agricultural growth and raising it to 4 per cent per annum has been identified as one of the important strategies for achieving faster and inclusive growth and thereby accomplishing an overall target of 9 per cent gross domestic product (GDP) growth per annum in the 11th Five Year Plan. In order to achieve this objective, allocation of funds to agriculture and allied sectors and for rural development was increased by more than 100 per cent and 118 per cent respectively over the 10th Five Year Plan. In addition, the National Food Security Mission (NFSM) was launched in the agricultural year 2007-08 in 312 identified districts of 17 states covering 136 districts under rice, 141 districts under wheat and 171 districts under pulses. It was proposed that at least 20 million tonnes of additional foodgrains production are to be realized by 2011-12 with a break up of 10 million tonnes of rice, 8 million tonnes of wheat and 2 million tonnes of pulses. The 11th Five Year Plan has entered in its fifth year of operation after passing the initial four years. Since, the National Food Security Mission, pulses has been in operation for almost four years in Haryana, it may be expected that pulse producers might have been by now well acquainted with the (Mission) and farmers might be availing the benefit of incremental income through the assistance provided under the programme. Hence, it would be appropriate to conduct an impact study to assess the benefits of the National Food Security Mission pulses and this study is formulated with this objective in mind.

The decrease in production and shrinkage in area of pulse crops in Haryana in the last few decades, as a consequence of green revolution, is a cause of great concern. Also, the reduction in the production of pulses is undesirable from nutritional point of view since a large population of Haryana is vegetarian. The government launched National Food Security Mission (NFSM), pulses in five districts of Haryana. Under the scheme, assistance is provided for the production and distribution of breeder, foundation and certified seeds, Integrated Nutrient Management (INM) and Integrated Pest Management (IPM). In addition, farmers receive 50 per cent assistance limited to Rs. 15000 on zero till seed drills, multi crop planters, seed drills and rotavators, etc.

With this objective in view, the present study has the following objectives:

- iv) to analyse returns from cultivation of pulses vis-a-vis other important crops
- v) to analyse major problems and prospects for pulse cultivation
- vi) to assess the impact, if any, of NFSM, pulse

Research Methodology:

For this study, both primary and secondary level data were collected and analysed. The primary level data were aimed at eliciting information from farmers and field level officials whereas, secondary level data were collected to obtain state and district level information from the various issues of the Statistical Abstract of Haryana. The reference period for this study is 2007-08 to 2009-10. The data for the year 2006-07 were not available because funds for the Mission were received late and therefore, could not be implemented in the state during this year.

For primary data, field survey was conducted in two districts: Bhiwani (NFSM district) and Mahendragarh (non-NFSM district). One representative village was selected from these districts and 50 pulse growers in each village were interviewed. Thus, total sample for the study constituted 100 pulse growers. An effort was made to cover marginal, small and SC farmers in the sample.

The analysis included calculation of gross returns, paid out costs and net returns from pulse crops and other major crops. The gross returns were computed by multiplying physical quantity and per unit price of the respective crop and then adding to it the value of by product. The paid out costs included value of purchased seeds, manure, fertilizers, pesticides, wages paid to hired human labour, machinery and irrigation charges incurred in the production of crops. The net returns were estimated by deducting paid out costs from gross returns.

In addition, growth trends of area, production and yield of pulse crops and other important crops in the selected state of Haryana were computed for the period 1997-2007 by using semi log functions. Also, other important data such as GCA, NSA, NIA and GIA were analysed for the state.

Chapter-2

Pulse Sector in Haryana

Introduction:

An overview of pulses presented in the previous chapter revealed that there is a significant decline in the area and production of pulses in Haryana during the last three decades. The yield of pulses has moderately increased in the same period. This chapter deals with details of growth of area, production and productivity of pulses. In addition, it reviews cropping pattern, growth of NAS, GCA, NIA and fertilizer consumption in Haryana.

I. Area under Important Crops:

It is evident from Table 2.1 that agricultural economy of Haryana is foodgrains based with 66.7 per cent of GCA under their cultivation. Wheat followed by paddy have been observed as the most important cereal crops with 36.7 and 15.9 per cent of GCA in the state during the reference period. In addition, mustard and cotton are also grown on sizeable proportion (10.4 and 8.9 per cent) of GCA. It is essential to mention that area under pulses became as low as 2.7 per cent of GCA during the reference period.

Table 2.1
Area under Important Crops in Haryana

(Average of Last Five Years, 2002-03 to 2006-07)

Crop	Area (‘000ha)	Area per cent to GCA
Rice	1006.74	15.7
Wheat	2323.66	36.3
Bajra	590.84	9.2
Total Cereals	4056.18	63.4
Pulses	174.20	2.7
Total Foodgrains	4230.38	66.1
Mustard	670.36	10.5
Cotton	570.06	8.9
Total	5470.80	85.5
Source: Various Issues of Statistical Abstract of Haryana,		

Growth Rates of Area, Production and Yield:

After analyzing share of important crops in GCA in Haryana, it is imperative to examine growth performance in terms of area, production and yield during the study period. It may be observed from Table 2.2 that growth rates of area under rice and wheat were observed 1.12 and 1.28 per cent per annum respectively, between 1996-97 and 2006-07. Mustard and cotton also indicated positive growth in area. But, pulse area declined at an alarming rate of 8.40 per cent per annum during the reference period due to diversion of area towards remunerative crops such as mustard. It appears that implementation of the Pulse Development Programme in the state was not successful in encouraging farmers to grow pulses. Moreover, impressive growth in area under mustard replaced pulses particularly gram in rainfed areas of Haryana. Among important crops, production performance of bajra (3.46 per cent per annum) followed by rice (2.93 per cent per annum) and wheat (1.81 per cent per annum) was found better due to positive growth in area as well as in yield during this period. Unfortunately, production of pulses has exhibited a declining rate of 9.61 per cent per annum despite positive growth in yield during the study period. It was observed that yield growth was unable to compensate for higher decline in area under pulse crops in the state.

Table 2.2

Compound Annual Growth Rate (CAGR) of Area, Production and Yield of Important Crops in Haryana, 1996-97 to 2006-07

(per cent)

Crop	Area	Prod	Yield
Rice	1.12	2.93	1.79
Wheat	1.28	1.81	0.52
Bajra	0.39	3.46	3.06
Total Cereals	0.88	2.06	1.17
Pulses	-8.40	-9.61	1.32
Total Foodgrains	0.21	1.83	1.62
Mustard	3.53	5.09	1.51
Cotton	-0.61	3.54	4.17

Source: Ibid

II. Growth of Net Area Sown, Gross Cropped Area, Net Irrigated Area, Gross Irrigated Area and Fertilizer Consumption in Haryana.

Table-2.3 provides year wise details of above mentioned indicators and their growth rates in Haryana over the study period. We begin with growth of NAS and GCA which play an important role in augmenting agricultural income, marketed surplus and in adoption of improved farm management practices. NAS had reached to a saturation point in early eighties in Haryana and therefore, its growth was negative. The cropping intensity has been rising continuously in Haryana. Therefore, GCA grew at the rate of 0.74 per cent per annum during the study period. The status of irrigation plays an important role in enhancing productivity per unit of land. In Haryana, 76.51 per cent, of NAS and 78.78 per cent of GCA were irrigated during 1997 and it reached to 83.18 per cent and 84.06 per cent respectively, during 2006-07.

Table 2.3

Compound Annual Growth Rate (CAGR) of Important Variables in Haryana, 1996-97 to 2006-07

Year	NSA	GCA	NIA	GIA	NIA/GCA	Fertilizers Consumption	Fertilizers Consumption/ha
1996-97	3615	6074	2766	4785	0.58	761458	125
1997-98	3635	6143	2792	4829	0.58	835525	136
1998-99	3628	6320	2842	5041	0.56	838397	133
1999-00	3552	6029	2888	5124	0.56	901799	150
2000-01	3526	6115	2958	5223	0.57	930295	152
2001-02	3566	6318	2938	5311	0.55	983960	156
2002-03	3458	6035	2966	5202	0.57	983598	163
2003-04	3534	6388	2969	5343	0.56	1009108	158
2004-05	3528	6425	2954	5434	0.54	1124688	175
2005-06	3566	6509	2936	5451	0.54	1128671	173
2006-07	3596	6619	2991	5564	0.54	1124974	170
CAGR (per cent)	-0.20	0.74	0.70	1.41	-0.70	4.00	3.24

Source: Ibid

Fertilizers consumption has played an important role in increasing crop production, especially of cereals in Haryana and will continue to be a cornerstone of the technology driven agriculture required to feed the expanding population. Fertilizers replenish nutrients removed from soils by harvesting crops and encourage adoption of improved seed varieties. Haryana is the second biggest

consumer of fertilizers in India. It consumed 187.6 kg/ha against an all India average consumption of 117.1 kg/ha during 2007-08. During 1997, fertilizer consumption in Haryana was 125kg/ha. After a decade, it became 170 kg/ha. As indicated in the table, fertilizer consumption grew at the rate of 3.24 per cent per annum during the reference period and helped in continuously rising cropping intensity.

III. Area under Pulse Crops

Pulse crops occupied an important position in the crop pattern of Haryana during 1964-65 with 30.16 per cent of GCA under their cultivation. Gram was the dominant pulse crop with 28.82 per cent of GCA. Moong and massar were also marginally grown. With the increase in irrigation facilities and with widespread adoption of high yielding variety seeds of wheat and paddy, share of pulse crops in cultivated area dropped continuously and became as low as 2.7 per cent of GCA. Table 2.3 provides area under individual pulse crops. Gram is the main pulse crop of the state and it occupied around 2/3 of total pulse area in Haryana. Moong is the second ranking pulse crop with around 11 per cent of area under pulses cultivated. Massar is a minor pulse crop and it shared 3 per cent of pulse area. In addition, other pulses were grown in the state and these shared around 25 per cent of the total pulse area of Haryana during the reference period.

Table 2.4

**Area Under Important Pulses in Haryana
(Average of Last Five Years, 2002-03 to 2006-07)**

Crop	Area	Total Pulse Area (%)
Gram	104.6	60.1
Moong	19.8	11.3
Massar	5.6	3.2
Other	44.2	25.4
Total	174.2	100.0

Source: Ibid

As already stated, area under pulses in Haryana has been declining since the mid-sixties. The prime reasons for this phenomenon include the extension of irrigated area followed by the evolution of high yielding varieties of wheat and

rice. Specially, wheat has become popular crop among the farmers of Haryana and a significant share of gram area in rabi season has been diverted to growing wheat in irrigated areas. In un-irrigated areas, pulses face tough competition with mustard and cotton, which are more remunerative than pulses. Thus, pulses are being gradually pushed out to relatively less favourable areas. As such, there is a likelihood of further decline in area under pulses unless improved production technology of pulses is successfully transferred to field level.

Growth Rates of Area, Production and Yield of Gram

Gram has special status among pulse crops in Haryana. Growth rates of area, production and yield exhibited in Table 2.5 indicate that area under gram in Haryana has declined at a high rate of 11.81 per cent per annum during the reference period. It is expected in an agriculturally developed state that yield of gram would rise. But, reverse was observed and it had declined at the rate of less than one per cent per annum during this period. It could be due to declining proportion of irrigated area under this crop. As a result, production of gram in Haryana dropped at an alarming rate of 12.57 per cent per year between 1996-97 and 2006-07. Thus, negative growth in area as well as in yield were found responsible for a higher declining rate of gram production in Haryana.

Table 2.5

Compound Annual Growth Rate (CAGR) of Area, Production, Yield and Irrigated Area of Gram in Haryana, 1996-97 to 2006-07

Year	Area	Production	Yield	Irrigated Area
1996-97	345.1	276	800	65
1997-98	353.9	309	873	53
1998-99	357.0	294	824	49
1999-00	100.4	58	578	43
2000-01	124.5	80	643	41
2001-02	142.5	122	856	39
2002-03	54.7	41	750	30
2003-04	122.8	100	814	26
2004-05	107.9	91	843	19
2005-06	129.8	72	555	24
2006-07	108	90	833	26
CAGR (per cent)	-11.81	-12.57	-0.63	-10.26

Area under Improved variety Seeds is not available.

Source: Ibid

Growth Rates of Area, Production and Yield of Moong

Moong ranks second amongst pulse crops in Haryana. It is mainly cultivated in kharif season and some farmers grow in summer. Growth rates in area, production and yield of moong in Haryana presented in Table 2.6 indicate that area under moong has risen at the rate of 5.26 per cent per annum in the state during the reference period. But, performance of yield was poor, which has declined at the rate of 0.46 per cent per year during this period. Since, rate of area expansion was higher; production has increased at the rate of 4.77 per cent per year in the study period. Moong has a good potential in the state but its realization is possible when yield rates improve.

Table 2.6

Compound Annual Growth Rate (CAGR) of Area, Production and Yield of Moong in Haryana, 1996-97 to 2006-07

Year	Area	Production	Yield
1996-97	11.7	5.7	487
1997-98	16.5	8.0	485
1998-99	21.0	5.0	238
1999-00	9.9	2.0	202
2000-01	5.3	1.2	226
2001-02	13.6	3.1	228
2002-03	18.3	2.8	153
2003-04	25.2	4.0	159
2004-05	16.0	6.1	381
2005-06	17.9	7.7	430
2006-07	21.4	9.3	435
CAGR (per cent)	5.26	4.77	-0.46

Information on irrigated area and Area under improved varieties seeds is not available.

Source: Ibid

Growth Rates of Area, Production and Yield of Massar

Massar is a valuable pulse crop with excellent growth performance at the all India level. In Haryana, it is grown as minor pulse crop and it has exhibited poor performance and its production declined at around 6 per cent per year during the reference period. Like gram, area has declined at the rate of 7 per cent per year during the reference period. Although, growth of productivity was found positive during this period but it was inadequate to compensate for high area losses. Keeping in view high nutritional status of massar among pulses,

production needs to be increased in Haryana through improving productivity and expanding area wherever it is possible (Table-2.7).

Table 2.7

Compound Annual Growth Rate (CAGR) of Area, Production and Yield of Massar in Haryana, 1996-97 to 2006-07

Year	Area	Production	Yield
1996-97	9.3	7.2	774
1997-98	8.6	6	698
1998-99	11	7	636
1999-00	8.7	6.2	713
2000-01	6.5	5.2	800
2001-02	9.3	7.5	806
2002-03	6.0	5.4	900
2003-04	6.3	5.1	810
2004-05	5.9	4.7	797
2005-06	5.2	3.9	750
2006-07	4.5	3.5	778
CAGR (per cent)	-7.21	-6.06	1.24

Information on irrigated area and Area under Improved varieties seeds is not available.

Source: Ibid

IV. Growth of Pulse Production in Selected Districts:

Bhiwani:

Looking further at growth performance of pulse crops in Bhiwani (NFMS district) in Table-2.8, it was observed that area registered a high rate of decline that is 8.25 per cent per annum during the reference period because, cotton in kharif and mustard in rabi season were preferred by farmers due to their higher profitability. In addition, negative growth rate was observed for yield of pulses as a whole and gram in particular which is the main pulse crop of the district. Among pulse crops of the district, moong performed well and its production grew at 6.90 per cent per annum during the study period. It could be possible due to impressive growth in area and positive growth in yield. However, production of pulses as a whole in Bhiwani dropped at an alarming rate of 9.38 per cent per year during this period. Thus, poor production performance of the pulses at the state level was also reflected in Bhiwani.

Table 2.8

Compound Annual Growth Rate (CAGR) of Area, Production, Yield of Major Pulse Crops in Bhiwani District, 1996-97 to 2006-07

Crop	Area	Production	Yield
Gram	-9.43	-10.09	-0.78
Moong	5.24	6.90	1.88
Massar*	-	-	-
Other	-48.02	-48.29	-3.60
Total	-8.25	-9.38	-1.23

* Area under crop is negligible.

Source: Ibid

Mahendragarh:

Like Haryana and Bhiwani district, growth performance of pulse crops in Mahendragarh (non-NFSM district) was found extremely poor. Area under pulses declined at a high rate of 10.23 per cent per year during the reference period because farmers shifted to mustard in rabi season and gowar in kharif season due to their higher relative profitability. Un-expectedly, yield of pulses in the district has also dropped at less than 1 per cent per year during this period. As a whole, performance of pulses was poor and production declined at 10.83 per cent per year during the study period (Table-2.9).

Table 2.9

Compound Annual Growth Rate (CAGR) of Area, Production, Yield of Major Pulse Crops in Mahendragarh District, 1996-97 to 2006-07

Crop	Area	Production	Yield
Gram	-10.52	-10.04	-0.61
Moong*	-	-	-
Massar*	-	-	-
Other*	-	-	-
Total	-10.23	-10.83	-0.67

* Area under crop is negligible.

Source: Ibid

Summing up:

Results of data analyses in this chapter show that wheat and rice are the major cereal crops of Haryana and occupied 36.3 and 15.7 per cent of GCA during the reference period. Mustard and cotton were the next ranking crops with 10.5 and 8.9 per cent per cent of GCA. Pulse crops have experienced a poor status in crop pattern of Haryana and only 2.7 per cent of GCA was devoted to pulse sector during this period.

Findings of this chapter indicate that there has been significant growth in production and productivity of major cereals in Haryana between 1997 and 2007. Also, production of commercial crops such as mustard and cotton grew significantly (5.09 and 3.54 per cent per annum) during this period. Performance of pulses in the state however, has been poor. Pulse production declined at an alarming rate of 9.61 per cent per annum. Productivity growth of 1.32 per cent per year during this period was not impressive and therefore, was unable to compensate for continuous decline in area.

The scenario of growth performance of pulse crops during the study period in the selected districts of Bhiwani and Mahendragarh was equally poor since pulse production in both declined at a high rate although rate of decline was observed higher in Mahendragarh. In the scenario of despair, a silver lining was noticed in case of moong in Bhiwani. Its production grew at the rate of 6.90 per cent per year during the study period due to impressive growth in area and positive growth in yield. In view of this result, it is suggested that yield potential of moong should be realized by implementing specific policy measures such as easy availability of improved seeds to farmers.

Chapter-3

Demographic Profile and Cropping Pattern of the Sampled Farm Households

The efficiency and success of any economic enterprise, including farming, is influenced to a significant degree by the socio-economic background of the farm households. In addition, these characteristics influence the adoption of improved production technology. Therefore, this chapter presents some of the basic agro-economic features of the farm households surveyed for this study.

This chapter has been divided into two sections. Section I describes the socio-economic features of the sampled households. The next section outlines the details of cropping pattern and status of pulse farming on beneficiary and non-beneficiary farm households.

Section I

General Overview

Demographic Profile

The total population of the sampled households in Bhiwani was 313 persons. It included 127 males, 113 females and 73 children. In Mahendragarh, total population was 291 persons comprising of 117 males, 116 females and 58 children.

The average size of family was 6 persons in Bhiwani as well as in Mahendragarh. But, it varied across different categories of the farmers. The size of medium farm households was found higher than overall average size of family in the former district. Probably, their relatively large land holdings had been a basic factor for encouraging them to remain a joint family.

Overall, male-female ratio was 53.47 in Bhiwani and 50.50 in Mahendragarh. The medium farm households in Bhiwani and small farm households in Mahendragarh indicated the highest disparity in male/female ratio.

Table-3.1**Population and Size of Family of Sampled Households
(No.)**

Farm Size	-----Adults-----			Children	Total	Average Size of family
	Males	Females	Total			
BHIWANI						
Marginal	7	6	13	7	20	5
Small	23	23	46	21	67	6
Medium	56	48	104	30	134	7
Large	41	36	77	15	92	6
Total	127	113	240	73	313	6
MAHENDRAGARH						
Marginal	24	26	50	11	61	5
Small	40	32	72	15	87	5
Medium	35	42	77	18	95	7
Large	18	16	34	14	48	7
Total	117	116	233	58	291	6

Source: field Survey

Caste Composition:

Caste composition of sampled households in selected districts of Bhiwani and Mahendragarh indicates that majority of the sample farmers belonged to general category. Although, SC population constitutes a significant share of population in rural Haryana, they rarely own agricultural land. Most of them work as wage labour. As an exception, a few of them leased-in land from big cultivators. Therefore, share of SC households in sample was only 2 per cent and 4 per cent, respectively in Bhiwani and Mahendragarh districts. OBC formed 32 per cent and 18 per cent of sample in these districts while others constituted large majority by indicating 66 per cent and 78 per cent, respectively.

Table-3.2
Distribution of Caste Composition of Sampled Households
(Per cent)

Farm Size	SC	ST	OBC	Others	Total
BHIWANI					
Marginal	0.0	0.0	75.0	25.0	100
Small	0.0	0.0	27.3	72.7	100
Medium	5.0	0.0	35.0	60.0	100
Large	0.0	0.0	20.0	80.0	100
Total	2.0	0.0	32.0	66.0	100
MAHENDRAGARH					
Farm Size	SC	ST	OBC	Others	Total
Marginal	0.0	0.0	15.4	84.6	100
Small	0.0	0.0	11.8	88.2	100
Medium	7.7	0.0	15.4	76.9	100
Large	14.3	0.0	42.9	42.9	100
Total	4.0	0.0	18.0	78.0	100

Source: Ibid

Educational Status of Head of the Household

The educational level of head of the household is an indicator of better organizational set up and efficient use of available farm resources. Particularly, educational status of the head of the household affects the farm management techniques which in turn lead to optimum use of available farm resources and accelerate the agricultural production and farm income.

Table-3.3
Educational Status of the Head of the Sampled Households
(Per cent)

Farm Size	Illiterate	Primary	Secondary & Above	Total
BHIWANI				
Marginal	50.0	50.0	0.0	100
Small	27.3	27.3	45.5	100
Medium	25.0	10.0	65.0	100
Large	0.0	0.0	100.0	100
Total	20.0	14.0	66.0	100
MAHINDRAGARH				
Marginal	30.8	23.1	46.2	100
Small	35.3	41.2	23.5	100
Medium	23.1	23.1	53.8	100
Large	42.9	14.3	42.9	100
Total	32.0	28.0	40.0	100

Source: Ibid

Table 3.3 reveals that educational status of the head of the households is not impressive as 20 per cent of them in Bhiwani and 32 per cent in Mahendragarh were found illiterate. The proportion of illiterate heads of the household was high in economically impoverished households in Bhiwani but a contrast was observed in Mahendragarh where large farmers indicated the highest illiterate heads.

Out of 50 heads of household, 14 per cent in Bhiwani and 28 per cent in Mahendragarh had received education upto primary level. Their proportion was higher in households with small holdings. Further, 66 per cent of the heads of household in Bhiwani and 40 per cent in Mahendragarh attained secondary and above level of education. In Bhiwani, all the selected heads in large farm category received this level of education. However, this pattern was observed entirely different in Mahendragarh as only 40 per cent heads received education of this level. Moreover, medium farmers were ahead of other categories in this regard.

Table-3.4
Percentage Distribution of Adult Educated Population of Sampled Households

Farm Size	Illiterate	Primary	Secondary & Above	Total
BHIWANI				
Marginal	46.2	7.7	46.2	100
Small	21.7	4.3	73.9	100
Medium	26.9	4.8	68.3	100
Large	22.1	1.3	76.6	100
Total	25.4	3.8	70.8	100
MAHENDRAGARH				
Marginal	32.0	8.0	60.0	100
Small	25.0	12.5	62.5	100
Medium	20.8	9.1	70.1	100
Large	23.5	8.8	67.6	100
Total	24.9	9.9	65.2	100

Source: Ibid

Table 3.4 presents educational attainment of adult population in the sample households. Increasing awareness about the benefits of education in the rural areas of Haryana has lead to better results. Around 71 per cent adult

population attained above secondary level education in Bhiwani and large farmers indicated 76.6 per cent adults with this level of education. It could be due to their better economic status.

Results about educational attainment of adult population deviated in Mahendragarh where medium farmers were leading with 70 per cent adult population having secondary and above educational qualification. It is unfortunate that 25 per cent of adult population in beneficiary as well as non beneficiary households was found illiterate despite the implementation of the Sarva Shiksha Abhiyan for quite some time in Haryana.

Section-II

Crop-structure of Sampled Farms

Cropping Pattern:

Crop pattern signifies the proportion of cultivated area under different crops at a point of time. Crop pattern of an area depends on the soil, water and temperature. The information about the crop pattern of sampled farms in Bhiwani and Mahendragarh for average of three years (2007-08 to 2009-10) is presented in Table 3.5 and 3.6.

According to the survey, crop pattern in Bhiwani was dominated by cotton (26.15 per cent of GCA) followed by wheat (25.24 per cent of GCA). The other important crops grown were bajra and mustard (31.55 per cent of GCA). Around 12 per cent of cultivated area was devoted to pulses and these were found relatively popular in case of large farmers.

The allocation of GCA to important crops on sampled farms in Mahendragarh was significantly different. Crop pattern on sampled farms in Mahendragarh during the study period was dominated by bajra (28.44 per cent of GCA) followed by wheat (20.27 per cent of GCA). It suggests that these crops are quite common among the farmers. Pulses occupied 25.49 per cent of GCA. Other important crops of the district are gowar and mustard (24.41 per cent of GCA).

Season-wise information on crop pattern in Bhiwani district (Appendix table-) reveals that 167.43 acres of area was cultivated in rabi season against 127.21 acres in kharif season and only 6.30 acres in the zaid season. These differences occurred largely due to availability of assured irrigation. The percentage distribution of area devoted to various crops by the selected beneficiary farmers is indicative of their preference for cotton followed by bajra in kharif season and wheat followed by mustard in rabi season. In zaid season, only chillies were grown. Pulses received merely 1.10 per cent share of cultivated area in kharif season and small farmers were found ahead of others in growing pulses. On the other hand, proportion of cultivated area devoted to pulses was found one fifth and that appears to be quite significant.

Having analysed season-wise crop pattern in Bhiwani, NFSM district, we look into area devoted to various crops by non-beneficiary farmers in Mahendragarh district. Bajra followed by gowar was the main crops in kharif season and occupied 57.70 per cent and 27.49 per cent of cultivated area during the study period. Pulses received third rank by indicating 11.49 per cent of cultivated area. Among the various categories of farmers, marginal farmers devoted highest proportion of cultivated area to pulses. During rabi season, wheat followed by mustard were the major crops grown by the selected farmers. Pulses received almost same priority as for wheat due to inadequate availability of irrigation facilities. Particularly, marginal farmers devoted as high as 54.47 per cent of cultivated area to pulses. In zaid, again chillies were the only crop grown by the farmers.

Table 3.5

Cropping Pattern - All Seasons: Bhiwani District
(Average of 2007-08, 2008-09 and 2009-10 in ha)

AREA SOWN						
Farm Size	Wheat	Cotton	Other Major Crops	Pulses	Others	Total
Marginal	1.40	0.00	2.96	0.36	0.20	4.92
Small	9.33	5.60	7.93	2.67	2.20	27.73
Medium	24.00	28.10	32.19	10.60	6.97	101.85
Large	41.23	45.00	51.87	21.73	6.60	166.43
Total	75.97	78.70	94.95	35.36	15.97	300.94
PERCENTAGE OF TOTAL AREA SOWN						
Marginal	28.46	0.00	60.16	7.32	4.07	100.00
Small	33.65	20.19	28.61	9.62	7.93	100.00
Medium	23.56	27.59	31.60	10.41	6.84	100.00
Large	24.77	27.04	31.16	13.06	3.97	100.00
Total	25.24	26.15	31.55	11.75	5.31	100.00

Other Major Crops are: Bajra and Mustard

Pulses Crops are : Gram and Moong

Other Crops are: Paddy, Chillies, Tinda, Bhindi, Capcicum, Methi, Gowar, Sugarcane, Til and Fodder.

Source: Ibid

Table 3.6

Cropping Pattern - All Seasons: Mahendra Garh District
(Average of 2007-08, 2008-09 and 2009-10 in ha)

A R E A S O W N						
Farm Size	Wheat	Bajra	Other Major Crops	Pulses	Others	Total
Marginal	3.10	5.63	0.73	5.47	0.53	15.47
Small	7.57	13.50	12.03	12.80	0.27	46.17
Medium	11.57	18.40	14.73	16.07	0.27	61.03
Large	19.07	20.40	20.20	17.60	3.80	81.07
Total	41.30	57.93	47.70	51.93	4.87	203.73
PERCENTAGE OF TOTAL AREA SOWN						
Marginal	20.04	36.42	4.74	35.34	3.45	100.00
Small	16.39	29.24	26.06	27.73	0.58	100.00
Medium	18.95	30.15	24.14	26.32	0.44	100.00
Large	23.52	25.16	24.92	21.71	4.69	100.00
Total	20.27	28.44	23.41	25.49	2.39	100.00

Other Major Crops are: Gowar and Mustard

Pulses Crops are : Gram, Moong and Arhar

Other Crops are: Chillies, Methi, Raddish, Mix(Bajra+Gowar+Moong), etc.

Source: Ibid

Table 3.7

Cropping Pattern – Season-wise: Bhiwani District

(Average of 2007-08, 2008-09 and 2009-10

(Per cent)

K H A R I F A R E A S O W N					
Farm Size	Bajra	Cotton	Pulses	Others	Total
Marginal	97.18	0.00	0.00	2.82	100.00
Small	40.52	43.64	0.00	15.84	100.00
Medium	29.36	61.02	1.45	8.18	100.00
Large	26.68	68.22	1.11	3.99	100.00
Total	30.35	61.86	1.10	6.68	100.00

R A B I A R E A S O W N					
Farm Size	Wheat	Mustard	Pulses	Others	Total
Marginal	57.69	27.47	14.84	0.00	100.00
Small	62.64	18.34	17.90	1.12	100.00
Medium	44.94	34.96	18.60	1.50	100.00
Large	42.64	35.44	21.72	0.21	100.00
Total	45.37	33.65	20.28	0.70	100.00

Z A I D A R E A S O W N					
Farm Size	Chillies		Pulses	Others	Total
Marginal	-	-	-	-	-
Small	-	-	-	-	-
Medium	-	-	-	-	-
Large	100.00	0.00	0.00	0.00	100.00
Total	100.00	0.00	0.00	0.00	100.00

Source: Ibid

Thus, differences in crop pattern on sampled farms in Bhiwani and Mahendragrh are not prominent. In Bhiwani, crop pattern is dominated by dry crops except wheat due to lack of assured irrigation facilities. These are grown against the backdrop of uncertainty of rainfall. Similarly, crop pattern in Mahendragrh is also dominated by rainfed crops such as mustard, gowar, gram and moong.

Table 3.8

Cropping Pattern – Season-wise: Mahendra Garh District
(Average of 2007-08, 2008-09 and 2009-10) (Per cent)

K H A R I F A R E A S O W N					
Farm Size	Bajra	Gowar	Pulses	Others	Total
Marginal	73.80	3.49	15.72	6.99	100.00
Small	59.12	30.66	10.22	0.00	100.00
Medium	60.00	26.09	13.91	0.00	100.00
Large	51.95	31.41	9.51	7.13	100.00
Total	57.70	27.49	11.49	3.32	100.00

R A B I A R E A S O W N					
Farm Size	Wheat	Mustard	Pulses	Others	Total
Marginal	39.57	5.96	54.47	0.00	100.00
Small	32.43	21.57	44.86	1.14	100.00
Medium	38.09	22.17	38.86	0.88	100.00
Large	45.69	18.85	33.23	2.24	100.00
Total	39.99	19.46	39.12	1.42	100.00

Z A I D A R E A S O W N					
Farm Size	Chillies		Pulses	Others	Total
Marginal	-	-	-	-	-
Small	-	-	-	-	-
Medium	-	-	-	-	-
Large	100.00	0.00	0.00	0.00	100.00
Total	100.00	0.00	0.00	0.00	100.00

Source: Ibid

Acreage under Pulse Crops:

Table-3.9 reveals that pulse economy of sampled farms in Bhiwani is dominated by gram. It occupied around 96 per cent of pulse area at the overall level. Further, small and marginal farmers devoted entire pulse area to gram. It was as high as 93.71 per cent on medium farms and 96.63 per cent on large farms during the study period. The next pulse crop of the district was moong which accounted for 3.96 per cent of total area under pulses. Thus, gram was observed as dominant pulse crop of the sampled farms in district Bhiwani and moong was a minor pulse crop grown by the farmers.

The allocation of area under pulse crops on sampled farms in Mahendragarh has indicated some divergence. Pulse economy of Mahendragarh is also dominated by gram which accounted for 77.79 per cent of total pulse area. It was around 78 per cent on marginal farms, 82 per cent on small and 79 per cent on large farms. Among other pulses, moong was significant which occupied 21.92 per cent of total area under pulses. In addition, arhar was also grown but its share was marginal.

In brief, pulse economy of Bhiwani depends largely on gram while gram and moong together play important role in Mahendragarh.

Table 3.9

Season-wise Area under Pulse Crops in Bhiwani and Mahendragarh Districts

(Average of 2007-08, 2008-09 and 2009-10)

(Per cent)

Farm Size	K H A R I F			R A B I	Kharif+Rabi
	Moong	Arhar	Total	Gram	Total
BHIWANI					
Marginal	0.00	-	0.00	100.00	100.00
Small	0.00	-	0.00	100.00	100.00
Medium	6.29	-	6.29	93.71	100.00
Large	3.37	-	3.37	96.63	100.00
Total	3.96	-	3.96	96.04	100.00
MAHENDRAGARH					
Marginal	21.95	0.00	21.95	78.05	100.00
Small	17.19	1.04	18.23	81.77	100.00
Medium	26.56	0.00	26.56	73.44	100.00
Large	21.21	0.00	21.21	78.79	100.00
Total	21.95	0.26	22.21	77.79	100.00

Source: Ibid

Table 3.10

Share of Different Farm Size Groups in Pulse Farming

(Average of 2007-08, 2008-09 and 2009-10)

Farm Size	Total Area Under Pulses	Per cent Share to Total
BHIWANI		
Marginal	0.36	1.02
Small	2.67	7.54
Medium	10.60	29.98
Large	21.73	61.46
Total	35.36	100.00
MAHENDRAGARH		
Marginal	5.47	10.53
Small	12.80	24.65
Medium	16.07	30.94
Large	17.60	33.89
Total	51.93	100.00

Source: Ibid

It would be interesting to look into the share of various categories of farm households in pulse farming in the selected districts for the study. As such, large farm households indicated around 61 per cent share in pulse farming in Bhiwani. Marginal and small farm households could share hardly 8 per cent due to their small land holdings and a small fraction devoted to pulses on these farms (Table-3-10).

A significant variation was observed in the share of various categories in pulse farming in Mahendragarh district. Here, each category share more than 10 per cent in pulse farming but again large farmer's share was higher due to their big farms where it was possible to grow pulses on sizeable land.

Irrigation:

Irrigation plays an important role in the development of agriculture in any region. In arid and semi-arid climatic conditions, timing and amount of rainfall are uncertain and quantum is not adequate to meet the moisture requirement of crops. Therefore, supplementary irrigation is essential to raise crops and to realize potential of yield.

Tables-3.11 and 3.12 present crop-wise share in irrigated area in the NFSM and non NFSM districts of Bhiwani and Mahendragarh districts in Haryana. Field survey has revealed that major crops such as wheat and cotton received more than half of the share in irrigated area in Bhiwani district. Particularly, large farmers reserved around 61 per cent share for these crops. Other important crops received around 32 per cent share while pulses could get hardly 11 per cent share. This indicates that pulses received lowest priority in allotting irrigated area by the beneficiary farmers in this district. Marginal farmer's devoted merely 6 per cent share to these protein rich crops.

An examination of crop wise irrigated area in Mahendragarh, a non NFSM district showed that wheat, a major crop of the area received highest priority and cornered around half of irrigated area. Other major crops also showed around 28 per cent share in irrigated area. It is essential to mention that share of irrigated area received by pulses was found almost double in Mahendragarh district in comparison to Bhiwani and enjoyed 21.78 per cent share in irrigated area. Marginal farmers also devoted 31.09 per cent share to pulses.

Table 3.11**Crop-wise Share in Irrigated Area: Bhiwani District**

(Average of 2007-08, 2008-09 and 2009-10)

Irrigated Area in ha.				
Farm Size	Pulses	Wheat & Cotton	All Other Crops	Total
Marginal	0.23	1.40	1.89	3.52
Small	1.60	11.13	7.73	20.47
Medium	6.53	37.17	27.82	71.52
Large	14.80	72.77	31.27	118.83
Total	23.16	122.47	68.71	214.34
Per cent of Irrigated Area				
Marginal	6.44	39.77	53.79	100.00
Small	7.82	54.40	37.79	100.00
Medium	9.13	51.97	38.90	100.00
Large	12.45	61.23	26.31	100.00
Total	10.81	57.14	32.06	100.00

Source: Ibid

Table 3.12**Crop-wise Share in Irrigated Area: Mahendragarh District**

(Average of 2007-08, 2008-09 and 2009-10)

Irrigated Area in ha.				
Farm Size	Pulses	Wheat	All Other Crops	Total
Marginal	2.47	4.47	1.00	7.93
Small	6.13	13.60	10.43	30.17
Medium	7.00	12.77	7.67	27.43
Large	7.53	22.13	11.00	40.67
Total	23.13	52.97	30.10	106.20
Per cent of Irrigated Area				
Marginal	31.09	56.30	12.61	100.00
Small	20.33	45.08	34.59	100.00
Medium	25.52	46.54	27.95	100.00
Large	18.52	54.43	27.05	100.00
Total	21.78	49.87	28.34	100.00

Source: Ibid

Table 3.13**Percentage of Irrigated Area under Pulses in Bhiwani and Mahendragarh Districts**

(Average of 2007-08, 2008-09 and 2009-10)

<i>Irrigated Area in ha.</i>									
Bhiwani					Mahendragarh				
Farm Size	Gram	Moong	Arhar	Total		Gram	Moong	Arhar	Total
Marginal	0.23	0.00	-	0.23		1.67	0.80	0.00	2.47
Small	1.60	0.00	-	1.60		4.80	1.20	0.13	6.13
Medium	5.87	0.67	-	6.53		5.40	1.60	0.00	7.00
Large	14.07	0.73	-	14.80		5.73	1.80	0.00	7.53
Total	21.76	1.40	-	23.16		17.60	5.40	0.13	23.13
Total Area in ha.									
Marginal	0.36	0.00	-	0.36		4.27	1.20	0.00	5.47
Small	2.67	0.00	-	2.67		10.47	2.20	0.13	12.80
Medium	9.93	0.67	-	10.60		11.80	4.27	0.00	16.07
Large	21.00	0.73	-	21.73		13.87	3.73	0.00	17.60
Total	33.96	1.40	-	35.36		40.40	11.40	0.13	51.93
Per cent of Irrigated Area									
Marginal	62.96	-	-	62.96		39.06	66.67	-	45.12
Small	60.00	-	-	60.00		45.86	54.55	100.00	47.92
Medium	59.06	100.00	-	61.64		45.76	37.50	-	43.57
Large	66.98	100.00	-	68.10		41.35	48.21	-	42.80
Total	64.08	100.00	-	65.50		43.56	47.37	100.00	44.54

Source: Ibid

Irrigation Facilities for Pulse Crops

Although, two to three life saving irrigations improve productivity of pulses, the large proportion of area under pulses remains rainfed/unirrigated in India. But, situation was observed different in the selected districts. It may be seen from Table 3.13 that 65.50 per cent of cultivated area under pulses was irrigated in Bhiwani during the study period. Class variations were not substantial, although large farmers indicated the highest proportion of area under pulses as irrigated. Cultivated area under moong was found fully irrigated. In case of gram, more than 50 per cent of cultivated area was found irrigated in each category.

In Mahendragarh, irrigation facilities are poorer than Bhiwani but around 45 per cent of cultivated area under pulses was found irrigated during this period. Small farm households have shown slightly higher proportion of irrigated area under pulses. Moong received little higher irrigation in comparison to gram.

Summing up:

The cropping pattern of sampled farmers in Bhiwani, (NFISM district) and in Mahendragarh (non-NFISM district) is largely dry crops based due to inadequate availability of irrigation facilities except for wheat which occupied more than 20 per cent of GCA. These districts have tremendous and immense scope for increasing area under pulses. This, however, would be possible only if the existing available improved production technology is extended to the farmers for adoption with availability of crucial inputs both in rainfed and irrigated conditions.

In irrigated conditions, land is generally kept fallow after the harvest of rabi crops. Short duration varieties of summer moong/urd can be easily fitted in crop rotations in such areas where irrigation facilities are available. In summer, these crops have no competition with the main crops. With increase in irrigation facilities in the coming years, there appears to be a great scope of increasing summer cultivation of pulse crops. This would add a new dimension in raising acreage under pulses.

In un-irrigated/rainfed conditions, acreage of pulses in these areas can be increased by popularizing the practices of inter-cropping and mixed-cropping. Through these devices, farmers can have two crops with different requirements. In Bhiwani, arhar can be inter-cropped with bajra and cotton. In Mahendragarh, urd can be advantageously accommodated with important crops. Similarly, other crops can be also used for inter-cropping of pulses. The pulse crops besides giving additional income will help farmers in enhancing soil fertility.

Chapter-4

Economics of Pulse Cultivation vis-à-vis other Important Crops

Profitability of various crops is the most important determinant of production of agricultural commodities governing the behaviour of producers. In reality, perceptions of profitability derive crop options. Farmers grow crops, which offer the highest returns per unit of their scarcest resources such as land and dearer inputs. Profitability being a catalytic factor in increased production of agricultural commodities; it is proposed to examine the same for pulse crops with principal crops grown in Bhiwani (NFMS district) and Mahendragarh (non-NFMS district) in Haryana for three years (2007-08, 2008-09 and 2009-10).

In this chapter, analysis of gross and net returns from gram cultivation is based on yearly data collected during the field survey in these districts. The discussion is confined to gram, moong, wheat, bajra, gowar, mustard and cotton. The paid out costs were considered appropriate for measuring net returns of these crops. These included cost of hired human labour, bullock labour, machine labour, seeds, fertilizers and manure, pesticides and irrigation charges and cost of miscellaneous items. Thus, paid out cost is the cost that has been incurred by the farmer in cash for raising a particular crop. The net returns for each crop were worked out by subtracting costs from gross returns. In gross returns, value of the main product and by product was added. It may be mentioned here that the net returns and profitability are used interchangeably in this analysis.

Now, results of profitability of gram, moong, vis-à-vis principal crops in Bhiwani (NFMS district) and Mahendragarh (non-NFMS district) are presented for the years 2007-08, 2008-09 and 2009-10.

I. Gram:

At the outset, information on gross returns and net returns from gram cultivation in the selected districts for three years is presented in Table-4.1. The main competing crops considered in the forth coming analysis are wheat and mustard. It may be noticed that gross returns per hectare from gram cultivation in Bhiwani and Mahendragarh districts during 2007-08 were Rs. 22407 and Rs. 20744, respectively. Bhiwani has indicated higher value productivity of gram due

to having higher proportion of gram area as irrigated. It is expected that assistance received under the NFSM has reduced paid out costs of farmers in Bhiwani but net returns per hectare from gram cultivation were found marginally lower than Mahendragarh. Significant differences were observed across the various categories of farmers. Medium farmers in Bhiwani and marginal farmers in Mahendragarh reaped higher gross returns in comparison to other categories of farmers during 2007-08. Class variations were also noticed for net returns per hectare and medium farmers benefited more than others. In case of gross and net returns per quintal, Mahendragarh was ahead of Bhiwani. Among various categories of farmers, marginal farmers in Bhiwani as well as in Mahendragarh were ahead of other categories in reaping gross returns per quintal while for net returns per quintal, large farmers in Mahendragarh were leading over others. The value of market surplus of gram was positively related to farm size in both the situations except small farms in Mahendragarh during 2007-08 when value of marketed surplus was higher than medium farmers. During the next year, gross returns per hectare in Bhiwani were higher but net returns per hectare were marginally lower than Mahendragarh. It could be due to lower paid out costs in Mahendragarh. Farm size variations were common in both the districts. Marginal farmers in Bhiwani and large farmers in Mahendragarh reaped higher net returns per hectare from gram cultivation in comparison to other categories of farmers during 2008-09. Further, gross net returns per quintal during this year in Bhiwani were encouraging and these were found lower than Mahendragarh at the overall level. Moreover, mixed scenario emerged for various categories of farmers. Mostly, value of marketed surplus and farm size were positively related in both the selected districts. During 2009-10, gross and net returns per hectare in Bhiwani were observed significantly higher than Mahendragarh. Across the farm categories, marginal farmers in case of gross returns and large farmers in Mahendragarh in case of net returns were ahead of other categories. Results for gross and net returns per quintal followed the same pattern and Bhiwani was found ahead of Mahendragarh. It could be due to better

Table 4.1
Profitability of Pulse Farming on Sampled Farms : GRAM (Rs)

District/ Farm-Size	Gross Returns	Paid out costs	Net Returns	Gross Returns per ha	Net Returns per ha	Gross Returns per qtl	Net Returns per qtl	Value of Marketed surplus
BHIWANI								
Marginal								
2007-08	3400	1620	1780	21250	11125	2267	1187	2000
2008-09	4650	1825	2825	29063	17656	2325	1413	3150
2009-10	16100	6515	9585	21184	12612	2147	1278	6450
Small								
2007-08	55025	27025	28000	19652	10000	1897	966	38700
2008-09	51610	26830	24780	19850	9531	2064	991	40200
2009-10	51450	32645	18805	19788	7233	2287	836	25750
Medium								
2007-08	221840	92600	129240	23600	13749	1904	1109	181125
2008-09	275955	116820	159135	26033	15013	2067	1192	242640
2009-10	220335	117468	102867	22483	10497	2283	1066	179685
Large								
2007-08	417950	167285	250665	22231	13333	1926	1155	309800
2008-09	617450	241955	375495	22131	13459	1868	1136	537625
2009-10	522750	142375	380375	32071	23336	2318	1687	320500
Total								
2007-08	698215	288530	409685	22407	13148	1918	1126	531625
2008-09	949665	387430	562235	23017	13627	1934	1145	823615
2009-10	810635	299003	511632	27516	17367	2303	1454	532385
MAHENDRAGARH								
Marginal								
2007-08	81330	34656	46674	23921	13728	2169	1245	66550
2008-09	136650	57072	79578	24845	14469	2152	1253	114450
2009-10	94125	43561	50564	24135	12965	2268	1218	78800
Small								
2007-08	218865	90400	128465	22798	13382	1972	1157	192600
2008-09	252450	110250	142200	23593	13290	2214	1247	209623
2009-10	231755	127215	104540	20879	9418	2179	983	184375
Medium								
2007-08	245100	80260	164840	20425	13737	2060	1385	183800
2008-09	204675	98140	106535	16506	8592	2047	1065	177425
2009-10	252560	88825	163735	22960	14885	2245	1455	184720
Large								
2007-08	288600	94030	194570	18987	12801	2061	1390	255200
2008-09	370750	95650	275100	23766	17635	2168	1609	331500
2009-10	257750	89500	168250	23866	15579	2148	1402	190050
Total								
2007-08	833895	299346	534549	20744	13297	2046	1312	698150
2008-09	964525	361112	603413	21822	13652	2151	1345	832998
2009-10	836190	349101	487089	22723	13236	2198	1281	637945

Source: Field Survey

progress of the Mission in assisting farmers. Moreover, value of marketed surplus and farm size were positively related in Bhiwani as well as in Mahendragarh.

The story of wheat, which is main competing crop of gram in irrigated areas in rabi season in Haryana in general and Bhiwani and Mahendragarh in particular is different. The gross returns and net returns per hectare from wheat cultivation in Bhiwani during 2007-08 were observed higher than Mahendragarh. Among various categories of farmers, medium farmers in Bhiwani and small farmers in Mahendragarh reaped higher gross and net returns in comparison to other categories. This pattern of higher gross and net returns in Bhiwani continued in 2008-09 and 2009-10 but the rank of farm categories changed. In 2008-09, medium farmers in Bhiwani and small farmers in Mahendragarh

Table 4.2
Profitability of Important Rabi Crop on Sampled Farms : WHEAT (Rs.)

District Farm-Size	Gross Returns	Paid out costs	Net Returns	Gross Returns per ha	Net Returns per ha	Gross Returns per qtl	Net Returns per qtl	Value of Marketed surplus
BHIWANI								
Marginal								
2007-08	39800	13680	26120	28429	18657	1047	687	20100
2008-09	48300	16560	31740	34500	22671	1098	721	27400
2009-10	52000	18550	33450	37143	23893	1238	796	28200
Small								
2007-08	255150	87545	167605	28994	19046	1079	709	143060
2008-09	321390	108690	212700	33478	22156	1160	768	181700
2009-10	350140	123200	226940	36473	23640	1269	822	187250
Medium								
2007-08	702880	244117	458763	30828	20121	1023	668	403710
2008-09	841390	278543	562847	33927	22695	1105	739	504680
2009-10	1022660	323237	699423	41912	28665	1224	837	551560
Large								
2007-08	1156100	435650	720450	28267	17615	1063	662	790300
2008-09	1134270	445220	689050	29693	18038	1106	672	839650
2009-10	1584300	591100	993200	35522	22269	1242	778	1023300
Total								
2007-08	2153930	780992	1372938	29147	18578	1051	670	1357170
2008-09	2345350	849013	1496337	31694	20221	1112	710	1553430
2009-10	3009100	1056087	1953013	37614	24413	1239	804	1790310
MAHENDRAGARH								
Marginal								
2007-08	96050	38150	57900	28250	17029	1216	733	42300
2008-09	55250	17800	37450	27625	18725	1151	780	20250
2009-10	93500	43720	49780	23974	12764	1087	579	34000
Small								
2007-08	240940	99060	141880	36506	21497	1223	720	116050
2008-09	245230	93350	151880	31440	19472	1179	730	144320
2009-10	240975	103080	137895	29033	16614	1064	609	133550
Medium								
2007-08	284100	132300	151800	20737	11080	1235	660	160250
2008-09	182500	88405	94095	19010	9802	1185	611	91500
2009-10	224100	104640	119460	19658	10479	1143	609	125800
Large								
2007-08	521200	168850	352350	27146	18352	1169	790	387450
2008-09	461700	172750	288950	25650	16053	1154	722	333700
2009-10	392200	139800	252400	19610	12620	1117	719	272000
Total								
2007-08	1142290	438360	703930	26627	16409	1200	739	706050
2008-09	944680	372305	572375	25259	15304	1166	707	589770
2009-10	950775	391240	559535	21807	12833	1106	651	565350

Source: Ibid.

were leading over other categories. Next year the same pattern was noticed for gross returns as well as net returns per hectare. During this year, Bhiwani was also ahead of Mahendragarh in reaping gross and net returns per quintal from wheat cultivation. An examination of the value of marketed surplus in both the selected districts during the three years period of study indicated that it was positively related to farm size i.e. bigger the operational holding of the farmer and higher is the value of marketed surplus. Only one exception was noticed in Mahendragarh during 2008-09 when value of the marketed surplus of medium farmers was lower than small farmers (Table 4.2).

Mustard competes with gram in un-irrigated areas during the rabi season in Haryana and in study areas. The results of gross returns, net returns and value of marketed surplus are reported in Table-4.3. The gross and net returns per hectare from mustard cultivation in Bhiwani district during 2007-08 were Rs. 31459 and Rs. 24058, respectively. The comparable figures for Mahendragarh district were Rs. 21486 and Rs. 12897, respectively. A large variation of Rs. 9973 and Rs.11261 was noticed. It could be attributed to agro-climatic reasons. But, per quintal gross returns were found higher in Mahendragarh while opposite was seen in case of net returns per quintal. Next year, gross and net returns per ha from mustard cultivation in Bhiwani were also found higher than Mahendragarh. The same pattern was observed for net returns per quintal. Results were the same for the third year i.e. 2009-10 and Bhiwani emerged winner over Mahendragarh in mustard cultivation in terms of gross and net returns per hectare as well as per quintal.

Like gram and wheat, farm size variations in gross returns and net returns per hectare and per quintal were common in case of mustard too in both the selected districts. Medium farmers in Bhiwani and marginal farmers in Mahendragarh reaped higher gross returns per hectare during 2007-08. The same pattern was observed during 2008-09 and 2009-10. But, this was not true for net returns per hectare because value of net returns in case large farmers in Bhiwani during 2009-10 was found higher than other categories. A mixed pattern emerged for gross and net returns per quintal across farm sizes and across the

years. The value of marketed surplus of mustard was positively related to farm size in all cases. Findings on profitability of gram and its competing crops (wheat and mustard) during three years of study establish superiority of wheat and mustard over gram in Bhiwani. In Mahendragarh, a mixed scenario has emerged and gram was found ahead of two competing crops in terms of profitability per hectare during 2009-10 while wheat attained first rank during 2007-08 and 2008-09.

Table-4.3- Profitability of other Important Rabi Crop on Sampled Farms: MUSTARD (Rs.)

Farm-Size	Gross Returns	Total Paid out costs	Paid out costs	Gross Returns per ha	Net Returns per ha	Gross Returns per qtl	Net Returns per qtl	Value of Marketed surplus
BHIWANI								
Marginal								
2007-08	16060	6245	9815	16060	9815	2008	1227	12100
2008-09	16500	7195	9305	16500	9305	2063	1163	12600
2009-10	-	-	-	-	-	-	-	-
Small								
2007-08	69430	27700	41730	23143	13910	1851	1113	41850
2008-09	80100	27565	52535	30808	20206	2054	1347	56950
2009-10	93200	28095	65105	35846	25040	2219	1550	57200
Medium								
2007-08	694850	185793	509057	34061	24954	1909	1399	616100
2008-09	620700	186365	434335	35267	24678	2009	1406	567500
2009-10	700300	207262	493038	38906	27391	2135	1503	673250
Large								
2007-08	1207900	248035	959865	31131	24739	1890	1502	1063900
2008-09	1021050	280170	740880	32312	23446	2042	1482	900600
2009-10	1246510	323100	923410	38473	28500	2226	1649	958110
Total								
2007-08	1988240	467773	1520467	31459	24058	1896	1450	1733950
2008-09	1738350	501295	1237055	32923	23429	2031	1445	1537650
2009-10	2040010	558457	1481553	38491	27954	2194	1593	1688560
MAHENDRAGARH								
Marginal								
2007-08	17384	5950	11434	43460	28585	2246	1477	16404
2008-09	14450	5175	9275	36125	23188	2064	1325	11900
2009-10	13850	6180	7670	23083	12783	1910	1058	10500
Small								
2007-08	126350	49940	76410	28078	16980	2362	1428	114400
2008-09	103663	54950	48713	20326	9551	2171	1020	84650
2009-10	116900	56175	60725	21255	11041	2033	1056	92980
Medium								
2007-08	80425	48840	31585	15466	6074	2062	810	59350
2008-09	106775	63585	43190	12711	5142	1996	807	88000
2009-10	111950	51030	60920	16962	9230	2073	1128	97750
Large								
2007-08	169040	52450	116590	20615	14218	2140	1476	149800
2008-09	208500	45580	162920	27434	21437	2230	1742	179550
2009-10	154350	51830	102520	19788	13144	1929	1282	138650
Total								
2007-08	393199	157180	236019	21486	12897	2194	1317	339954
2008-09	433388	169290	264098	20158	12284	2148	1309	364100
2009-10	397050	165215	231835	19368	11309	1998	1166	339880

Source: Ibid

II. Moong

After analyzing the relative profitability of gram vis-à-vis its principal competing crops in Bhiwani (NFSM district) and Mahendragarh (non-NFSM district) during the study period of three years, the same is examined for moong. Moong is a minor pulse crop grown in Bhiwani and Mahendragarh districts of Haryana. Table-4.4 suggests that gross and net returns per hectare by cultivating moong in Bhiwani during 2007-08 were Rs. 27417 and Rs. 18517, respectively. The corresponding figures in Mahendragarh were Rs. 23234 and Rs. 17206, respectively. These were observed lower in Mahendragarh. The same pattern was noticed in 2008-09 and 2009-10. Farm size variations were common. First two categories did not grow moong in Bhiwani and a mixed pattern was observed in rest of the two categories. In 2007-08, large farmers were ahead of medium farmers while reverse was noticed during 2008-09. In Mahendragarh district, marginal farmers during first two years of study and small farmers during 2009-10, indicated higher gross and net returns per hectare. In case of gross and net returns per quintal, Mahendragarh was ahead of Bhiwani districts. Since moong is minor pulse crop grown by sampled farmers in the study area, value of marketed surplus was relatively lower in comparison to gram. The value of marketed surplus and farm size were positively related in Bhiwani during 2008-09 and 2009-10 but this was not true in 2007-08. A mixed pattern was observed in Mahendragarh.

Table 4.4
Profitability of Pulse Farming on Sampled Farms : MOONG (Rs.)

Farm-Size	Gross Returns	Paid out costs	Net Returns	Gross Returns per ha	Net Returns per ha	Gross Returns per qtl	Net Returns per qtl	Value of Marketed surplus
BHIWANI								
Marginal								
2007-08	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-
2009-10	-	-	-	-	-	-	-	-
Small	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-
2009-10	-	-	-	-	-	-	-	-
Medium	-	-	-	-	-	-	-	-
2007-08	17925	6555	11370	25607	16243	3117	1977	10600
2008-09	21600	4919	16681	30857	23830	3323	2566	16500
2009-10	16750	5420	11330	27917	18883	3722	2518	6125
Large	-	-	-	-	-	-	-	-
2007-08	6750	1455	5295	33750	26475	3000	2353	6000
2008-09	46725	13385	33340	25958	18522	3461	2470	45150
2009-10	7000	1740	5260	35000	26300	3500	2630	7000
Total	-	-	-	-	-	-	-	-
2007-08	24675	8010	16665	27417	18517	3084	2083	16600
2008-09	68325	18304	50021	27330	20008	3416	2501	61650
2009-10	23750	7160	16590	29688	20738	3654	2552	13125
MAHENDRAGARH								
Marginal	-	-	-	-	-	-	-	-
2007-08	41500	8200	33300	34583	27750	3192	2562	41500
2008-09	58800	13200	45600	36750	28500	3459	2682	58300
2009-10	18100	8000	10100	22625	12625	3620	2020	16000
Small	-	-	-	-	-	-	-	-
2007-08	73250	22580	50670	25259	17472	3447	2384	62025
2008-09	67300	20955	46345	29261	20150	3959	2726	62050
2009-10	53300	11445	41855	38071	29896	4442	3488	47500
Medium	-	-	-	-	-	-	-	-
2007-08	134050	33720	100330	20945	15677	3551	2658	125850
2008-09	75600	14570	61030	31500	25429	3979	3212	70450
2009-10	116750	30375	86375	29188	21594	4373	3235	106425
Large	-	-	-	-	-	-	-	-
2007-08	83450	21700	61750	21961	16250	3379	2500	58600
2008-09	59350	17015	42335	16486	11760	2800	1997	53950
2009-10	90000	22620	67380	23684	17732	4327	3239	83800
Total	-	-	-	-	-	-	-	-
2007-08	332250	86200	246050	23234	17206	3436	2544	287975
2008-09	261050	65740	195310	26369	19728	3518	2632	244750
2009-10	278150	72440	205710	27815	20571	4312	3189	253725

Source: Ibid

Farmers in Bhiwani and Mahendragarh grow bajra, cotton and gowar as main competing crops. The data presented in Table-4.5 reveal that gross returns and net returns per hectare from bajra cultivation in Bhiwani during 2007-08 were Rs. 12584 and Rs. 6706, respectively. The corresponding figures for Mahendragarh district were Rs. 12737 and Rs. 7932, respectively. Clearly, farmers in Mahendragarh reaped higher profitability per unit of land in comparison to Bhiwani district. Next year, Bhiwani was ahead of Mahendragarh district in gross returns per hectare. However, it was lagging in net returns per hectare. The situation for Bhiwani showed a marked improvement in third year i.e. 2009-10 and Bhiwani was leading over Mahendragarh not only in gross and net returns per hectare but also in gross and net returns per quintal.

Like earlier cases, farm size variations were common in profitability. During 2007-08, medium farmers in Bhiwani and small farmers in Mahendragarh indicated higher returns per hectare. In second year, small farmers in Bhiwani and large farmers in Mahendragarh were found ahead of other categories while large farmers in Bhiwani and small farmers in Mahendragarh reaped higher returns per unit of area in comparison to other categories. The value of marketed surplus of bajra was noticed higher on large farms in Bhiwani as well as in Mahendragarh but farm size and marketed surplus was not positively related in each year of the study period.

Table 4.5
Profitability of other Important Kharif Crop on Sampled Farms: BAJRA (Rs.)

Farm-Size	Gross Returns	Paid out costs	Net Returns	Gross Returns per ha	Net Returns per ha	Gross Returns per qtl	Net Returns per qtl	Value of Marketed surplus
BHIWANI								
Marginal								
2007-08	31225	17380	13845	12197	5408	811	360	11950
2008-09	32800	15080	17720	12813	6922	875	473	11625
2009-10	23400	10850	12550	13295	7131	936	502	14500
Small								
2007-08	65380	29340	36040	13621	7508	866	477	35740
2008-09	99090	40330	58760	16515	9793	885	525	51400
2009-10	75780	31900	43880	15788	9142	1031	597	34890
Medium								
2007-08	180450	82030	98420	13881	7571	785	428	113630
2008-09	218958	99755	119203	14036	7641	854	465	132340
2009-10	201000	82988	118012	16806	9867	939	551	121200
Large								
2007-08	235860	110820	125040	11562	6129	791	420	148760
2008-09	270160	146823	123337	13243	6046	802	366	164060
2009-10	239050	89098	149952	19921	12496	972	610	106700
Total								
2007-08	512915	239570	273345	12584	6706	799	426	310080
2008-09	621008	301988	319020	13936	7159	836	429	359425
2009-10	539230	214836	324394	17668	10629	965	581	277290
MAHENDRAGARH								
Marginal								
2007-08	71700	30520	41180	13528	7770	919	528	44600
2008-09	80070	29725	50345	13126	8253	880	553	55690
2009-10	59435	28105	31330	10806	5696	764	403	40970
Small								
2007-08	218740	87875	130865	14982	8963	886	530	162250
2008-09	195230	72165	123065	15018	9467	824	519	144975
2009-10	158450	66950	91500	12283	7093	821	474	119050
Medium								
2007-08	199850	84550	115300	11355	6551	892	515	137050
2008-09	166075	80490	85585	9436	4863	774	399	123750
2009-10	183300	82340	100960	9165	5048	822	453	130800
Large								
2007-08	252300	77220	175080	12130	8417	993	689	168900
2008-09	282750	72640	210110	15367	11419	939	698	199500
2009-10	215600	72810	142790	9800	6490	849	562	144350
Total								
2007-08	742590	280165	462425	12737	7932	925	576	512800
2008-09	724125	255020	469105	13142	8514	858	556	523915
2009-10	616785	250205	366580	10212	6069	825	490	435170

Source: Ibid

Table 4.6
Profitability of other Important Kharif Crop on Sampled Farms in Bhiwani: COTTON

(Rs.)

Farm-Size	Gross Returns	Paid out costs	Net Returns	Gross Returns per ha	Net Returns per ha	Gross Returns per qtl	Net Returns per qtl	Value of Marketed surplus
Marginal								
2007-08	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-
2009-10	-	-	-	-	-	-	-	-
Small								
2007-08	265050	89250	175800	49083	32556	2388	1584	262475
2008-09	321080	105100	215980	55359	37238	2654	1785	311650
2009-10	316850	102750	214100	56580	38232	2804	1895	260850
Medium								
2007-08	1290130	457275	832855	47606	30733	2335	1507	1266675
2008-09	1603665	548460	1055205	55490	36512	2539	1671	1582515
2009-10	1737550	596800	1140750	61398	40309	2821	1852	1918900
Large								
2007-08	1973900	924270	1049630	40783	21687	2413	1283	1936000
2008-09	1975650	904490	1071160	48423	26254	2530	1372	1938950
2009-10	2620900	1037150	1583750	57225	34580	2906	1756	2588300
Total								
2007-08	3529080	1470795	2058285	43623	25442	2382	1389	3465150
2008-09	3900395	1558050	2342345	51661	31024	2543	1527	3833115
2009-10	4675300	1736700	2938600	58661	36871	2867	1802	4768050

Source: Ibid

Table 4.7
Profitability of other Important Kharif Crop on Sampled Farms in Mahendragarh:GOWAR
(Rs.)

Farm-Size	Gross Returns	Paid out costs	Net Returns	Gross Returns per ha	Net Returns per ha	Gross Returns per qtl	Net Returns per qtl	Value of Marketed surplus
Marginal								
2007-08	15000	4400	10600	37500	26500	3000	2120	13000
2008-09	-	-	-	-	-	-	-	-
2009-10	6500	2100	4400	16250	11000	2167	1467	6000
Small								
2007-08	136425	59835	76590	17490	9819	2162	1214	127500
2008-09	124610	50075	74535	17307	10352	2026	1212	107595
2009-10	83025	41395	41630	13838	6938	1887	946	69794
Medium								
2007-08	111400	51550	59850	12659	6801	2321	1247	109050
2008-09	168350	57855	110495	15588	10231	2066	1356	158800
2009-10	79450	28000	51450	18057	11693	2408	1559	70550
Large								
2007-08	405200	69200	336000	23835	19765	2251	1867	369500
2008-09	146920	46700	100220	16695	11389	1908	1302	126870
2009-10	175660	53550	122110	15684	10903	1739	1209	155690
Total								
2007-08	668025	184985	483040	19648	14207	2256	1631	619050
2008-09	439880	154630	285250	16413	10644	1999	1297	393265
2009-10	344635	125045	219590	15665	9981	1904	1213	302034

Source: Ibid

During kharif season, farmers in Bhiwani district grow cotton due to higher profitability and suitability of the soil. It is a commercial crop of the area. Table-4.6 suggests that gross and net returns per hectare from cotton cultivation in Bhiwani district during 2007-08 were Rs. 43623 and Rs. 25442, respectively. The corresponding figures for the next year were Rs. 51661 and Rs. 31024, respectively. The returns became Rs. 58661 and Rs. 36871 during 2009-10. The gross and net returns per quintal also indicate increasing trend every year. It could be due to price rise and increase in productivity. Farm size variations were common. During 2009-10, medium farmers were leading over other categories in

Table 4.8
Profitability of Pulse Crops on Sampled Farms : GRAM+MOONG (Rs.)

Farm-Size	Gross Returns	Paid out costs	Net Returns	Gross Returns per ha	Net Returns per ha	Gross Returns per qtl	Net Returns per qtl	Value of Marketed surplus
BHIWANI								
Marginal								
2007-08	3400	1620	1780	21250	11125	2267	1187	2000
2008-09	4650	1825	2825	29063	17656	2325	1413	3150
2009-10	16100	6515	9585	21184	12612	2147	1278	6450
Small								
2007-08	55025	27025	28000	19652	10000	1897	966	38700
2008-09	51610	26830	24780	19850	9531	2064	991	40200
2009-10	51450	32645	18805	19788	7233	2287	836	25750
Medium								
2007-08	239765	99155	140610	23739	13922	1961	1150	191725
2008-09	297555	121739	175816	26332	15559	2125	1256	259140
2009-10	237085	122888	114197	22797	10980	2347	1131	185810
Large								
2007-08	424700	168740	255960	22353	13472	1937	1167	315800
2008-09	664175	255340	408835	22363	13765	1931	1188	582775
2009-10	529750	144115	385635	32106	23372	2329	1695	327500
Total								
2007-08	722890	296540	426350	22548	13299	1943	1146	548225
2008-09	1017990	405734	612256	23263	13991	1992	1198	885265
2009-10	834385	306163	528222	27574	17456	2327	1473	545510
MAHENDRAGARH								
Marginal								
2007-08	122830	42856	79974	26702	17386	2432	1584	108050
2008-09	195450	70272	125178	27528	17631	2428	1555	172750
2009-10	112225	51561	60664	23878	12907	2413	1305	94800
Small								
2007-08	292115	112980	179135	23369	14331	2209	1355	254625
2008-09	319750	131205	188545	24596	14503	2441	1439	271673
2009-10	285055	138660	146395	22804	11712	2409	1237	231875
Medium								
2007-08	379150	113980	265170	20606	14411	2419	1692	309650
2008-09	280275	112710	167565	18938	11322	2355	1408	247875
2009-10	369310	119200	250110	24621	16674	2653	1797	291145
Large								
2007-08	372050	115730	256320	19582	13491	2259	1556	313800
2008-09	430100	112665	317435	22401	16533	2238	1652	385450
2009-10	347750	112120	235630	23818	16139	2470	1674	273850
Total								
2007-08	1166145	385546	780599	21397	14323	2313	1548	986125
2008-09	1225575	426852	798723	22654	14764	2345	1528	1077748
2009-10	1114340	421541	692799	23811	14803	2505	1557	891670

Source: Ibid

terms of gross and net returns per hectare while large farmers reaped higher profitability in terms of gross returns per quintal. The value of marketed surplus of cotton in Bhiwani district during 2007-08, 2008-09 and 2009-10 was positively related to farm size.

Some farmers in Mahendragarh district grow gowar during the kharif season. The results obtained for gross returns, net returns and marketed surplus during the three years of study period are presented in Table-4.7. It suggests that gross and net returns per hectare from gowar cultivation in Mahendragarh district during 2007-08 were Rs. 19648 and Rs. 14207, respectively. Surprisingly, both

Table 4.9
Profitability of other Important Crops on Sampled Farms in Bhiwani (Rs.)
(Wheat+Bajra+Cotton+Mustard)

Farm-Size	Gross Returns	Paid out costs	Net Returns	Gross Returns per ha	Net Returns per ha	Gross Returns per qtl	Net Returns per qtl	Value of Marketed surplus
Marginal								
2007-08	87085	37305	49780	17557	10036	1031	589	44150
2008-09	97600	38835	58765	19677	11848	1091	657	51625
2009-10	75400	29400	46000	23861	14557	1125	687	42700
Small								
2007-08	655010	233835	421175	29773	19144	1422	915	483125
2008-09	821660	281685	539975	34236	22499	1497	984	601700
2009-10	835970	285945	550025	36990	24337	1657	1090	540190
Medium								
2007-08	2868310	969215	1899095	34433	22798	1564	1036	2400115
2008-09	3284713	1113123	2171590	37799	24990	1677	1109	2787035
2009-10	3661510	1210287	2451223	44296	29654	1837	1230	3264910
Large								
2007-08	4573760	1718775	2854985	30800	19225	1609	1004	3938960
2008-09	4401130	1776703	2624427	33596	20034	1665	993	3843260
2009-10	5690760	2040448	3650312	42216	27079	1907	1223	4676410
Total								
2007-08	8184165	2959130	5225035	31628	20193	1567	1001	6866350
2008-09	8605103	3210346	5394757	34858	21854	1642	1029	7283620
2009-10	10263640	3566080	6697560	42199	27537	1850	1207	8524210

Source: Ibid

these declined over the next two years. The similar pattern was observed for gross and net returns per quintal.

Farm size variations were a common phenomenon. Large farmers during first year and medium farmers during third year reaped higher returns per hectare. In this case, value of marketed surplus was not directly related to farm size and a mixed pattern was observed.

Table 4.10
Profitability of other Important Crops in Mahendragarh (Rs.)
(Wheat+Bajra+Gowar+Mustard)

Farm-Size	Gross Returns	Paid out costs	Net Returns	Gross Returns per ha	Net Returns per ha	Gross Returns per qtl	Net Returns per qtl	Value of Marketed surplus
Marginal								
2007-08	200134	79020	121114	21067	12749	1179	714	116304
2008-09	149770	52700	97070	17620	11420	1026	665	87840
2009-10	173285	80105	93180	16662	8960	996	536	91470
Small								
2007-08	722455	296710	425745	21566	12709	1289	759	520200
2008-09	668733	270540	398193	20203	12030	1207	718	481540
2009-10	599350	267600	331750	18329	10145	1150	637	415374
Medium								
2007-08	675775	317240	358535	14918	7915	1249	663	465700
2008-09	623700	290335	333365	13442	7185	1239	662	462050
2009-10	598800	266010	332790	14123	7849	1183	658	424900
Large								
2007-08	1347740	367720	980020	20671	15031	1405	1022	1075650
2008-09	1099870	337670	762200	20831	14436	1262	875	839620
2009-10	937810	317990	619820	15374	10161	1193	789	710690
Total								
2007-08	2946104	1060690	1885414	19193	12283	1321	845	2177854
2008-09	2542073	951245	1590828	18054	11298	1225	767	1871050
2009-10	2309245	931705	1377540	15763	9403	1162	693	1642434

Source: Ibid

Before summing up this chapter, we have analysed gross returns, net returns and value of marketed surplus of gram + moong and all important crops

clubbed together in the selected districts of Bhiwani and Mahendragarh during referred years. This information is given in Table 4.8.

The value of gross and net returns per hectare from gram + moong cultivation were Rs. 23548 and Rs. 13765, respectively in Bhiwani and Rs. 21397 and Rs. 14323, respectively in Mahendragarh district during 2007-08. Next year, these figures became Rs. 23263 and Rs. 13991, respectively in Bhiwani by indicating a marginal of 3.17 per cent and 5.20 per cent, respectively. In Mahendragarh also, gross and net returns per hectare have shown an increase of Rs. 1257 and Rs. 441 in 2008-09 over 2007-08. After initial years of implementation of the NFSM, pulses in Bhiwani during 2009-10, gross and net returns increased by 18.53 and 24.78 per cent, respectively and these were not substantial. The same rising trend was observed in gross and net returns per quintal in Bhiwani but in Mahendragarh, gross returns per quintal increased continuously but net returns per quintal have shown a marginal decline in 2008-09 over 2007-08. Class variations were evident in both the districts. Large farmers in Bhiwani and medium farmers in Mahendragarh reaped higher gross and net returns per hectare during 2009-10. The value of marketed surplus and farm size were observed positively related in most of the cases.

When gross returns and net returns per hectare and per quintal were calculated after clubbing all major crops (wheat+bajra+cotton+mustard) in Bhiwani, it was observed that gross as well as net returns per hectare were continuously rising over the study period. Results for per quintal gross and net returns also corroborate this finding. Findings suggest that per hectare returns were higher in case of all crops together than pulses in Bhiwani but reverse was observed for gross and net returns per quintal. These results varied for different categories of farmers but in most cases, returns per quintal were observed better from in pulse cultivation than other important crops. As expected, value of marketed surplus of all principal crops together was higher than individual pulse crops (Table 4.9) in each category of farms as well as at overall level in all the referred years.

Findings related to returns from all important crops (wheat+bajra+gowar+mustard) clubbed together in Mahendragarh are presented in Table-4.10. At the overall level, gross and net returns per hectare from pulse cultivation were higher than all other crops during 2007-08, 2008-09 and 2009-10. It is interesting to report that even the per quintal returns from pulse cultivation were found better in each year. This is true for most of the farm categories. Of course, figures differed in each case. The value of marketed surplus for all important crops was mostly positively related barring a few exceptions.

Summing up:

The impact of the National Food Security Mission (pulses) in Bhiwani on gross returns, net returns per hectare and per quintal was assessed through appropriate comparison with the non-beneficiary farmers in Mahendragarh district during 2007-08, 2008-09 and 2009-10. Results of sampled survey point out that gross returns per hectare from gram cultivation in Bhiwani district were found higher than Mahendragarh district during all these years but this was not true for net returns during first two years. Farm size variations were common in gross returns and net returns per hectare as well as per quintal. The value of marketed surplus in most cases was positively related to farm size.

A comparison of returns with other important crops during the rabi season has exhibited that wheat and mustard were found superior than gram in Bhiwani in terms of net returns per unit of land. The economics of moong, a minor pulse crop grown in these districts was also worked out and profitability was compared vis-à-vis principal competing crops such as bajra, cotton and gowar. This pulse crop provided higher net returns per hectare in comparison to bajra in both the selected districts. It was observed that cotton is far superior crop than moong and bajra during kharif season in Bhiwani district, while profitability of moong was found better in comparison to bajra and gowar in Mahendragarh district.

Chapter-5

Adoption of Technology and Marketing of Pulses

Introduction:

An analysis of the status of pulse sector in Haryana in chapter-2 revealed that yield of pulses in this agriculturally advanced state grew at a slow rate between 1996-97 and 2006-07. One of the major reasons could be slow adoption of improved pulse technology by the growers. A study by Shiyani et al., 2000 indicates that improved varieties are gradually replacing traditional pulse varieties. This is a useful study which throws some light on adoption of pulse technology by farmers during the nineties. We need current evidence to substantiate this finding. Therefore, present chapter deals with adoption of improved technology by sampled farmers in Bhiwani (NFSM) and Mahendragarh districts (non-NFSM) in Haryana.

Section-1

Adoption of Improved Varieties of Pulses

Knowledge and Area under Improved Varieties

Improved seeds have a tremendous role in boosting pulse production through increasing yield levels. Table 5.1 indicates that its use is popular among the sampled farmers for gram and moong cultivation. It is noteworthy that none of the sampled farmers grew traditional variety seeds of pulses. Reasons were asked for complete switch over from traditional to improved varieties. Farmers reported that traditional varieties are prone to biotic stress and reduced yield due to infestation of insects, pests and diseases. Attack of pod borer and gram blight are common diseases responsible for yield losses in case of gram. These diseases damage pulse grain at the time of harvesting. The damaged pulse grain fetches low prices in the market. They also reported that yield of pulses from traditional variety seeds was uncertain and unstable.

Table-5.2 suggests that entire area under pulse cultivation in Bhiwani and Mahendragarh both was covered by improved variety seeds. This was irrespective of farm size and class of the pulse growers.

Since, everyone among sampled farmers adopted improved variety seeds of pulses; they had full knowledge of these varieties. The identified sources of knowledge were extension agent, neighbours, news papers/media and others. Among sampled farmers in Bhiwani, 94 per cent received relevant information about improved variety seeds from extension agents. At least, 80 per cent of farmers in each class received this information from extension services. The remaining 6 per cent of pulse growers in Bhiwani obtained knowledge about improved variety seeds from their neighbours (Table-5.3).

Table 5.1

Area Under Improved Varieties of Pulses, 2009-10

Pulse Crop	Total Area under Crop (acre)	Area Under Traditional Varieties	Area Under Improved Varieties	% of Area Under Improved Varieties
Bhiwani				
Gram	29.5	0.0	29.5	100
Moong	0.8	0.0	0.8	100
Total	30.3	0.0	30.3	100
Mahendragarh				
Gram	36.8	0.0	36.8	100
Moong	10.0	0.0	10.0	100
Total	46.8	0.0	46.8	100

Source: Field Survey

Table 5.2
Status of Knowledge about Improved Varieties of Pulses

Farm Size	No. of Farmers aware of Improved Varieties	Total No. of Farmers in the Size Group	% of Farmers aware of Improved Varieties
Bhiwani			
Marginal	4	4	100
Small	11	11	100
Medium	20	20	100
Large	15	15	100
Total	50	50	100
Mahendragarh			
Marginal	13	13	100
Small	17	17	100
Medium	13	13	100
Large	7	7	100
Total	50	50	100

Source: Ibid

Table 5.3
Source of Knowledge of Improved Varieties of Pulses to Sampled Farmers

(% pulse growers)

Farm Size	Extension Agent	Neighbours	News papers/ Media	Others	Total
Bhiwani					
Marginal	100.00	0.00	0.00	0.00	100
Small	81.82	18.18	0.00	0.00	100
Medium	95.00	5.00	0.00	0.00	100
Large	100.00	0.00	0.00	0.00	100
Total	94.00	6.00	0.00	0.00	100
Mahendragarh					
Marginal	38.46	30.77	0.00	30.77	100
Small	41.18	47.06	0.00	11.76	100
Medium	61.54	30.77	0.00	7.69	100
Large	42.86	42.86	0.00	14.29	100
Total	46.00	38.00	0.00	16.00	100

Source: Ibid

The scenario regarding source of knowledge about improved variety seeds of pulses to farmers in Mahendragarh was different. In this district, proportion of sampled farmers acquiring this knowledge from extension agent, neighbours and others was 46 and 16 per cent, respectively. Thus, extension agents were important but other sources also played an important role in imparting knowledge to pulse growers about improved seeds of pulses. Further, significant variations were observed across different categories of farmers. None of the sampled farmers in Mahendragarh district obtained this knowledge from media or newspapers.

Section-2

Adoption of Recommended Practices

Full adoption of recommended package of practices is essential for the success of improved technology in pulse cultivation. This section examines extent of adoption of recommended package of practices by the pulse growers. The operations considered for measuring adoption of recommended package of practices are sowing practices, seed practices and other practices such as application of manure, fertilizers, number of irrigations and application of plant protection measures.

Table 5.4
Adoption of Recommended Package of Practices of GRAM by Sampled Farmers

Farm Size	Sowing Practices		Seed Practices			Other Practices			Adoption of Plant protection (% of measures growers)
	Sown in time (% growers)	Average no. of tillage	Seed Treatment (% of growers)	Adoption of seed rate in kg/acre	Line/Broadcas-ting (% of growers)	Application of manure (% of growers)	Application of fertilizers (% of growers)	Average no. of Irrigations	
Bhiwani									
Marginal	100	3	100	15	100	0	100	0.0	100
Small	100	3	100	15	100	73	91	2.8	100
Medium	100	3	100	15	100	45	100	1.1	100
Large	100	3	100	15	100	40	100	1.3	93
Total	100	3	100	15	100	46	98	1.0	98
Mahendragarh									
Marginal	100	2.8	100	13.8	100	46.2	84.6	0.7	100
Small	100	3.1	100	14.9	94	76.5	88.2	1.2	100
Medium	100	2.8	100	11.4	100	69.2	92.3	1.5	100
Large	100	3.0	100	14.7	100	71.4	100.0	0.0	100
Total	100	2.9	100	13.7	98	66.0	90.0	0.5	100

Source: Ibid

Table 5.5
Adoption of Recommended Package of Practices of MOONG by
Sampled Farmers

Farm Size	Sowing Practices		Seed Practices			Other Practices			Adoption of Plant protection (% of measures growers)
	Sown in time(% growers)	Average no. of tillage	Seed Treatment (% of growers)	Adoption of seed rate in kg/acre	Line/ Broadcas-ting (% of growers)	Application of manure (% of growers)	Application of fertilizers (% of growers)	Average no. of Irrigations	
Bhiwani									
Marginal	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	-	-	-	-	-
Medium	100	2.5	100	3	100	25	25	1	100
Large	100	2.5	100	4	100	50	50	1	100
Total	100	2.5	100	3	100	33	33	1	100
Mahendragarh									
Marginal	100	2.1	100	5.0	100	28.6	71.4	0.29	100
Small	100	2.0	100	3.0	100	0.0	50.0	0.17	100
Medium	100	2.6	100	4.1	100	33.3	55.6	0.11	100
Large	100	2.9	100	3.4	100	57.1	57.1	0.00	100
Total	100	2.4	100	3.9	100	31.0	58.6	0.14	100

Source: Ibid

Sowing practices include preparation of land in terms of number of tillage and timely sowing of seeds. It may be noted from Table-5.4 that practice of timely sowing was followed by all pulse growers in Bhiwani and Mahendragarh irrespective of farm size. Further, average number of tillage by pulse growers was the same for gram cultivation in Bhiwani while it was observed different across farm categories in Mahendragarh. In case of Bhiwani, this practice was fully followed by all gram growers and number of tillage was 3. The recommended number of ploughings for all pulse crops is 2 to 3. In case of moong, average number of ploughings was 2.5 in Bhiwani and 2.4 in Mahendragarh. Also, farm size variations were observed in Mahendragarh district. Particularly, marginal and small farmers ploughed fields twice for moong cultivation against ideal number of 3.

Seed practices include seed treatment, adoption of recommended seed rate at recommended depth through line sowing method. The recommended seed rate for improved varieties of gram and moong is 15-18 kg/acre and 6 -8 kg./acre, respectively (Package of Practices for rabi and kharif crops, HAU, 2007)

The rate and specified depth to be followed by the growers of improved pulse variety seeds were indicated by the extension agent. Most of the pulse growers had sown seeds at specified depth. It was reported that all pulse growers used treated seeds or treated them selves irrespective of farm size.

In case of moong, seed rate applied by growers varied between 3 and 5 kg/acre. Since the recommended seed rate of moong for improved varieties is at least 6 kg/acre, all categories cultivators used less than the recommend rate of seed. Thus, optimum seed rate was not used by farmers for moong cultivation. Like gram, moong growers fully adopted seed treatment and line sowing but seed rate was below the recommendation.

The method of line sowing is recommended for sowing improved variety seeds of pulses because it helps in reducing weeds. Line sowing was adopted by all surveyed farmers in both the districts for cultivation of gram as well as moong. We had asked reasons for their preference over broadcasting. Pulse growers opined that line sowing saves labour in weeding and inter culture and also makes irrigation easier.

Gram growers fully satisfied the condition of recommended seed rate in Bhiwani. However, seed rate applied in Mahendragarh for gram cultivation was below recommended rate of 15-18 kg. /acre particularly in marginal and medium categories of farmers. In a nutshell, all pulse growers took adequate care and followed seed practices for cultivation of gram in Bhiwani but in case of Mahendragarh, adoption of recommended seed rate was partial. Especially, adoption of seed rate in Mahendragarh was below the recommendation.

Other practices include application of manure, fertilizers, minimum number of irrigations and application of plant protection measures. It may be observed from Tables-5.4 and 5.5 that 46 per cent of gram growers in Bhiwani and 66 per cent in Mahendragarh applied manure during the crop season. The main reason given for not applying farm yard manure was extent of requirement. However, proportion of gram growers applying organic manure was found higher among small farmers in comparison to other categories.

Results regarding application of farm yard manure in moong cultivation were poor. Only 33 per cent growers in Bhiwani and 36 per cent in Mahendragarh applied farm yard manure. Especially, medium farmers in Bhiwani and small farmers were found lagging behind other categories in Mahendragarh while reverse was true in Bhiwani where proportion of large moong growers applying manure was double.

Use of fertilizers was widely practiced by the pulse growers despite being an expensive proposition. In each category, more than 80 per cent growers applied fertilizers for gram cultivation. In case of moong, 33 per cent in Bhiwani and 58.6 per cent in Mahendragarh applied fertilizers. Large variations were found across farm sizes. Contrary of our expectation, marginal farmers in Mahendragarh have shown higher percentage as users of fertilizers in comparison to other categories in cultivation of moong.

During field survey, it was accepted by all pulse growers that irrigation is a must for the success of improved variety seeds of pulses. Since, irrigation facilities in selected districts are limited; farmers reserved it for superior cereals and commercial crops. The average number of irrigations applied during the crop season by gram growers in Bhiwani and in Mahendragarh was one and 0.5, respectively which is below the recommendation of 3 irrigations. In case of moong, one irrigation in Bhiwani and 0.14 in Mahendragarh was average number of irrigations. Particularly, large farmers in Mahendragarh did not irrigate the moong fields.

It is well known that most of the pulse crops are vulnerable to pest attacks and therefore, adoption of plant protection measures becomes a must to save the quantity as well as quality of output. In view of importance attached to this measure, all gram and moong growers in Bhiwani and Mahenragarh under took this practice.

Thus, application of irrigation in terms of number was the poorest component as far as adoption of recommended package of practices for pulse growing is concerned on sampled farms in Bhiwani and Mahendragarh districts in

Haryana. As expected, significant deviations were found in adoption of some recommended package of practices across pulse crops and growers in Bhiwani as well as in Mahendragarh.

Problems with Improved Varieties

It would be worth while to look into the problems faced by growers of improved variety seeds of pulses in the selected districts. We have tried to investigate these problems with the help of opinion survey. The results of opinion survey are presented in Tables-5.6 & 5.7. It was noticed during survey that a major part of knowledge remains un-utilized for various reasons because of problems faced by the pulse growers. availability of improved variety seeds was awarded lower rank by most of the growers. Further, these are expensive and need larger doses of other expensive, such as fertilizers received third, fourth and fifth ranks in Bhiwani. In contrast, at least 50 per cent gram growers in Mahendragarh experienced these problems. The inadequate pest resistance of improved seeds was high lighted by majority of gram growers (88 per cent in Bhiwani and 84 per cent in Mahendragarh). Second, most important problem faced by the gram growers was less than expected yield from growing improved seeds.

Table 5.6**Percentage Distribution of Farmers Reporting Problems with Improved Variety Seeds of Pulses**

Crop: GRAM

Problem	Rank1	Rank2	Rank3	Rank4	Rank5	Rank6	Total
Bhiwani							
Not available at all	2	0	0	8	32	58	100
Available but not on time	4	8	24	22	18	24	100
Very expensive	4	8	16	24	34	14	100
Need large doses of other inputs	6	18	32	36	6	2	100
Much lower yield than expected	14	48	20	8	10	0	100
Pest resistance not adequate	70	18	8	2	0	2	100
Mahendragarh							
Not available at all	0	0	0	4	10	86	100
Available but not on time	0	0	16	22	58	4	100
Very Expensive	8	36	24	12	14	6	100
Need large doses of other inputs	18	10	22	42	6	2	100
Much lower yield than expected	4	40	24	18	12	2	100
Pest resistance not adequate	70	14	14	2	0	0	100

Source: Ibid

Table 5.7**Percentage Distribution of Farmers Reporting Problems with Improved Variety Seeds of Pulses**

Crop: MOONG

Problem	Rank1	Rank2	Rank3	Rank4	Rank5	Rank6	Total
Bhiwani							
Not available at all	0	0	0	0	50	50	100
Available but not on time	0	0	0	50	0	50	100
Very expensive	0	0	0	50	50	0	100
Need large doses of other inputs	0	50	50	0	0	0	100
Much lower yield than expected	0	50	50	0	0	0	100
Pest resistance not adequate	100	0	0	0	0	0	100
Mahendragarh							
Not available at all	0	0	7	7	19	67	100
Available but not on time	22	7	15	7	37	11	100
Very expensive	26	19	7	15	22	11	100
Need large doses of other inputs	4	37	7	37	15	0	100
Much lower yield than expected	7	22	33	22	7	7	100
Pest resistance not adequate	41	15	30	11	0	4	100

Source: Ibid

In addition, moong growers showed concern for the need of high doses of other inputs and lower than expected yield from improved seeds of moong.

The scenario of problems faced by moong cultivators in Bhiwani as well as in Mahendragarh was different. In Bhiwani, all moong growers pointed out towards the inadequate resistance of improved variety seeds. They also awarded second and third ranks to lower than expected yield and need of larger doses of other inputs. Timely availability of seed was not a serious problem in this district. On the other hand, moong growers faced this problem in Mahendragarh district. Expensive nature of seeds was awarded first three ranks by 52 per cent growers. In addition, moong growers showed concern for the need of high doses of other inputs and lower than expected yield from improved seeds of moong.

In brief, inadequate pest resistance of improved seeds and lower than expected yield emerged as the most important problems faced by the growers of gram and moong in sampled district of Haryana.

In addition, major pest problems were reported by the pulse growers. On an average 20 per cent pulse crops are annually wasted due to damage caused by pod borer in pigeon pea and chickpea. Pod fly also causes 10-15 per cent losses in north India. Wilt and root rot cause heavy loss to gram. According to opinion survey, 2.99 qtls. in Bhiwani and 3.58 qtls. in Mahendragarh could be the estimated yield loss of gram. In case of moong, yield loss could be 1.1 qtl. in Bhiwani and 1.77 qtl. in Mahendragarh. The solution lies in creation of Integrated Pest Management facility at a wider scale. Second, popularization of seed treatment against wilt and root rot and conducting IPM demonstrations on gram against key insects, pests and diseases could help to save the quantity as well as quality of the produce (Table-5.8).

Table 5.8

Major Pest Problems Reported by Sampled Farmers

Crop affected :Gram				Crop affected :Moong		
Type of Pest	No. of Growers Reporting problems	% of total Growers	Estimated yield loss qtls/ha.*	No. of Growers Reporting problems	% of total Growers	Estimated yield loss qtls/ha*
Bhiwani						
Pod borer	49	98	2.99	0	0	1.00
Pod fly	21	42	-	1	2	-
Wilt	2	4	-	0	0	-
Root rot	1	2	-	0	0	-
Nematodes	0	0	-	0	0	-
Any other	-	-	-	-	-	-
Mahendragarh						
Pod borer	48	96	3.58	5	10	1.77
Pod fly	18	36	-	1	2	-
Wilt	2	4	-	5	10	-
Root rot	6	12	-	1	2	-
Nematodes	0	0	-	0	0	-
Any other	-	-	-	-	-	-

* Yield loss due to all above reasons.

Source: Ibid

Solutions Suggested by the Sampled Farmers:

Having analysed the problems faced by cultivators of improved variety seeds of pulses in the selected districts, we had asked farmers to suggest solutions to the above mentioned problems. Three options namely cheaper and timely availability of improved seeds and subsidy were put as options to solve the problems. Subsidy component was awarded higher (first and second) rank by 70 per cent gram growers in Bhiwani and 86 per cent in Mahendragarh district. Due importance has also been given to cheaper and timely availability of improved seeds and more than 50 per cent gram cultivators endorsed these solutions.

Like gram, majority of sampled moong growers in Bhiwani and Mahendragarh awarded first two ranks to subsidy component. In Bhiwani, cheaper availability of improved variety seeds was also given high priority (Table-5.9).

Table 5.9

(Per cent)

Suggested solutions for the Success of Improved Varieties of Pulses

Crop: GRAM

Problem	Rank1	Rank2	Rank3	Rank4	Total
Bhiwani					
Cheaper availability of Seeds	22	44	34	0	100
Timely availability of Seeds	44	22	34	0	100
Subsidy	34	36	30	0	100
Other	-	-	-	-	-
Mahendragarh					
Cheaper availability of Seeds	12	44	44	0	100
Timely availability of Seeds	26	32	42	0	100
Subsidy	62	24	14	0	100
Others	-	-	-	-	-

Source: Ibid

Table 5.10

(Per cent)

Suggested solutions for the Success of Improved Variety of Pulses:

Crop: MOONG

Problem	Rank1	Rank2	Rank3	Rank4	Total
Bhiwani					
Cheaper availability of Seeds	100	0	0	0	100
Timely availability of Seeds	0	0	100	0	100
Subsidy	0	100	0	0	100
Other	-	-	-	-	-
Mahendragarh					
Cheaper availability of Seeds	33	11	56	0	100
Timely availability of Seeds	11	70	19	0	100
Subsidy	56	22	22	0	100
Others	-	-	-	-	-

Source: Ibid

SECTION-3

Marketing of Pulse Crops

Market Channels:

Marketing is a function through which pulses move from producer to ultimate consumer. Like other pulses in India, gram and moong are consumed in the processed (dal) and non-processed (whole) form. The usual marketing channels adopted by pulse growers in Haryana are as under :

- Channel I - Producer – Consumer
- Channel II - Producer -Village Shopkeeper/Merchant-Consumer
- Channel III - Producer – Zamindar
- Channel IV - Producer – Commission Agent - Wholesale Trader – Retailer – Consumer
- Channel V - Producer – Commission Agent – Dal Miller – Wholesale Trader – Retailer – Consumer.

With a view to under stand the marketing behavior of pulse growers in Bhiwani (NFMS district) and Mahendragarh (non-NFMS district) of Haryana, primary data were collected about marketing channels. Results are present in Table-5.11.

Most of the sampled pulse growers sold their marketable surplus of pulses in the village market. This was true irrespective of farm size. A small proportion of producers (5 & 7 per cent) in Mahendragarh disposed their produce to commission agents and in the regulated market. None of the pulse producers sold their pulse produce to the government agencies such as NAFED. During the field visit, questions were asked about preference of the pulse growers in adopting marketing channels. Most of them informed that they would prefer to sell their produce to the NAFED at the minimum support price. The main reason given for their preference were assured price, quick disposal and assured market for their produce.

Table 5.11

Percentage of Growers Marketing through Various Channels during 2009-10

Farm Size	Village Market	Commission Agent	Regulated Market	Govt. Agencies (NAFED)	Others	Total
Bhiwani						
Marginal	100	0	0	0	0	100
Small	100	0	0	0	0	100
Medium	100	0	0	0	0	100
Large	100	0	0	0	0	100
Total	100	0	0	0	0	100
Mahendragarh						
Marginal	78	0	11	0	0	100
Small	88	6	13	0	0	100
Medium	92	8	0	0	0	100
Large	100	0	0	0	0	100
Total	89	5	7	0	0	100

Source: Ibid

In addition to marketing channels, an enquiry was made about the quantity sold and prices received by the gram and moong growers. Gram growers in Bhiwani and Mahendragarh received Rs. 2232 and Rs. 2111 per qtl, respectively during 2009-10. Clearly, prices received were higher in Bhiwani in comparison to Mahendragarh. Large farmers in Bhiwani and medium farmers in Mahendragarh received higher prices in comparison to other categories of farmers. It could be due to their holding capacity of the produce.

Table 5.12**Quantity Sold through various Channels, Gram - 2009-10**

Farm Size	Village Market		Commission Agent		Regulated Market		Government Agency (NAFED)		Others		Total	
	Qty Sold	Value (Rs.)	Qty Sold	Value (Rs.)	Qty Sold	Value (Rs.)	Qty Sold	Value (Rs.)	Qty Sold	Value (Rs.)	Qty Sold	Price/ Qtl
Bhiwani												
Marginal	3.00	6450	0	0	0	0	0	0	0	0	3.00	2150
Small	12.00	25750	0	0	0	0	0	0	0	0	12.00	2146
Medium	82.30	179685	0	0	0	0	0	0	0	0	82.30	2183
Large	144.50	320500	0	0	0	0	0	0	0	0	144.50	2218
Total	241.80	532385	0	0	0	0	0	0	0	0	241.80	2202
Mahendragarh												
Marginal	33.00	70800	0	0	3.5	8000	0	0	0	0	36.50	2159
Small	60.75	123550	3	9225	24	51600	0	0	0	0	87.75	2101
Medium	84.50	184720	0	0	0	0	0	0	0	0	84.50	2186
Large	93.50	190050	0	0	0	0	0	0	0	0	93.50	2033
Total	271.75	569120	3.00	9225	27.50	59600	0	0	0	0	302.25	2111

Source: Ibid

Table 5.13**Quantity Sold through various Channels, Moong - 2009-10**

Farm Size	Village Market		Commission Agent		Regulated Market		Government Agency (NAFED)		Others		Total	
	Qty Sold	Value (Rs.)	Qty Sold	Value (Rs.)	Qty Sold	Value (Rs.)	Qty Sold	Value (Rs.)	Qty Sold	Value (Rs.)	Qty Sold	Price/ qtl
Bhiwani												
Marginal	0.00	0	0	0	0	0	0	0	0	0	0.00	-
Small	0.00	0	0	0	0	0	0	0	0	0	0.00	-
Medium	1.75	6125	0	0	0	0	0	0	0	0	1.75	3500
Large	2.00	7000	0	0	0	0	0	0	0	0	2.00	3500
Total	3.75	13125	0	0	0	0	0	0	0	0	3.75	3500
Mahendragarh												
Marginal	4.50	16000	0	0	0	0	0	0	0	0	4.50	3556
Small	10.40	47500	0	0	0	0	0	0	0	0	10.40	4567
Medium	19.15	98425	4	8000	0	0	0	0	0	0	23.15	4597
Large	19.00	83800	0	0	0	0	0	0	0	0	19.00	4411
Total	53.05	245725	4.00	8000	0.00	0	0	0	0	0	57.05	4447

Source: Ibid

Analysis of data presented in Table-5.13 reveals that average price received from sale of moong was Rs. 3500 per qtl. in Bhiwani and Rs. 4447 per qtl. in Mahendragrh. In the former district, each category received the same price. In the second district, medium farmers sold their moong produce at higher price in comparison to other categories of farmers. It could be due to their holding the produce and selling at a later date. During the field visit, we had tried to gain insight into the problems faced by farmers in marketing of pulses. In view of pulses being an item with short shelf life, it is important for farmers to have information about prevailing prices.

Summing up

Results of this chapter suggest that improved variety seeds for pulse cultivation are popular among growers due to low yield risk in terms of infestation of insects, pests and diseases. The rate of adoption of improved seeds among sampled farmers was 100 per cent since each one has switched over from traditional variety seeds to improved variety seeds. Further, adoption of full package of recommended practices is essential for realizing good yield. It was observed that pulse growers fully adopted sowing and partially adopted seed practices in growing pulses. Especially, seed rate applied by farmers for gram cultivation in Mahendragarh and seed rate applied for moong cultivation in Bhiwani as well as in Mahendragarh was below the recommendation. Adoption of other important practices related to application of manure and number of irrigations was partial. Particularly, number of irrigation was much below the required number for realizing the potential yield from growing improved varieties of pulses in Haryana.

Average number of irrigations was one against a requirement of 2-3 irrigations. This is precisely one of the important reasons for lower than expected yield from improved variety seeds of gram and moong on sampled farms in Bhiwani as well as in Mahendragrh.

We had tried to understand the problems of pulse growers in adoption of improved variety seeds through opinion survey. Five options such as non-

availability, timely availability, expensive nature of seeds, need of larger doses of other inputs, lower than expected yield and inadequate pest resistance were provided. Inadequate pest resistance of improved seeds and lower than expected yield emerged as the most important problems faced by the growers of gram and moong in sampled districts of Haryana.

Results show that most of the sampled pulse producers sold their produce in the village market. They were not satisfied with the marketing system and prices received. In order to provide an alternative marketing system and to ensure remunerative prices to the farmers, following suggestions are made.

The pulse produce of the farmers should be procured by an integrated agency or cooperative society created for this purpose, eliminating the system of middlemen. This agency should also be entrusted with the task of processing and marketing. In initial years, it would be difficult because of the strong traders' cartel, but gradually with the increase in membership and volume traded, the agency will be able to surmount the obstacles created by traders. The major activities of the agency should be arrangement of auction, processing, storage facilities and providing credit to members against stock. This will ensure reasonable returns to the farmers, saving them from the harassment at the hands of middlemen and traders. The consumers too would get pulses at reasonable rates.

Adequate storage facilities should be created at village level. For this, the Government should provide necessary financial help and technical assistance. Interested pulse growers should be also encouraged to set up small scale processing units and the necessary marketing avenues be provided to them.

Chapter-6

Perceptions of Sampled Farmers about Pulse Cultivation

Introduction:

In the previous chapter, various issues related to adoption of technology by sampled farmers in the Bhiwani (NFMS district) and in Mahendragarh (non-NFMS district) were discussed. For a deeper understanding of this phenomenon, perceptions of farmers about pulse cultivation at the grass root levels should be known and understood. In order to capture this aspect, some questions were included in opinion survey and the related queries have been answered on this basis. This chapter focuses on the perceptions of sampled farmers about pulse cultivation in the selected districts of Haryana.

I) Reasons for growing pulses

We have stated in Chapter-II that area under pulse crops is declining at an alarming rate in Haryana due to spread of irrigation facilities which pushed pulses to marginal rainfed lands. On the basis of survey data, we have concluded that pulse growers devoted a significant percentage of cultivated area to these crops where irrigation facilities are limited or not available. We had given five options for ranking the reasons why they grow pulses. These included home consumption, animal feed, inferior quality of land, lack of irrigation and profitability. Table-6.1 suggests that 36 per cent pulse growers in Bhiwani and 66 per cent in Mahendragarh opined that profitability and lack of irrigation were relatively important factors in decision making about pulse cultivation. In Mahendragarh, 76 per cent small and 71 per cent large farmers cited profitability followed by lack of irrigation as important factors for growing pulses (Tables -6.2 and 6.3).

Table 6.1**Reasons for Growing Pulses in Selected Districts**

Item	Total No. of HHs*	% of Total HHs	Total No. of HHs	% of Total HHs
	Bhiwani		Mahendragarh	
Home Consumption	14	28	1	2
Animal Fed	0	0	0	0
Inferior quality of land	6	12	5	10
Lack of Irrigation	12	24	11	22
Profitability	18	36	33	66
Others	0	0	0	0
Total	50	100	50	100

Source: Field survey

* Households

Table 6.2**Reasons for Growing Pulses by Sampled Farmers in Bhiwani District**

(No. of HHs)

Farm size	Home Consumption	Animal Feed	Inferior quality of land	Lack of Irrigation	Profitability	Others	Total
Marginal	1	0	0	0	3	0	4
Small	3	0	0	3	5	0	11
Medium	8	0	2	4	6	0	20
Large	2	0	4	5	4	0	15
Total	14	0	6	12	18	0	50
% to total Growers							
Marginal	25	0	0	0	75	0	100
Small	27	0	0	27	45	0	100
Medium	40	0	10	20	30	0	100
Large	13	0	27	33	27	0	100
Total	28	0	12	24	36	0	100

Source: Ibid

Table 6.3

Reasons for Growing Pulses by Sampled Farmers in Mahendragarh District

(No. of HHs)

Farm size	Home Consumption	Animal Feed	Inferior quality of land	Lack of Irrigation	Profitability	Others	Total
Marginal	0	0	2	3	8	0	13
Small	1	0	1	2	13	0	17
Medium	0	0	1	5	7	0	13
Large	0	0	1	1	5	0	7
Total	1	0	5	11	33	0	50
% to Total Farmers in the size group							
Marginal	0	0	15	23	62	0	100
Small	6	0	6	12	76	0	100
Medium	0	0	8	38	54	0	100
Large	0	0	14	14	71	0	100
Total	2	0	10	22	66	0	100

Source: Ibid

II) Criteria used for opting to grow Pulses

A variety of price and non-price factors influence farmers' decisions regarding allocation of land to various crops. These range from expected profitability to yield levels. Among non-price factors, rainfall, suitability of soil, home requirement, inferior quality of land and availability of irrigation are important. Table-6.4 suggests that soils followed by inferior quality of land are used as main criteria for deciding area under pulses.

Table 6.4

Criteria Used by Sampled farmers in opting for Growing Pulses

Item	Bhiwani		Mahendragarh	
	Total No.	%	Total No.	%
Rainfall	4	8	0	0
Soil	23	46	38	76
Home requirement	7	14	1	2
Inferior quality of land	10	20	7	14
Extent of irrigation	4	8	4	8
Others	2	4	0	0
Total	50	100	50	100

Source: Ibid

Among various categories of pulse growers in Bhiwani, medium farmers followed by small farmers attached highest importance to home consumption. On the other hand, 27 and 33 per cent large farmers cited inferior quality of land and lack of irrigation as important reasons.

Results of secondary data on growth of area under important crops in Haryana revealed that area from pulse crops has shifted to other remunerative crops. It would be worth while to understand reasons which promoted area shift from pulses to some other crops. We have tried to investigate these reasons with the help of opinion survey. We have included six reasons in the analyses i.e. higher yield of other crops, availability of irrigation, lower prices of pulses, higher risk in cultivation of pulses, assured market for other crops and changes in consumption pattern.

III) Reasons for low area under Pulses

Farmers decision to allocate cultivated land to a particular crop is generally based on availability of improved seeds, irrigation, rainfall, facility of procurement by the government agencies, resistance of crop to pest attacks, extension services, home consumption and availability of alternate crops, credit and assured market. Unfortunately, information based on extensive field studies on all these factors and even a tabular analysis is not available. We had designed some options in the opinion survey to answer these queries. Majority of farmers

opined that pest problems followed by lower profitability and lower yields are the major reasons for low area under pulses (Table-6.5).

Table 6.5

Reported Reasons for Low Area under Pulses by Sampled farmers

Item	Total No.	%	Total No.	%
	Bhiwani		Mahendragarh	
Low Profitability	12	24	7	14
Low yield	8	16	18	36
Instability (Yield or Price)	7	14	3	6
Marketing Problem	1	2	0	0
Pest Problem	22	44	22	44
Others	0	0	0	0
Total	50	100	50	100

Source: Ibid

Farmers reported that high pest incidence followed by lack of irrigation facilities and lower market price are the major reasons for low area under pulse cultivation and therefore, transfer of improved pulse production technology remained the most neglected component in the past and consequently the benefits of improved varieties and available production technology could not be harnessed. The solution lies in full support to farmers in transfer of technology through Frontline Demonstrations and Block Demonstrations at regular intervals involving all stake holders in important pulse growing districts as a priority and gradually extending these services of to each district.

Table 6.6

Reasons for not growing Pulses on Irrigated Land

Item	Total No.	%	Total No.	%
	Bhiwani		Mahendragarh	
Yield is Low	30	60	31	62
Price realization is low	1	2	2	4
No assured market	11	22	9	18
Yield of improved varieties is uncertain	5	10	3	6
Large doses of other inputs required	3	6	5	10
Others	0	0	0	0
Total	50	100	50	100

Source: Ibid

The above cited table demonstrates that low yield of pulse crops was the primary reason for not allotting irrigated lands to pulses. In addition, lack of assured market plays an important role in low acreage under pulses on irrigated lands.

IV) Crops grown on inferior quality land

In Haryana, farmers generally grow coarse cereals and other crops such as bajra, gowar and pulses on inferior quality land in rainfed conditions. Diversification of crop systems on inferior quality land through pulses is possible if area specific varieties are available which require low doses of expensive inputs particularly irrigation and provide potential yield. Extending liberal credit facilities to farmers opting for cultivation of pulses on inferior quality land can be helpful in encouraging cultivation of pulses (Table-6.6).

Table 6.7**Crops Grown on Inferior Quality Land by Sampled Farmers**

Item	Bhiwani		Mahendragarh	
	Total No.	%	Total No.	%
Superior cereals	8	16	5	10
Coarse cereals	30	60	31	62
Pulses	5	10	11	22
Oilseeds	5	10	2	4
Vegetables	0	0	0	0
Others	2	4	1	2
Total	50	100	50	100

Source: Ibid

V) Problems of growing pulses on inferior quality land

Inferior quality lands are mostly rainfed and characterized by poor quality soils which are devoid of micro-nutrients, organic carbon, nitrogen, phosphorous and potassium. Practically, these soils are known for low organic matter. In terms of physical and chemical properties, these lands are associated with poor soil fertility status. In view of these features, farmers in Haryana grow bajra, gowar and pulses on inferior quality lands. It was reported by pulse growers that yield rates of pulses grown on inferior lands are low and quality of the grain is poor (Table 6.7).

Table 6.8**Problems of growing Pulses on Inferior Quality Land**

Item	Bhiwani		Mahendragarh	
	Total No. of HHS*	% of Total HHS	Total No. of HHS	% of Total HHS
Yield is Low	26	52	22	44
Grain quality is poor	1	2	6	12
Both (above)	23	46	22	44
Total	50	100	50	100

Source: Ibid

* Households

VI) Farmers willingness to grow pulses with assured procurement

None of the pulse growers in Bhiwani as well as in Mahendragarh districts reported purchase of pulse grain by the NAFED because operations of NAFED at present are extremely limited and therefore, unable to impact prices and marketing of pulses in Haryana. Pulse growers in opinion survey reported that they are willing to expand area under pulses if pulse grain is procured by the government at the MSP. This would reduce marketing risk in pulse cultivation (table-6.8).

Table 6.9
Sampled Farmers willing to grow Pulses with Assured Market

Farm Size	No. of Farmers willing	Total No. of Farmers in the Size Group	% of farmers willing	No. of Farmers willing	Total No. of Farmers in the Size Group	% of farmers willing
	Bhiwani			Mahendragarh		
Marginal	3	4	75	5	13	38
Small	10	11	91	16	17	94
Medium	20	20	100	7	13	54
Large	15	15	100	5	7	71
Total	48	50	96	33	50	66

Source: Ibid

VII) Problems of Pulse Cultivation

Pulse growers faced umpteen number of problems and these hinder spread of improved production technology of pulses. The ranks of major problems presented in Table-6.9 reveal that high pest incidence and lack of irrigation were the major constraints in pulse cultivation. Next is low market price which affects profitability of the pulse crops influencing acreage decisions of the farmers.

Around 80 per cent of area under pulses is rainfed and consequently, pulses face severe moisture stress with low yield rates. Productivity jump is possible when at least life saving irrigation is provided to pulse crops. Easy availability of sprinkler sets with some subsidy can be used for efficient use of scarce water.

Despite the problems listed above, production of pulses in Haryana can be increased in the next five to ten years provided a breakthrough in yield is achieved and area is expanded where ever it is possible.

Table 6.10**Rank of Major Problems Faced by Sampled Farmers in Cultivating Pulses**

Item	Rank1	Rank2	Rank3	Rank4	Rank5	Rank6	Rank7	Total
Bhiwani								
Lack of Irrigation facilities	28	20	10	16	18	8	0	100
Lack of Improved variety seeds	0	2	12	40	34	12	0	100
Lower Yield	8	10	46	14	10	12	0	100
High Pest incidence	44	36	16	0	0	4	0	100
Low market price	20	16	10	8	14	32	0	100
No assured market	0	16	6	22	24	32	0	100
Any other	0	0	0	0	0	0	0	0
Total	100	100	100	100	100	100	0	
Mahendragarh								
Lack of Irrigation facilities	26	10	16	16	22	8	2	100
Lack of Improved variety seeds	0	10	22	30	26	12	0	100
Lower Yield	18	28	16	20	12	6	0	100
High Pest incidence	50	18	12	6	8	6	0	100
Low market price	4	26	8	14	16	32	0	100
No assured market	2	6	26	14	16	36	0	100
Any other	0	2	0	0	0	0	98	100
Total	100	100	100	100	100	100	100	

Source: Ibid

In Mahendragarh too, high pest incidence, lack of irrigation facilities and low market price were the major problems encountered by farmers in pulse cultivation.

VIII) Important Suggestions

Farmers were asked to put forward their suggestions in solving the problems related to pulse cultivation. Five options such as improved irrigation facilities, availability of high yielding variety seeds, availability of pest resistant seeds, assured procurement with MSP and higher market price. Farmers opined that improved irrigation facilities, availability of pest resistant seeds and high market prices are most important facilities to be provided to increase pulse production in Haryana (Table-6.11).

Table 6.11**Rank of Important Suggestions offered by Sampled for Promoting Cultivation of Pulses**

Item	Rank1	Rank2	Rank3	Rank4	Rank5	Rank6	Total
Bhiwani							
Improved Irrigation facilities	34	28	24	4	10	0	100
Availability of High yielding variety seeds	0	10	46	30	14	0	100
Availability of Pest resistant seeds	28	36	10	10	16	0	100
Assured procurement with MSP	28	8	8	14	42	0	100
Higher Market Price	10	18	12	42	18	0	100
Any other	0	0	0	0	0	0	0
Total	100	100	100	100	100	0	
Mahendragarh							
Improved Irrigation facilities	30	16	10	30	12	2	100
Availability of High yielding variety seeds	2	22	32	30	14	0	100
Availability of Pest resistant seeds	28	34	18	10	10	0	100
Assured procurement with MSP	4	14	24	18	40	0	100
Higher Market Price	32	14	14	12	24	4	100
Any other	4	0	2	0	0	94	0
Total	100	100	100	100	100	100	

Source: Ibid

After discussing with farmers following suggestions has been offered :-

- i) Integrating all on going pulse programmes into one programme with full support to farmers through easy access to improved extension services and other facilities.
- ii) Popularization of moong in irrigated areas in wheat and rice rotations and to encourage inter cropping of pulses.
- iii) Pulse marketing needs effective intervention. Pulse growers sell their produce immediately after the harvest due to short shelf life and lack of storage facilities. As a result, they receive low prices. At present, NAFED operations are extremely limited due to low financial support. It is urgent to provide adequate financial support to NAFED for commercial purchases and price support scheme.
- iv) Creation of storage facility at the village level.

Chapter-7

Impact of NFSM, Pulses on Pulse Production

Introduction:

The National Food Security Mission, pulses launched during October. 2007 has completed its initial phase of implementation. Under the Mission, pulse growers have been provided improved seeds, pesticides and financial assistance for buying sprinkler sets, etc. It would be useful to analyse the experiences of farmers and their awareness about the Mission. This chapter deals with these aspects. The inferences are drawn on the basis of opinion survey during collection of primary data in Bhiwani where NFSM, pulses is being implemented since 2007-08.

I. Awareness about NFSM, Pulses

Table 7.1

Awareness of Farmers about NFSM, Pulses

Farm Size	(No. of Farmers) awareness	Total No. of Farmers in the Size Group	% of farmers
Marginal	4	4	100
Small	11	11	100
Medium	20	20	100
Large	15	15	100
Total	50	50	100

Source: Field Survey

At the outset, it would be useful to understand whether pulse growers in Bhiwani (NFSM district) were fully aware about of the NFSM, pulses. A perusal of Table 7.1 indicates that all the sampled farmers were fully aware about the Mission irrespective of farm size.

II. Assistance received

NFSM, pulses has a provision for financial assistance to pulse growers for improved variety seeds, micro nutrients and purchase of machinery. A farmer will get assistance for a maximum of 5 hectares of area under the cultivation of pulses.

During the opinion survey, questions were asked whether beneficiaries of the Mission availed assistance. Table-7.2 indicates that each beneficiary farmer received some time of assistance under the Mission.

Table 7.2

Assistance received by farmers under NFSM, Pulses

Farm Size	No. of Farmers received assistance	Total No. of Farmers in the Size Group	% of farmers assisted
Marginal	4	4	100
Small	11	11	100
Medium	20	20	100
Large	15	15	100
Total	50	50	100

Source: Ibid

NFSM, pulses has a provision for financial assistance for improved variety seeds, micro nutrients/lime/gypsum, etc. Farmers will get assistance for a minimum of 5 hectares of area under the cultivation of pulses.

Mechanization in pulses will help in timely completion of field operations and will add to the efficiency of the farmers in performing field operations and economize upon the cost of cultivation. Under the Mission, an incentive is provided to the pulse growers to purchase machines such as sprinkler sets, sprayers, rotavators and multi crop planters. A farmers can avail this benefit for each machine only once during the entire period of the Mission. In addition, there is a provision for Integrated Pest Management (IPM) upto 50 per cent of the cost or Rs. 750 per hectare.

Table 7.3**Distribution of farmers by type of assistance received under NFSM, Pulses**

Farm Size	No. of Households Assisted						
	Seeds	INM*	IPM**	Equipment like seed drills etc	Demonstration	Training	Other (Pesticide)
Marginal	0	0	0	0	0	0	4
Small	1	0	0	0	0	0	11
Medium	0	0	1	0	0	0	20
Large	0	0	1	0	0	0	15
Total	1	0	2	0	0	0	50

Source: Ibid

* INM (Integrated Nutrient Management),

** IPM (Integrated Pest Management)

Although, there is provision for a variety of assistance under the Mission pulses, most of the beneficiary growers received assistance for pesticides. Surprisingly, only one beneficiary availed assistance for seeds. Among various categories of farmers, only a fraction of them availed assistance other than pesticides.

III. Impact on Area and Production of Pulses after NFSM

Findings of Table-7.4 reveal that area cultivated under gram as well as moong has declined on beneficiary farms after the implementation of the Mission. Farm size variations were found significant. On marginal farms, area cultivated under gram multiplied five times while it was completely stagnant on small and medium farms. A major decline in area was noticed on large farms. The loss of cultivated area under moong at the overall level was high since area dropped to less than 50 per cent. Thus, results about shift in area under pulses after the implementation of the Mission did not fulfill expectations. During the field visit, farmers reported that benefits provided under the Mission are limited and therefore, they have not shifted the area under pulses from other crops (Table-7.4).

Table 7.4**Area under Pulse Crops before and after NFSM, Pulses**

Farm Size	Gram		Moong	
	Average of 2007-08 and 2008-09	2009-10	Average of 2007-08 and 2008-09	2009-10
Marginal	0.16	0.8	0.0	0.0
Small	2.70	2.6	0.0	0.0
Medium	10.00	9.8	0.7	0.6
Large	23.35	16.3	1.0	0.2
Total	36.21	29.46	1.70	0.80

Source: Ibid

Like acreage, achievements of the Mission in terms of increased production of gram and moong on the beneficiary farms in Bhiwani were found poor at the overall level. Among the various categories of beneficiary farmers, only marginal growers of gram experience almost four times increase. In the remaining categories pulse production had declined significantly. Moong presented the same scenario at the farm level. In none of the category production has increased after the implantation of the Mission.

Table 7.5**Production of Pulse Crops before and after NFSM, Pulses**

Farm Size	Gram		Moong	
	Average of 2007-08 and 2008-09	2009-10	Average of 2007-08 and 2008-09	2009-10
Marginal	1.8	7.5	0.0	0.0
Small	27.0	22.5	0.0	0.0
Medium	125.0	96.5	6.1	4.5
Large	273.8	225.5	7.9	2.0
Total	427.5	352.0	14.0	6.5

Source: Ibid

An analysis of yield rates of gram and moong presented in Table-7.7 suggests that there was marginal increase in the productivity of gram after the implementation of the Mission but yield of gram at the overall level had declined

from its earlier level. In case of gram, large farmers indicated impressive increase of 17.90 per cent while for remaining categories yield of moong had declined.

Moong presented a mixed scenario of yield rates at the farm size level. In case of large farmers, productivity of moong increased by more than 20 per cent while reverse could be observed in case of medium farmers.

Thus, gram has shown marginal improvement in the productivity after implementation of the Mission and this was largely due to yield and enhancement on large farms. One reason could be higher benefits availed by these farmers under the Mission.

Table 7.6

Yield of Pulse Crops before and after NFSM, Pulses

(kg/ha.)

Farm Size	Gram		Moong	
	Average of 2007-08 and 2008-09	2009-10	Average of 2007-08 and 2008-09	2009-10
Marginal	1125	938	-	-
Small	1000	865	-	-
Medium	1250	985	871	750
Large	1173	1383	790	1000
Total	1181	1195	824	813

Source: Ibid

We have collected and analysed data on yield rates of pulses on sampled farmers in Bhiwani (NFSM district) and Mahendragarh (non NFSM district). Clearly, yield rates of gram in Bhiwani were found higher by 16.18 per cent in comparison to Mahendragarh district. Among different categories of farmers, highest productivity of gram was noticed on 16.20 per cent in beneficiaries farms. This result does not hold true for the moong and yield gap between farmers benefited from the NFSM (pulse) and not benefited from this Mission was greater as compared to gram. In a nutshell, achievements per acre through adoption of the NFSM, pulses in Bhiwani were moderate in comparison to the expected yield of gram and moong, which ranges between 15-20 per qtls per/ha. The poor performance of yield on sampled farmers could be attributed to a variety of factors such as low level of input use, partial adoption of recommended package

of practices, uncertainty of rainfall lack of plant protection measures and weed control measures. However, application of life saving irrigation appears to be prominent factors.

Table 7.7

Yield of Pulse Crops on Sampled Farmers
(Average of 3 Years)

(kg/ha)

Farm Size	Gram	Moong
Bhiwani		
Marginal	1019	-
Small	956	-
Medium	1163	838
Large	1227	807
Total	1185	821
Mahendragarh		
Marginal	1113	972
Small	1055	761
Medium	936	652
Large	1036	596
Total	1020	688

Source: Ibid

IV. Use fullness of the Mission for Farmers:

Successes and achievements of a policy measure related to enhancement of crop production depend on its utility for the farmers. We had included a quarry on use fullness of the Mission for the pulse producer in the opinion survey. Table-7.8 indicates the results. Among sampled farmers, 52 per cent found the Mission use full in solving the problems related to pulse production. Finding show that 67 per cent among the large farmers found it use full while this percentage was 25 for marginal farmers.

Analysis of the type of use fullness indicates that 52 per cent farmers opined that assistance received under the Mission reduced the problem of pest attack in pulse cultivation. It could be possible through provision of pesticides. The utility of the Mission regarding components such as higher yield, reduced drudgery and increase knowledge was found negligible irrespective of farm size.

Table 7.8

Usefulness of NFSM, Pulses

Farm Size	No. of Farmers who found useful	Total No. of Farmers in the Size Group	% of farmers found useful
Marginal	1	4	25
Small	7	11	64
Medium	8	20	40
Large	10	15	67
Total	26	50	52

Source: Ibid

Table 7.9

Distribution by type of Use fullness of NFSM, Pulses

Farm Size	No. of Households by type of use					Total
	Higher Yield	Reduced pest attack	Reduced Drudgery	Increased knowledge	Other	
Marginal	0	1	0	0	0	1
Small	1	7	0	1	0	9
Medium	0	8	0	0	0	8
Large	1	10	0	0	0	11
Total	2	26	0	1	0	29
% of farmers to Total Farmers in the Size Group						
Marginal	0	25	0	0	0	25
Small	9	64	0	9	0	82
Medium	0	40	0	0	0	40
Large	7	67	0	0	0	73
Total	4	52	0	2	0	58

Source: Ibid

V. Major Suggestions

The impact of the NFSM, pulses on yield rates was assessed through appropriate comparisons of beneficiary farmers in Bhiwani with non-beneficiaries farmers in Mahendragarh in Haryana. The results of sample survey revealed that yield of gram on beneficiary farms was higher by 16.18 per cent but it was much below the expected yield of 15-20 qtls. Therefore, factors constraining yield need to be studied carefully and remedial actions through policy measures need to be initiated at the earliest. Analysis of yield rates of gram and moong before and after the Mission in Bhiwani district indicated that achievements were not significant in case of gram and were poor in case of moong.

Survey results show that efforts made for the development of pulses in the selected district of Bhiwani through implementation of NFSM, pulses did not make significant impact on pulse production by increase in area and yield due to limited coverage in terms of area as well as number of pulse growers.

Secondly, coverage of the NFSM (pulses) was found extremely limited in terms of area and number of farmers covered. It appears NFSM, pulses is making slow progress in Haryana because the coverage of the Mission in terms of pulse producers is limited and insignificant. Only five districts with higher pulse production potential have been covered under the Mission. In view of declining production of pulses in the state of Haryana at an alarming rate, it is suggested that remaining districts also be covered under the Mission so that pulse cultivation becomes popular as an inter crop and in wheat and rice rotations.

Chapter-8

Conclusions and Policy Implications

The main objective of this chapter is to derive conclusions on the basis of major findings of this study. It also suggests important policy directions to augment production and productivity of pulse crops in Haryana through implementation of National Food Security Mission, Pulses. The study is based on secondary as well as primary data collected through a field survey in two districts (Bhiwani-NFSM and Mahendragarh non-NFSM district).

Main Findings:

I. Status of Pulse Sector in Haryana

Results of data analyses show that wheat and rice are the major cereal crops of Haryana and occupied 36.3 and 15.7 per cent of GCA respectively during average of five years (2002-03 to 2006-07). Mustard and cotton crops were next in the order with 10.5 and 8.9 per cent of GCA respectively. Pulse crops however, experienced a poor status in crop pattern of Haryana and only 2.7 per cent of GCA was devoted to pulse sector during this period.

There has been significant growth in production and productivity of major cereals in Haryana between TE 1996-97 and 2006-07. Also, production of commercial crops such as mustard and cotton grew significantly (5.09 and 3.54 per cent per annum) during this period. Performance of pulses in the state however, has been poor. Pulse production declined at an alarming rate of 9.61 per cent per annum. Productivity growth of 1.32 per cent per year during this period was not impressive and therefore, was unable to compensate for continuous decline in area.

The scenario of growth performance of pulse crops during the study period in the selected districts of Bhiwani and Mahendragarh was equally poor since pulse production in both areas declined at a high rate. The rate of decline was observed higher in Mahendragarh. However, a silver lining was noticed in case of moong in Bhiwani. Its production grew at the rate of 6.90 per cent per year during the study period due to impressive growth in area and positive growth in yield. In view of this result, it is suggested that yield potential of moong should be realized

by implementing specific policy measures such as easy availability of improved seeds to farmers.

II. Crop-structure of Sampled Farms

The cropping pattern of sampled farmers in Bhiwani, (NFMS district) and in Mahendragarh (non-NFMS district) is largely dry crops based due to inadequate availability of irrigation facilities except for wheat which occupied more than 20 per cent of GCA. These districts have tremendous and immense scope for increasing area under pulses. This, however, would be possible only if the existing available improved production technology is extended to the farmers for adoption with availability of crucial inputs both in rainfed and irrigated conditions.

In irrigated conditions, land is generally kept fallow after the harvest of rabi crops. Short duration varieties of summer moong/urad can be easily adjusted in crop rotations in such areas where irrigation facilities are available. In summer, these crops have no competition with the main crops. With increase in irrigation facilities in the coming years, there appears to be a great scope of increasing summer cultivation of pulse crops. This would add a new dimension in raising acreage under pulses.

In un-irrigated/rainfed conditions, acreage of pulses in these areas can be increased by popularizing the practices of inter-cropping and mixed-cropping. Through these devices, farmers can have two crops with different requirements. In Bhiwani, arhar can be inter-cropped with bajra and cotton. In Mahendragarh, urd can be advantageously accommodated with important crops. Similarly, other crops can be also used for inter-cropping of pulses. The pulse crops besides giving additional income will help farmers in enhancing soil fertility.

III. Returns from Pulses vis-à-vis other Important Crops :

The impact of the National Food Security Mission, pulses in Bhiwani on gross returns and net returns per hectare and per quintal was assessed through appropriate comparison with the non-beneficiary farmers in Mahendragarh district during 2007-08, 2008-09 and 2009-10. Results of sampled survey point out that gross returns per hectare from gram cultivation in Bhiwani district were

found higher than Mahendragarh district during all these years but this was not true for net returns during first two years. Farm size variations were common in gross returns and net returns per hectare as well as per quintal. The value of marketed surplus in most cases was positively related to farm size.

A comparison of gross returns and net returns with other important crops during the rabi season has exhibited that wheat and mustard were found superior than gram in Bhiwani in terms of net returns per unit of land. The economics of moong, a minor pulse crop grown in these districts was also worked out and profitability was compared vis-à-vis other important crops such as bajra, cotton and gowar. This pulse crop provided higher net returns per hectare in comparison to bajra in both the selected districts. It was observed that cotton is far superior crop than moong and bajra during kharif season in Bhiwani district while profitability of moong was found better in comparison to bajra and gowar in Mahendragarh district.

IV. Adoption of Technology :

Improved variety seeds for pulse cultivation are popular among farmers due to low yield risk in terms of infestation of insects, pests and diseases. The rate of adoption of improved seeds among sampled farmers was 100 per cent since each one has switched over from traditional variety seeds to improved variety seeds. Further, adoption of full package of recommended practices is essential for realizing good yield. It was observed that pulse growers fully adopted sowing and partially adopted seed practices. Especially, seed rate applied by farmers for gram cultivation in Mahendragarh and seed rate applied for moong cultivation in Bhiwani as well as in Mahendragarh was below the recommended levels. Adoption of other important practices related to application of manure and number of irrigations was partial. Particularly, number of irrigation was below the required number for realizing the potential yield from growing improved varieties of pulses in Haryana.

We had tried to understand the problems of pulse growers in adoption of improved variety seeds through opinion survey. Five options such as non-availability, timely availability, expensive nature of seeds, need of larger doses of

other inputs, lower than expected yield and inadequate pest resistance were provided. Inadequate pest resistance of improved seeds and lower than expected yield emerged as the most important problems faced by the growers of gram and moong in sampled districts of Haryana.

Results show that most of the sampled pulse producers sold their produce in the village market. They were not satisfied with the marketing system and prices received. It is essential to provide an alternative marketing system and to ensure remunerative prices to the farmers.

The pulse produce of the farmers should be procured by an integrated agency or cooperative society created for this purpose, eliminating the system of middlemen. This agency should also be entrusted with the task of processing and marketing. In initial years, it could be difficult to implement because of the strong traders' cartel, but gradually with the increase in membership and volumes, the agency will be able to surmount the obstacles created by traders. The major activities of the agency should be arrangement of auction, processing, storage facilities and providing credit to members against stock. This will ensure reasonable returns to the farmers, saving them from the harassment at the hands of middlemen and traders. The consumers too would get pulses at reasonable rates.

Adequate storage facilities should be created at village level. For this, the Government should provide necessary financial help and technical assistance. Interested pulse growers should be also encouraged to set up small scale processing units and the necessary marketing avenues to be provided to them.

V. Progress of National Food Security Mission, Pulses in Haryana :

The NFSM, pulses has completed the initial phase of its implementation in Haryana. It is making slow progress in the state because coverage of the Mission in terms of pulse producers is limited and insignificant. Only five districts with higher pulse production potential are covered under the Mission. In fact, the Mission has been spread too thinly over the state, with the result that the impact

of the Mission is hardly visible in pulse farming. The Mission is making slow progress because it is being implemented through Government channels without involving the farmers at the grass root levels. In addition, undue delay in issue of state level sanctions and release of funds to implementing agencies sometimes hinders the progress. The components such as in time availability of improved variety seeds at affordable prices to farmers and IPM demonstrations need urgent attention.

Policy Implications:

Pulse development in Haryana through the implementation of the NFSM, pulses should aim at arresting the continuous decline in area cultivated and increasing yield to the potential level. The Mission has completed around four years of implementation in the state but its impact on area, production and yield of pulse crops was found to be limited due to low coverage of farmers and lack of holistic approach in practice. In order to make the Mission more effective, the following policy initiatives are recommended:

- (1) For arresting the continuous decline in acreage under pulses, these crops should be introduced as inter-crop/mixed-crop/rotational crop in the cropping system. Some financial incentives should be given to the farmers for bringing more area under pulses.
- (2) The yield of pulses in Haryana has risen between 1996-97 and 2006-07 but it can be further increased to potential levels through wider and full adoption of improved production technology. For popularizing improved pulse production technology among the pulse growers, farmers should be given full support.
- (3) Proper guidance should be given to the pulse growers about the use of recommended inputs. In particular, guidance is required in the case of use of fertilizers and pesticides.
- (4) Research should be directed towards evolving improved disease resistant variety seeds of pulses. For this purpose, each pulse should be treated separately and financial backing be given accordingly. Gram is the major pulse crop of the state and its yield rate has increased substantially during

the past one decade. It can be further increased if the disease resistant area specific improved variety seeds of gram are evolved and popularized among farmers.

- (5) In order to provide an alternative marketing system and to ensure remunerative prices to the farmers, pulse produce should be procured by an integrated agency/cooperative society created for this purpose, eliminating the system of middlemen. This agency should also be entrusted with the task of processing and marketing of pulses. It is suggested that pulses should be covered under the Public Distribution System. They should be procured at the minimum support prices. This would benefit both the producers and the consumers. Further, it can be greatly helpful in improving the nutritional standards of the poor people.

At the end, we would like to conclude that the National Food Security Mission, pulses is not a well known Programme across Haryana. It has low coverage in terms of pulse growers and districts. It is urged that, instead of covering only five districts with high potential for pulse production, the entire state should be covered. This, however, is not possible within the currently available funds, which are grossly inadequate for this purpose. It is suggested that financial support for the Mission in Haryana should be increased. Moreover, the success of the Mission depends on its usefulness for the farmers. In order to achieve this goal, each beneficiary must be provided with all the essential components as a package under the programme. In addition, involvement of farmers' organizations at the grass root level can be used to efficiently promote and propel this endeavour.

It appears that there is an urgent need for an integrated pulse programme under which credit, input supply and marketing of produce of cultivators are tackled by a single agency. These facilities may be given through Farmers' Service Societies which would meet all the above requirements of the farmers under one roof.

Annexure Tables

Table 1: Education of the Head of Sampled Households
(No. of HHs*)

Size Group	Illiterate	Primary	Secondary & Above	Total
Bhiwani				
Marginal	2	2	0	4
Small	3	3	5	11
Medium	5	2	13	20
Large	0	0	15	15
Total	10	7	33	50
Mahendragarh				
Marginal	4	3	6	13
Small	6	7	4	17
Medium	3	3	7	13
Large	3	1	3	7
Total	16	14	20	50

Source: Field Survey
* Households

Table 2: Educational Profile of the Adult Population on Sampled Households
(Population)

Size Group	Illiterate	Primary	Secondary & Above	Total
Bhiwani				
Marginal	6	1	6	13
Small	10	2	34	46
Medium	28	5	71	104
Large	17	1	59	77
Total	61	9	170	240
Mahendragarh				
Marginal	16	4	30	50
Small	18	9	45	72
Medium	16	7	54	77
Large	8	3	23	34
Total	58	23	152	233

Source: Ibid

Table 3: Caste Composition of Sampled Households
(No. of HHs*)

Size Group	SC	ST	OBC	Others	Total
Bhiwani					
Marginal	0	0	3	1	4
Small	0	0	3	8	11
Medium	1	0	7	12	20
Large	0	0	3	12	15
Total	1	0	16	33	50
Mahendragarh					
Size	SC	ST	OBC	Others	Total
Marginal	0	0	2	11	13
Small	0	0	2	15	17
Medium	1	0	2	10	13
Large	1	0	3	3	7
Total	2	0	9	39	50

Source: Ibid
* Households

Table 4(a): Irrigation details of Sampled Farms ('in acres)

Bhiwani

Size Group	-----Irrigated Area-----					Unirrigated Area	Total Area
	Canal	Tubewell	Canal+TW	Others	Total		
Marginal	0	0	4.4	0	4.40	2.00	6.40
Small	6.75	7	8.5	0	22.25	15.00	37.25
Medium	57.25	18	23.75	0	99.00	45.00	144.00
Large	90.75	18	49	0	157.75	86.00	243.75
Total	154.75	43.00	85.65	0	283.40	148.00	431.40

Mahendragarh

Marginal	0	8.50	0	0	8.50	11.25	19.75
Small	0	41.25	0	0	41.25	20.75	62.00
Medium	0	41.00	0	0	41.00	36.00	77.00
Large	0	55.50	0	0	55.50	64.00	119.50
Total	0	146.25	0	0	146.25	132.00	278.25

Source: Ibid

Table 4(b): Distribution of Source-wise irrigation of Sampled Farms

(%)

Size Group	-----Irrigated-----					Unirrigated	Total
	Canal	Tubewell	Canal+TW	Others	Total		
Bhiwani							
Marginal	0.00	0.00	68.75	0.00	68.75	31.25	100.00
Small	18.12	18.79	22.82	0.00	59.73	40.27	100.00
Medium	39.76	12.50	16.49	0.00	68.75	31.25	100.00
Large	37.23	7.38	20.10	0.00	64.72	35.28	100.00
Total	35.87	9.97	19.85	0.00	65.69	34.31	100.00
Mahendragarh							
Marginal	0.00	43.04	0.00	0.00	43.04	56.96	100.00
Small	0.00	66.53	0.00	0.00	66.53	33.47	100.00
Medium	0.00	53.25	0.00	0.00	53.25	46.75	100.00
Large	0.00	46.44	0.00	0.00	46.44	53.56	100.00
Total	0.00	52.56	0.00	0.00	52.56	47.44	100.00

Source: Ibid

Table 5: Cropping Pattern (Season-wise) of Sampled farms

Bhiwani

(Average of 2007-08, 2008-09, 2009-10 in ha)

KHARIF AREA SOWN					
Size Group	Bajra	Cotton	Pulses	Others	Total
Marginal	2.29	0.00	0.00	0.07	2.36
Small	5.20	5.60	0.00	2.03	12.83
Medium	13.52	28.10	0.67	3.77	46.05
Large	17.60	45.00	0.73	2.63	65.97
Total	38.61	78.70	1.40	8.50	127.21

RABI AREA SOWN					
Size group	Wheat	Mustard	Pulses	Others	Total
Marginal	1.40	0.67	0.36	0.00	2.43
Small	9.33	2.73	2.67	0.17	14.90
Medium	24.00	18.67	9.93	0.80	53.40
Large	41.23	34.27	21.00	0.20	96.70
Total	75.97	56.33	33.96	1.17	167.43

ZAID AREA SOWN					
Size Group	Chillies		Pulses	Others	Total
Marginal	0.13				0.13
Small	0.00				0.00
Medium	2.40				2.40
Large	3.77				3.77
Total	6.30	0.00	0.00	0.00	6.30

Source: Ibid

Mahendragarh

(Average of 2007-08, 2008-09, 2009-10 in ha)

KHARIF AREA SOWN					
Size Group	Bajra	Gowar	Pulses	Others	Total
Marginal	5.63	0.27	1.20	0.53	7.63
Small	13.50	7.00	2.33	0.00	22.83
Medium	18.40	8.00	4.27	0.00	30.67
Large	20.40	12.33	3.73	2.80	39.27
Total	57.93	27.60	11.53	3.33	100.40

RABI AREA SOWN					
Size Group	Wheat	Mustard	Pulses	Others	Total
Marginal	3.10	0.47	4.27	0.00	7.83
Small	7.57	5.03	10.47	0.27	23.33
Medium	11.57	6.73	11.80	0.27	30.37
Large	19.07	7.87	13.87	0.93	41.73
Total	41.30	20.10	40.40	1.47	103.27

ZAID AREA SOWN					
Size Group	Chillies		Pulses	Others	Total
Marginal	0.00				0.00
Small	0.00				0.00
Medium	0.00				0.00
Large	0.07				0.07
Total	0.07	0.00	0.00	0.00	0.07

Table 6: Source of Knowledge of Improved Varieties of Pulses on Sampled Farms

Size Group	Extension Agent	Neighbourers	News papers/ Media	Others	Total
Bhiwani					
Marginal	4	0	0	0	4
Small	9	2	0	0	11
Medium	19	1	0	0	20
Large	15	0	0	0	15
Total	47	3	0	0	50
Mahendragarh					
Marginal	5	4	0	4	13
Small	7	8	0	2	17
Medium	8	4	0	1	13
Large	3	3	0	1	7
Total	23	19	0	8	50

Source: Ibid

Table 7(a): Farmers following Recommended Package of Practices

(No.)

Crop: Gram

Size Group	Sowing Practices	Seed Practices	Other	Not followed any Practice
Bhiwani				
Marginal	4	4	4	0
Small	11	11	11	0
Medium	20	20	20	0
Large	15	15	15	0
Total	50	50	50	0
Mahendragarh				
Marginal	13	13	13	0
Small	17	17	17	0
Medium	13	13	13	0
Large	7	7	7	0
Total	50	50	50	0

Source: Ibid

Table 7(b): Farmers following Recommended Package of Practices

(No.)

Crop: Moong

Size Group	Sowing Practices	Seed Practices	Other	Not followed any Practice
Bhiwani				
Marginal	0	0	0	4
Small	0	0	0	11
Medium	4	4	4	16
Large	2	2	2	13
Total	6	6	6	44
Mahendragarh				
Marginal	7	7	7	6
Small	6	6	6	11
Medium	9	9	9	4
Large	7	7	7	0
Total	29	29	29	21

Source: Ibid

Table 8(a): Farmers reporting Problems with Improved Varieties of Pulses
Crop Name: GRAM

Problem	Rank1	Rank2	Rank3	Rank4	Rank5	Rank6	Total
Bhiwani							
Not available at all	1	0	0	4	16	29	50
Available but not on time	2	4	12	11	9	12	50
Very expensive	2	4	8	12	17	7	50
Need large doses of other inputs	3	9	16	18	3	1	50
Much lower yield than expected	7	24	10	4	5	0	50
Pest resistance not adequate	35	9	4	1	0	1	50
Total	50	50	50	50	50	50	
Mahendragarh							
Not available at all	0	0	0	2	5	43	50
Available but not on time	0	0	8	11	29	2	50
Very expensive	4	18	12	6	7	3	50
Need large doses of other inputs	9	5	11	21	3	1	50
Much lower yield than expected	2	20	12	9	6	1	50
Pest resistance not adequate	35	7	7	1	0	0	50
Total	50	50	50	50	50	50	

Source: Ibid

Table 8(b): Households reporting Problems with Improved Varieties of Pulses
Crop Name: MOONG

Problem	Rank1	Rank2	Rank3	Rank4	Rank5	Rank6	Total
Bhiwani							
Not available at all	0	0	0	0	1	1	2
Available but not on time	0	0	0	1	0	1	2
Very expensive	0	0	0	1	1	0	2
Need large doses of other inputs	0	1	1	0	0	0	2
Much lower yield than expected	0	1	1	0	0	0	2
Pest resistance not adequate	2	0	0	0	0	0	2
Total	2	2	2	2	2	2	
Mahendragarh							
Not available at all	0	0	2	2	5	18	27
Available but not on time	6	2	4	2	10	3	27
Very expensive	7	5	2	4	6	3	27
Need large doses of other inputs	1	10	2	10	4	0	27
Much lower yield than expected	2	6	9	6	2	2	27
Pest resistance not adequate	11	4	8	3	0	1	27
Total	27	27	27	27	27	27	

Source: Ibid

**Table 9(a): Suggested solutions by Farmers for the success
of Improved Varieties of Pulses**

Crop Name: GRAM

Problem	Rank1	Rank2	Rank3	Rank4	Total
Bhiwani					
Cheaper availability of Seeds	11	22	17	0	50
Timely availability of Seeds	22	11	17	0	50
Subsidy	17	18	15	0	50
Others	0	0	0	0	0
Total	50	51	49	0	
Mahendragarh					
Cheaper availability of Seeds	6	22	22	0	50
Timely availability of Seeds	13	16	21	0	50
Subsidy	31	12	7	0	50
Others	0	0	0	0	0
Total	50	50	50	0	

Source: Ibid

**Table 9(b): Suggested solutions by farmers for the success
of Improved Varieties of Pulses**

Crop Name: MOONG

Problem	Rank1	Rank2	Rank3	Rank4	Total
Bhiwani					
Cheaper availability of Seeds	2	0	0	0	2
Timely availability of Seeds	0	0	2	0	2
Subsidy	0	2	0	0	2
Others	0	0	0	0	0
Total	2	2	2	0	
Mahendragarh					
Cheaper availability of Seeds	9	3	15	0	27
Timely availability of Seeds	3	19	5	0	27
Subsidy	15	6	6	0	27
Others	0	0	0	0	0
Total	27	28	26	0	

Source: Ibid

Table 10: Number of Households Marketing through Various Channels

2009-10

Size Group	Village Market	Commission Agent	Regulated Market	Govt. Agencies (NAFED)	Others	Total
Bhiwani						
Marginal	4	0	0	0	0	4
Small	11	0	0	0	0	11
Medium	20	0	0	0	0	20
Large	15	0	0	0	0	15
Total	50	0	0	0	0	50
Mahendragarh						
Marginal	7	0	1	0	0	9
Small	14	1	2	0	0	16
Medium	11	1	0	0	0	12
Large	7	0	0	0	0	7
Total	39	2	3	0	0	44

Source: Ibid

Table 11: Major problems faced by farmers in cultivation of Pulses

(No. of farmers)

Reason	Rank1	Rank2	Rank3	Rank4	Rank5	Rank6	Rank7	Total
Bhiwani								
Lack of Irrigation facilities	14	10	5	8	9	4	0	50
Lack of Improved varieties	0	1	6	20	17	6	0	50
Lower Yield	4	5	23	7	5	6	0	50
High Pest incidence	22	18	8	0	0	2	0	50
Low market price	10	8	5	4	7	16	0	50
No assured market	0	8	3	11	12	16	0	50
Any other	0	0	0	0	0	0	0	0
Total	50	50	50	50	50	50	0	
Mahendragarh								
Lack of Irrigation facilities	13	5	8	8	11	4	1	50
Lack of Improved varieties	0	5	11	15	13	6	0	50
Lower Yield	9	14	8	10	6	3	0	50
High Pest incidence	25	9	6	3	4	3	0	50
Low market price	2	13	4	7	8	16	0	50
No assured market	1	3	13	7	8	18	0	50
Any other	0	1	0	0	0	0	49	50
Total	50	50	50	50	50	50	50	

Source: Ibid

Table 12: Important Suggestions from the farmers for cultivating Pulses

(No. of farmers)

Reason	Rank1	Rank2	Rank3	Rank4	Rank5	Rank6	Total
Bhiwani							
Improve Irrigation facilities	17	14	12	2	5	0	50
Availability of High yielding Varieties	0	5	23	15	7	0	50
Availability of Pest resistant Varieties	14	18	5	5	8	0	50
Assured procurement with MSP	14	4	4	7	21	0	50
Higher Market Price	5	9	6	21	9	0	50
Any other	0	0	0	0	0	0	0
Total	50	50	50	50	50	0	
Mahendragarh							
Improve Irrigation facilities	15	8	5	15	6	1	50
Availability of High yielding Varieties	1	11	16	15	7	0	50
Availability of Pest resistant Varieties	14	17	9	5	5	0	50
Assured procurement with MSP	2	7	12	9	20	0	50
Higher Market Price	16	7	7	6	12	2	50
Any other	2	0	1	0	0	47	50
Total	50	50	50	50	50	50	

Source: Ibid

Table 13: Increase in Area under Pulses after NFSM: Farmers' Perceptions

Size Group	No. of Farmers who reporting increase	Total No. of Farmers in the size group	% of farmers reporting increase
Marginal	0	4	0
Small	0	11	0
Medium	0	20	0
Large	0	15	0
Total	0	50	0

Source: Ibid

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Action taken on the Comments of the Coordinator

All the suggested tables by the Coordinator have been attached as annex (page 90-99).