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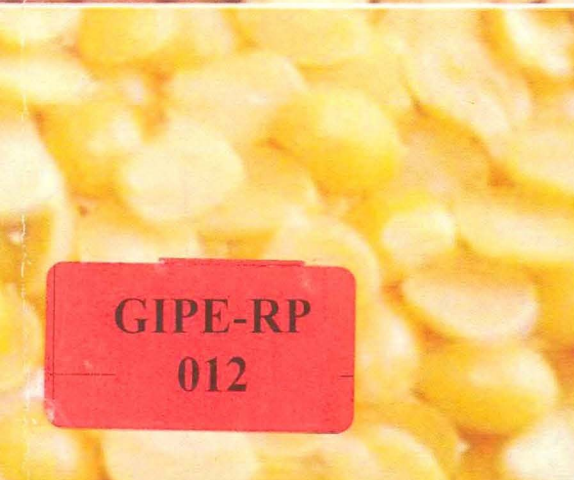
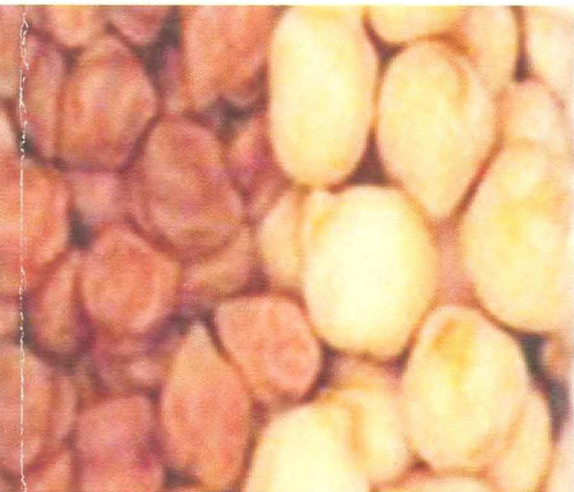
AERC Report



**Agro-Economic
Research Centre
(AERC)**

Possibilities and Constraints in Increasing Pulses Production in Maharashtra and the Impact of National Food Security Mission on Pulses

Deepak Shah



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FOREWORD

India has made rapid strides in foodgrain production, especially after the mid-sixties period, which was mainly due to the introduction of new farm technology, popularly known as seed-fertilizer-water technology. Though the new farm technology had powerful impact on food sector of the country, this impact was tardy and dismal in the case of pulse crops. This is despite the fact that several policy initiatives, projects and programmes with respect to pulses were undertaken in the past viz. All India Coordinated Pulses Improvement Project (AICPIP), National Pulses Development Programme (NPDP), Technology Mission on Pulses (TMOP), Centrally Sponsored Integrated Scheme of Oilseeds, Pulses, Oil palm and Maize (ISOPOM), etc. Since these policies and programmes hardly led to any improvement in pulses production of India, the National Development Council (NDC) resolved to launch a Food Security Mission for rice, wheat and pulses, especially for raising the production levels by 10 million tonnes for rice, 8 million tonnes for wheat and 2 million tonnes for pulses by the end of the Eleventh Five Year Plan (2011-12).

As for pulses, the major areas of concern are the low yield levels, marginal lands devoted to pulse cultivation, stagnation in production technology, severe abiotic (climate-related) and biotic (insect, pest) stresses, volatility of prices and lack of effective procurement. The present study, therefore, attempts to unravel the degree of importance of these constraints and outline the prospects for pulses production in the state of Maharashtra. The study also intends to assess the effectiveness of NFSM-Pulses on the pulse production in Maharashtra. The study has shown positive impact of NFSM programme on pulses crops cultivation in the state of Maharashtra since the element of profit involved in the cultivation of pulses crops turned out to be much higher in the NFSM district as against the non-NFSM district. The element of profit involved in the cultivation of pulses crops in NFSM district was even higher than all other crops cultivated in the district. The plausible reasons for rise in profit margins in the cultivation of pulses crops could be traced in rise in yield levels, higher prices on offer for pulses, adoption of improved varieties of seeds, higher adoption of recommended practices such as sowing, seed and other practices, and availability of several other facilities to the farmers under the programme.

I hope the findings of the report would assume increasing significance, especially with growing concern for pulses production and food and nutritional security in our country.

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Rajas Parchure
Professor and Offg. Director

PREFACE

The agricultural sector has always been an important component of the Indian economy with period after mid-sixties being marked with significant expansion in foodgrain output of the country due to introduction of new technology, popularly known as seed-fertilizer-water technology. Though the new farm technology had a powerful impact on the food sector of the country, the impact of new technology was tardy and dismal in the case of pulses. In the race of output growth, pulses have lagged so far behind that these can be categorized as 'also ran'. This is despite the fact that several policy initiatives, projects and programmes with respect to pulses were undertaken in the past viz. All India Coordinated Pulses Improvement Project (AICPIP), National Pulses Development Programme (NPDP), Technology Mission on Pulses (TMOP), Centrally Sponsored Integrated Scheme of Oilseeds, Pulses, Oil palm and Maize (ISOPOM), etc. Since these policies and programmes hardly led to any improvement in pulses production of India, the National Development Council (NDC) in its 53rd meeting held on 29th May, 2007 resolved to launch a Food Security Mission for rice, wheat and pulses, especially for raising the production levels by 10 million tonnes for rice, 8 million tonnes for wheat and 2 million tonnes for pulses by the end of the Eleventh Five Year Plan (2011-12). In view of achieving these targets and operationalising the resolution taken by NDC, the 'National Food Security Mission (NFSM)' was launched in 2007-08 as a Centrally Sponsored Scheme. The NFSM comprises of three components, which include (a) NFSM – Rice, (b) NFSM – Wheat, and (c) NFSM – Pulses.

At present, the major areas of concern in pulse cultivation are the low yield levels, marginal lands devoted to pulse cultivation, stagnation in production technology, severe abiotic (climate-related) and biotic (insect, pest) stresses, volatility of prices and lack of effective procurement. The present study, therefore, attempts to unravel the degree of importance of these constraints and outline the prospects for pulses production in the state of Maharashtra. The study also intends to assess the effectiveness of NFSM-Pulses on the pulse production in Maharashtra.

The study showed positive impact of NFSM programme on pulses crops cultivation in the state of Maharashtra since the element of profit involved in the cultivation of pulses crops turned out to be much higher in the NFSM district as against the non-NFSM district. The element of profit involved in the cultivation of pulses crops in NFSM district was even higher than all other crops cultivated in the district. Not only

this, the net profit margins in the cultivation of pulses crops in NFSM district were substantially high in 2008-09 as against 2006-07 and 2007-08. The plausible reasons for rise in profit margins in the cultivation of pulses crops could be traced in rise in yield levels, higher prices on offer for pulses, adoption of improved varieties of seeds, higher adoption of recommended practices such as sowing, seed and other practices, and availability of several other facilities to the farmers under the programme.

At the initial stage of this study, I had fruitful discussions with Mr. Prabhakar Deshmukh, Agriculture Commissioner, Commissionrate of Agriculture, Government of Maharashtra, Pune and other senior officers of the Department. I am extremely grateful to them for providing inputs for this study. I am equally grateful to Mr. Jayant Deshmukh, Director (Extension and Training), Commissionrate of Agriculture, GOM, Pune, Mr. A.B. Kausale, Joint Director (Administration), and Mr. D.B. Deshmukh, Dy. Director (Project) for not only supplying the requisite information but also extending all possible help during the conduct of this study. I also extend special thanks to Mr. D.G. Mule, District Agriculture Officer, Beed, Mr. R.R. Shinde, District Statistical Officer, Beed, Mr. Vasant Rathor, Taluka Agriculture Officer, Majalgaon, Beed, Mr. K.S. Mule, District Agriculture Officer, Amravati, Mrs. Gavli, District Statistical Officer, Amravati and Mr. Uke, Taluka Agriculture Officer, Daryapur, Amravati for their support in this study.

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I hereby extend my hearty thanks to Mr. Chandrakant Kolekar for his support in collection, inputting and analysis of data. I also extend my hearty thanks to Shri S. S. Dete and Mr. Anil Memane for their support in collection of data for this study.

It gives me pleasure in extending thanks to my esteemed colleagues, both faculty members and office staff, for their cooperation and support in completing the study.

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CONTENTS

	Page No.
FOREWORD	i
PREFACE	ii
LIST OF TABLES	ix
<u>Chapter</u>	
I INTRODUCTION	1-11
1.1 Background	1
1.2 Pulses Development Programmes in India	2
1.3 Production Performance of Agriculture Sector: Recent Trends	2
1.4 Demand for Cereals and Pulses	3
1.5 National Food Security Mission	6
1.6 Objectives of the Study	7
1.7 Methodology	7
1.7.1 Sampling Design	7
1.7.2 Data Collection	9
1.7.3 Data Sources	10
1.7.4 Reference Period	10
1.8 Organization of the Study	10
II PULSES SECTOR IN THE STATE AND THE DISTRICT	12-38
2.1 Area under Important Crops	12
2.2 Growth Trends in Important Crops	14
2.3 Growth in GCA, NSA and Fertilizer Consumption	17
2.4 Area under Pulses in Maharashtra	19
2.5 Area, Production and Yield of Pulses Crops	19
2.6 Share of Districts in Area and Production of Pulses	24
2.7 District-wise Growth in A, P, Y of Pulses	28
III DEMOGRAPHIC PROFILE AND CROPPING PATTERN OF THE STUDY REGION	39-65
3.1 General Overview: Maharashtra State	39
3.2 General Overview: Study Districts	42
3.3 Family Size of NFSM and Non-NFSM District Farmers	44
3.4 Educational Status of NFSM and Non-NFSM District Farmers	45
3.5 Caste Composition of NFSM and Non-NFSM Farmers	49

<u>Chapter</u>		<u>Page No</u>
	3.6 Irrigated Area in NFSM Amravati and Non-NFSM Beed District	51
	3.7 Cropping Pattern of NFSM and Non-NFSM Farmers	53
	3.8 Area under Pulses for NFSM and Non-NFSM Farmers	57
	3.9 Share of Size-Groups in Pulse Farming: NDSM and Non-NFSM Districts	59
	3.10 Irrigated Area under Pulses in NFSM and Non-NFSM Districts	61
IV	ECONOMICS OF PULSES CULTIVATION	66-99
	4.1 Profitability of Pulses and Other Crops in NFSM District	66
	4.1.1 Economics of Pulses Crops in NFSM District	66
	4.1.2 Economics of Other Major Crops in NFSM District	72
	4.2 Profitability of Pulses and Other Crops in Non-NFSM District	80
	4.2.1 Economics of Pulses Crops in Non-NFSM District	80
	4.2.2 Economics of Other Major Crops in Non-NFSM District	86
V	TECHNOLOGY ADOPTION, MARKETING AND OTHER ISSUES	100-129
	5.1 Area Under Improved Varieties of Pulses: NFSM and Non-NFSM Districts	100
	5.2 Knowledge of Improved Varieties in NFSM and Non-NFSM Districts	103
	5.3 Recommended Practices in NFSM and Non-NFSM Districts	106
	5.4 Problems with Improved Varieties of Pulses: NFSM & Non-NFSM Districts	110
	5.5 Suggested Solutions for Improved Varieties: NFSM & Non-NFSM Districts	117
	5.6 Marketing of Pulses Crops in NFSM and Non-NFSM Districts	121
	5.7 Quantity of Pulses Marketed in NFSM and Non-NFSM Districts	126
VI	FARMERS' PERCEPTIONS	130-155
	6.1 Major Pest Problems in NFSM and Non-NFSM Districts	130
	6.2 Reasons for Growing Pulses Crops in NFSM and Non-NFSM Districts	133
	6.3 Criteria for Pulses Cultivation in NFSM and Non-NFSM Districts	136
	6.4 Reasons for Low Area under Pulses in NFSM and Non-NFSM Districts	138
	6.5 Crops Grown on Inferior Quality of Lands: NFSM & Non-NFSM Districts	141
	6.6 Problems with Pulses on Inferior Quality of Lands: NFSM & Non-NFSM	144
	6.7 Reasons for Shifting from Pulses to Other Crops: NFSM & Non-NFSM	146
	6.8 Farmers Willingness to Grow Pulses in NFSM and Non-NFSM Districts	149
	6.9 Major Problems in Cultivating Pulses in NFSM and Non-NFSM Districts	150
	6.10 Important Suggestion for Cultivating Pulses in NFSM and Non-NFSM	153
VII	IMPACT OF NFSM-PULSES ON PULSES PRODUCTION	156-165
	7.1 Farmers' Awareness of NFSM-Pulses	156

<u>Chapter</u>		<u>Page No.</u>
	7.2 Assistance Received under NFSM-Pulses	157
	7.3 Type of Assistance received under NFSM-Pulses	157
	7.4 Usefulness of NFSM-Pulses	158
	7.5 Type of Usefulness of NFSM-Pulses	159
	7.6 Area under Pulse Crops Before and After NFSM	160
	7.7 Production of Pulse Crops Before and After NFSM	161
	7.8 Increase in Area under Pulse Crops after NFSM	162
	7.9 Extent of Increase in Area under Pulse Crops after NFSM	163
	7.10 Suggestions for Improving NFSM – Pulses	163
VIII	SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS	166-189
	8.1 Backdrop	166
	8.2 Objectives of the Study	167
	8.3 Methodology	167
	8.4 Major Findings	168
	8.4.1 Status of Pulses Sector in Maharashtra	169
	8.4.1.1 Area under Important Crops	169
	8.4.1.2 Trend in Share of Important Crops in GCA	169
	8.4.1.3 Growth Trends in Important Crops	170
	8.4.1.4 Growth in GCA, NSA and Fertilizer Consumption	170
	8.4.1.5 Area under Pulses in Maharashtra	171
	8.4.1.6 Area, Production and Yield of Pulses Crops	171
	8.4.1.7 Share of Districts in Area and Production of Pulses	171
	8.4.1.8 District-wise Growth in A, P, Y of Pulses	172
	8.4.2 Socio-economic Characteristics & Resource Endowments of Farmers	172
	8.4.2.1 Family Size Composition of Farmers	173
	8.4.2.2 Educational Status of Farmers	173
	8.4.2.3 Caste Composition of Farmers	173
	8.4.2.4 Irrigated Area in NFSM and Non-NFSM Districts	173
	8.4.2.5 Cropping Pattern of Farmers	174
	8.4.2.6 Area under Pulses for NFSM & Non-NFSM Farmers	174
	8.4.2.7 Share of Size-Groups in Pulse Farming	175
	8.4.2.8 Irrigated Area under Pulses	175
	8.4.3 Economics of Pulses and Other Crops Cultivation	176
	8.4.3.1 Economics of Pulses Crops in NFSM District	176

8.4.3.2	Economics of Other Major Crops in NFSM District	177
8.4.3.3	Economics of Pulses Crops in Non-NFSM District	178
8.4.3.4	Economics of Other Major Crops in Non-NFSM District	178
8.4.4	Technology Adoption and Marketing	179
8.4.4.1	Area Under Improved Varieties of Pulses	179
8.4.4.2	Knowledge of Improved Varieties of Pulses	180
8.4.4.3	Recommended Practices in NFSM & Non-NFSM	180
8.4.4.4	Problems with Improved Varieties of Pulses	181
8.4.4.5	Suggested Solution for Improved Varieties of Pulses	181
8.4.4.6	Marketing of Pulses Crops	181
8.4.4.7	Quantity of Pulses Marketed	182
8.4.5	Farmers' Perceptions for Cultivation of Pulses	182
8.4.5.1	Major Pest Problems in Pulses Cultivation	182
8.4.5.2	Reasons for Growing Pulses Crops	182
8.4.5.3	Criteria for Pulses Cultivation	183
8.4.5.4	Reasons for Low Area under Pulses	183
8.4.5.5	Crops Grown on Inferior Quality of Land	183
8.4.5.6	Problems with Pulses on Inferior Quality of Land	184
8.4.5.7	Reasons for Shifting from Pulses to Other Crops	184
8.4.5.8	Farmers Willingness to Grow Pulses	184
8.4.5.9	Major Problems in Cultivating Pulses	185
8.4.5.10	Important Suggestion for Cultivating Pulses	185
8.4.6	Impact of NFSM-Pulses	185
8.4.6.1	Farmers' Awareness of NFSM-Pulses	185
8.4.6.2	Assistance Received under NFSM-Pulses	186
8.4.6.3	Type of Assistance received under NFSM-Pulses	186
8.4.6.4	Usefulness of NFSM-Pulses	186
8.4.6.5	Type of Usefulness of NFSM-Pulses	186
8.4.6.6	Area under Pulse Crops Before and After NFSM	186
8.4.6.7	Production of Pulse Crops Before and After NFSM	187
8.4.6.8	Increase in Area under Pulses after NFSM	187
8.4.6.9	Extent of Increase in Area under Pulses after NFSM	187
8.4.6.10	Suggestions for Improving NFSM-Pulses	187
8.5	Conclusions and Policy Implications	188

LIST OF TABLES

Table No	Title	Page No
1.1	Production Performance of Important Crops during 10 th Plan	3
1.2	Projected Demand for Foodgrains on the Behaviouristic Approach	4
1.3	Demand Projections for the Terminal Year of 11 th Five Year Plan	4
1.4	Sampled Farmers from the NFSM District of Amravati and Non-NFSM District of Beed	9
2.1	Area under Important Crops in Maharashtra: (Average of 2003-04 to 2007-08)	13
2.1 (a)	Share of Important Major Crops in GCA in Maharashtra: 1996-97 to 2007-08	14
2.2	Compound Annual Growth Rates (CAGR) over 1997-2008 (1996-97 to 2007-08) of Area, Production, Yield of Important Crops in Maharashtra	15
2.3	Growth in Important Variables in Maharashtra	17
2.4	Area under Important Pulses in Maharashtra: (Average of 2003-04 to 2007-08)	19
2.5	Area, Production, Yield and Irrigated Area under Pulses in Maharashtra: Mung	20
2.5 (a)	Area, Production, Yield and Irrigated Area under Pulses in Maharashtra: Tur	21
2.5 (b)	Area, Production, Yield and Irrigated Area under Pulses in Maharashtra: Udid	22
2.5 (c)	Area, Production, Yield and Irrigated Area under Pulses in Maharashtra: Gram	22
2.5 (d)	Area, Production, Yield and Irrigated Area under Pulses in Maharashtra: Total Pulses	23
2.6	Share of Districts in Total Area and Production of All Major Pulses Crops in Maharashtra: Average of 1996-97 to 2007-08	25
2.6 (a)	Share of Districts in Total Area and Production of Total Pulses Crops in Maharashtra: Average of 1996-97 to 2007-08	27
2.7	Compound Annual Growth Rates (CAGR) over 1997-2008 (1996-97 to 2007-08) of Area, Production, Yield of Important Pulses Crops in Maharashtra: Mung	29
2.8	Compound Annual Growth Rates (CAGR) over 1997-2008 (1996-97 to 2007-08) of Area, Production, Yield of Important Pulses Crops in Maharashtra: Tur	31

Table No	Title	Page No
2.9	Compound Annual Growth Rates (CAGR) over 1997-2008 (1996-97 to 2007-08) of Area, Production, Yield of Important Pulses Crops in Maharashtra: Udid	33
2.10	Compound Annual Growth Rates (CAGR) over 1997-2008 (1996-97 to 2007-08) of Area, Production, Yield of Important Pulses Crops in Maharashtra: Gram	35
2.11	Compound Annual Growth Rates (CAGR) over 1997-2008 (1996-97 to 2007-08) of Area, Production, Yield of Important Pulses Crops in Maharashtra: Total Pulses	37
3.1	Family Size Composition of NFSM Amravati District	44
3.2	Family Size Composition of Non-NFSM Beed District	44
3.3	Table 3.3: Education Status of Head of Household of NFSM Amravati District	46
3.3 (a)	% Distribution of Education Status of Head of Household of NFSM Amravati District	46
3.3 (b)	Education Profile of the Adult Population in NFSM Amravati District	46
3.3 (c)	% Distribution Education Profile of the Adult Population in NFSM Amravati District	47
3.4	Education Status of Head of Household of Non-NFSM Beed District	47
3.4 (a)	% Distribution of Education Status of Head of Household of Non-NFSM Beed District	48
3.4 (b)	Education Profile of the Adult Population in Non-NFSM Beed District	48
3.4 (c)	% Distribution Education Profile of the Adult Population in Non-NFSM Beed District	49
3.5	Caste Composition of Farmers in NFSM Amravati District	50
3.5 (a)	% Distribution of Caste Composition of Farmers in NFSM Amravati District	50
3.6	Caste Composition of Farmers in Non-NFSM Beed District	50
3.6 (a)	% Distribution of Caste Composition of Farmers in Non-NFSM Beed District	51
3.7	Irrigation Details for NFSM Amravati District	51
3.7 (a)	% Distribution of Irrigated Area by Source in NFSM Amravati District	52
3.8	Irrigation Details for Non-NFSM Beed District	52
3.8 (a)	% Distribution of Irrigated Area by Source in Non-NFSM Beed District	52
3.9	Cropping Pattern – Over All Seasons: NFSM Amravati District	54
3.9 (a)	Cropping Pattern – Over All Seasons: NFSM Amravati District	54

Table No	Title	Page No
3.10	Cropping Pattern – Over All Seasons: Non-NFSM Beed District	55
3.10 (a)	Cropping Pattern – Over All Seasons: Non-NFSM Beed District	56
3.11	Area Under Pulses: Over All Seasons: NFSM Amravati District	58
3.11 (a)	% Distribution of Area Under Pulses: Over All Seasons: NFSM Amravati District	58
3.12	Area Under Pulses: Over All Seasons: Non-NFSM Beed District	59
3.12 (a)	Distribution of Area Under Pulses: Over All Seasons: Non-NFSM Beed District	59
3.13	Share of Different Size-Groups in Pulse Farming: Over All Seasons: NFSM Amravati District	60
3.14	Share of Different Size-Groups in Pulse Farming: Over All Seasons: Non-NFSM Beed District	60
3.15	Percentage of Irrigated Area under Pulses: Over All Seasons: NFSM Amravati District	61
3.16	Percentage of Irrigated Area under Pulses: Over All Seasons: Non-NFSM Beed District	62
3.17	Crop-wise Share in Un-irrigated Area – Over All Seasons: NFSM Amravati District	63
3.18	Crop-wise Share in Irrigated Area – Over All Seasons: Non-NFSM Beed District	64
4.1	Profitability in Mung Crop Farming: NFSM Amravati District	67
4.2	Profitability in Tur Crop Farming: NFSM Amravati District	68
4.3	Profitability in Gram Crop Farming: NFSM Amravati District	69
4.4	Profitability in Total Pulses Crops Farming: NFSM Amravati District	70
4.5	Profitability in Soybean Crop Farming: NFSM Amravati District	72
4.6	Profitability in Kharif Jowar Crop Farming: NFSM Amravati District	73
4.7	Profitability in Cotton Crop Farming: NFSM Amravati District	74
4.8	Profitability in Bajra Crop Farming: NFSM Amravati District	75
4.9	Profitability in Kharif Sunflower Farming: NFSM Amravati District	76
4.10	Profitability in Ladyfinger Crop Farming: NFSM Amravati District	77
4.11	Profitability in Rabi Sunflower Crop Farming: NFSM Amravati District	78
4.12	Profitability in All Other Crop Farming: NFSM Amravati District	79
4.13	Profitability in Mung Crop Farming: Non-NFSM Beed District	81
4.14	Profitability in Tur Crop Farming: Non-NFSM Beed District	82
4.15	Profitability in Gram Crop Farming: Non-NFSM Beed District	83
4.16	Profitability in Total Pulses Crops Farming: Non-NFSM Beed District	84

Table No	Title	Page No
4.17	Profitability in Soybean Crop Farming: Non-NFSM Beed District	87
4.18	Profitability in Kharif Jowar Crop Farming: Non-NFSM Beed District	88
4.19	Profitability in Cotton Crop Farming: Non-NFSM Beed District	89
4.20	Profitability in Bajra Crop Farming: Non-NFSM Beed District	90
4.21	Profitability in Rabi Jowar Crop Farming: Non-NFSM Beed District	91
4.22	Profitability in Wheat Crop Farming: Non-NFSM Beed District	92
4.23	Profitability in Kardi Crop Farming: Non-NFSM Beed District	93
4.24	Profitability in Onion Crop Farming: Non-NFSM Beed District	94
4.25	Profitability in Sugarcane Crop Farming: Non-NFSM Beed District	95
4.26	Profitability in Banana Crop Farming: Non-NFSM Beed District	96
4.27	Profitability in All Other Crops Farming: Non-NFSM Beed District	97
5.1	Households Reporting Area Under Improved Varieties of Pulses: NFSM Amravati District	101
5.1 (a)	Area under Improved Varieties of Pulses: NFSM Amravati District – for 2008-09	101
5.2	Households Reporting Area Under Improved Varieties of Pulses: Non-NFSM Beed District	102
5.2 (a)	Area under Improved Varieties of Pulses: Non-NFSM Beed District – for 2008-09	103
5.3	Knowledge of Improved Varieties of Pulses: NFSM Amravati District	104
5.3 (a)	Source of Knowledge of Improved Varieties of Pulses: NFSM Amravati District	104
5.3 (b)	% Distribution of Source of Knowledge of Improved Varieties: NFSM Amravati District	104
5.4	Knowledge of Improved Varieties of Pulses: Non-NFSM Beed District	105
5.4 (a)	Source of Knowledge of Improved Varieties of Pulses: Non-NFSM Beed District	105
5.4 (b)	% Distribution of Source of Knowledge of Improved Varieties: Non-NFSM Beed District	105
5.5	Recommended Practices in Pulses Crops: NFSM Amravati District	107
5.5 (a)	% of Households Following Recommended Practices: NFSM Amravati District	107
5.6	Recommended Practices in Pulses Crop: Non-NFSM Beed District	109
5.6 (a)	% of Households Following Recommended Practices: Non-NFSM Beed District	109
5.7	Households Reporting Problems with Improved Varieties of Pulses: NFSM Amravati District	112

Table No	Title	Page No
5.7 (a)	% Distribution of Households Reporting Problems with Improved Varieties of Pulses: NFSM Amravati District	112
5.8	Households Reporting Problems with Improved Varieties of Pulses: Non-NFSM Beed District	115
5.8 (a)	% Distribution of Households Reporting Problems with Improved Varieties of Pulses: Non-NFSM Beed District	115
5.9	Suggested Solutions for Improved Varieties of Pulses: NFSM Amravati District	118
5.9 (a)	% Distribution of Suggested Solutions for Improved Varieties: NFSM Amravati District	119
5.10	Suggested Solutions for Improved Varieties of Pulses: Non-NFSM Beed District	120
5.10 (a)	% Distribution of Suggested Solutions for Improved Varieties: Non-NFSM Beed District	120
5.11	No. of Households Marketing Pulses through Various Channels: NFSM Amravati District	122
5.11 (a)	% of Total Households in the Size Group Marketing Pulses through Various Channels: NFSM Amravati District	123
5.12	No. of Households Marketing Pulses through Various Channels: Non-NFSM Beed District	124
5.12 (a)	% of Total Households in the Size Group Marketing Pulses through Various Channels: Beed District	125
5.13	Quantity of Pulses Sold through Various Channels: NFSM Amravati District	127
5.14	Quantity of Pulses Sold through Various Channels: Non-NFSM Beed District	128
5.15	Government (NAFED) Procurement of Pulses from Farmers: NFSM Amravati District	129
5.16	Government (NAFED) Procurement of Pulses from Farmers: Non-NFSM Beed District	129
6.1	Major Pest Problems faced in Pulses: NFSM Amravati District	131
6.2	Major Pest Problems faced in Pulses: Non-NFSM Beed District	132
6.3	Reasons for Growing Pulses: NFSM Amravati District	134
6.3 (a)	Reasons for Growing Pulses: Size-group-wise: NFSM Amravati District	134
6.4	Reasons for Growing Pulses: Non-NFSM Beed District	135
6.4 (a)	Reasons for Growing Pulses: Size-group-wise: Non-NFSM Beed District	135

Table No	Title	Page No
6.5	Criteria Used While Opting to Grow Pulses: NFSM Amravati District	136
6.5 (a)	Criteria Used While Opting to Grow Pulses: NFSM Amravati District	137
6.6	Criteria Used While Opting to Grow Pulses: Non-NFSM Beed District	137
6.6 (a)	Criteria Used While Opting to Grow Pulses: Non-NFSM Beed District	138
6.7	Reasons for Low Area under Pulses: NFSM Amravati District	139
6.7 (a)	Reasons for Low Area under Pulses: Size-group-wise: NFSM Amravati District	139
6.8	Reasons for Low Area under Pulses: Non-NFSM Beed District	140
6.8 (a)	Reasons for Low Area under Pulses: Size-group-wise: Non-NFSM Beed District	140
6.9	Crops Grown on Inferior Quality Lands: Size-group-wise: NFSM Amravati District	142
6.9 (a)	Crops Grown on Inferior Quality Lands: Size-group-wise: NFSM Amravati District	142
6.10	Crops Grown on Inferior Quality Lands: Size-group-wise: Non-NFSM Beed District	143
6.10 (a)	Crops Grown on Inferior Quality Lands: Size-group-wise: Non-NFSM Beed District	143
6.11	Problems of Growing Pulses on Inferior Quality Land : NFSM Amravati District	144
6.11 (a)	Problems of Growing Pulses on Inferior Quality Land: Size-group-wise: NFSM Amravati District	145
6.12	Problems of Growing Pulses on Inferior Quality Land: Non-NFSM Beed District	145
6.12 (a)	Problems of Growing Pulses on Inferior Quality Land: Size-group-wise: Non-NFSM Beed District	146
6.13	Reasons for Shifting from Pulses o Other Crops: NFSM Amravati District	147
6.13 (a)	Reasons for Shifting from Pulses o Other Crops: Size-group-wise: NFSM Amravati District	147
6.14	Reasons for Shifting from Pulses to Other Crops: Non-NFSM Beed District	148
6.14 (a)	Reasons for Shifting from Pulses to Other Crops: Size-group-wise: Non-NFSM Beed District	148
6.15	Farmers Willing to Grow Pulses if Assured Market is Provided: NFSM Amravati District	150
6.16	Farmers Willing to Grow Pulses if Assured Market is Provided: Non-NFSM Beed District	150

Table No	Title	Page No
6.17	Major Problems in Cultivating Pulses: NFSM Amravati District	151
6.17 (a)	% Distribution of Major Problems in Cultivating Pulses: NFSM Amravati District	151
6.18	Major Problems in Cultivating Pulses: Non-NFSM Beed District	152
6.18 (a)	% Distribution of Major Problems in Cultivating Pulses: Non-NFSM Beed District	152
6.19	Important Suggestions from the Farmers for Cultivating Pulses: NFSM Amravati District	154
6.19 (a)	% Distribution of Important Suggestions from the Farmers for Cultivating Pulses: NFSM Amravati District	154
6.20	Important Suggestions from the Farmers for Cultivating Pulses: Non-NFSM Beed District	154
6.20 (a)	% Distribution of Important Suggestions from the Farmers for Cultivating Pulses: Non-NFSM Beed District	155
7.1	Farmers' Awareness of NFSM – Pulses: NFSM Amravati District	156
7.2	Received any Assistance Under NFSM – Pulses: NFSM Amravati District	157
7.3	Distribution of Households by Type of Assistance: NFSM Amravati District	158
7.4	Usefulness of NFSM – Pulses: NFSM Amravati District	159
7.5	Distribution by Type of Uses– Pulses: NFSM Amravati District	159
7.6	Area under Pulse Crops Before and After NFSM: NFSM Amravati District	160
7.6 (a)	Area under Pulse Crops Before and After NFSM: NFSM Amravati District	160
7.7	Production of Pulse Crops Before and After NFSM: NFSM Amravati District	161
7.7 (a)	Production of Pulse Crops Before and After NFSM: NFSM Amravati District	162
7.8	Increase in Area under Pulses after NFSM: Farmers' Perception (Amravati District)	162
7.9	Distribution by Extent of Increase: Farmers' Perception (Amravati District)	163
7.10	Suggestions for Improving NFSM – Pulses: Farmers' Perception (Amravati District)	164

CHAPTER – I

INTRODUCTION

1.1 Background

The agricultural sector has always been an important component of the Indian economy with period after mid-sixties being marked with significant expansion in foodgrain output of the country due to introduction of new technology, popularly known as seed-fertilizer-water technology. Though before the mid-sixties increase in foodgrain output in the country came mostly from the growth of the cultivated area and extension of irrigation, ever since mid-sixties the new farm technology symbolized by HYV seeds and use of chemical fertilizer has been relied upon to get the desired increase in production. Though the new farm technology had a powerful impact on the food sector of the country, this technology revolution could gain momentum only in some select regions of the country and that too with respect to some cereal crops like rice and wheat. The impact of new technology was tardy and dismal in the case of pulses. In fact, in the race of output growth, pulses have lagged so far behind that these can be categorized as ‘also ran’ (Shah, 2003). A number of earlier studies have also shown a sluggish and erratic growth in pulses and coarse cereal production, though most of the studies are area specific (Moorti et. al. 1991; Bhatia, 1991, Shah, 1997). In the late 1970’s and early 1980’s, several studies raised concerns about a possible deceleration in the growth of foodgrain production, indicating a decline in the momentum of the green revolution and possible exhaustion of the potential of available technology (Alagh and Sharma, 1980; Desai and Namboodiri, 1983). Dantwala (1978) found that the HYV technology brought about significant improvement in the productivity of cereal crops, but its overall effect on foodgrain production, especially when evaluated in per capita terms, was not significant. A significant section also showed serious doubts about the productivity of modern inputs that are used in increasing quantities to sustain growth. The Government of India is now giving top priority for boosting the production of pulses in the country with the objective of meeting their domestic requirement and also to reduce their import bill.

Notably, India is reckoned as the largest producer and consumer of pulses in the world, accounting for about 25 per cent of global production, 27 per cent of consumption, and 34 percent of food use (Price et. al., 2003). Nevertheless, India is also the top importer pulses in the world with 11 per cent share in world pulse imports during 1995-

2001, though imports accounting for about 6 per cent of domestic consumption. Since pulse production in India has fluctuated widely with no long-term trend, this has led to steady decline in the per capita availability of pulses over the past 20 years or so. The per capita per day availability of pulses in India declined from 45.5 grams in 1978 to 41.1 grams in 1990 and further to 31.5 grams in 2005. This is despite the fact that a number of programmes were initiated in the past to meet the rising demand of pulses owing to ever increasing human population in the country.

1.2 Pulses Development Programmes in India

In view of unabated population increase, various programmes with respect to pulses were launched during various plan periods. A Centrally Sponsored Pulses Development Scheme was initiated from the Fourth Plan (1969-70 to 1973-74) with the introduction of production technologies and improved varieties amongst the farmers. Further, considering the quantum leap witnessed by the wheat and rice production in India in the aftermath of green revolution, a National Pulse Development Programme, covering almost 13 states, was set up in 1986 with the aim of introducing improved technologies to the farmers. The success of National Pulse Development Programme led to introduction of Technology Mission 1986 in order to boost the oilseeds sector in Indian economy, and pulses too came under this programme. It is to be noted that the previous National Pulses Development Project (NPDP) that was merged with the earlier Centrally Sponsored Scheme on pulses became a boon for the farming communities when the Ministry of Agriculture, Government of India launched it from the seventh plan onwards. In order to supplement the efforts under NPDP, a Special Food Grain Production Program (SFPP) on Pulses was also implemented during 1988-89 on a 100 per cent Central assistance basis. It deserves mention here that under the Government of India-UNDP Cooperation 1997-2003, Pulses Sector was identified as "Priority Sector" with focus on strengthening this sector on priority basis.

1.3 Production Performance of Agriculture Sector: Recent Trends

Although the main stay of the Indian economy is the agriculture sector since it contributes nearly 18 per cent of India's Gross Domestic Products (GDP) and provides employment to 57 per cent of the country's work force and livelihood security to more than 650 million people, the average annual growth rate in agriculture and allied activities declined sharply from 4.7 per cent during the Eighth Plan (1992-97) to 2.1 per cent during the Ninth Plan (1997-2002) and further to 1.2 per cent during the period 2002-05,

i.e. the first three years of the 10th Five Year Plan 2002-07. (Shah, 2009) The agricultural growth rate in the year 2004-05 was estimated at 1.1 per cent, especially in view of the high base of the previous year, though the first year of the Tenth Five Year Plan registered a negative – 7.0 per cent growth. In fact, the performance of Indian agriculture was most impressive during the Sixth Plan when the growth of agriculture and allied sector led the overall growth of the economy. However, in the subsequent plans the growth of agriculture and that of non-agriculture moved in different trajectories.

The slowing down in the growth of agricultural sector translated into subdued production response. Our country faced severe draught in 2002-03 that caused sharp fall in the production, and unlike in the decade of eighties, the production could not be revived. The 10th plan target of foodgrain production of 230 million tonnes turned out to be an ambitious target. In three out of first four years of the 10th Plan, the foodgrain production remained lower than the benchmark production of 2001-02, with the exception of 2003-04, when a record production of 213.9 million was achieved (Table 1.1). This achievement could be attributed to favourable rainfall that helped to achieve a record output of 37.6 million tonnes of coarse cereals.

Table 1.1: Production Performance of Important Crops during 10th Plan

Year	Production (Million Tonnes)							
	Foodgrain	Rice	Wheat	Coarse Cereals	Pulses	Oilseeds	Sugarcane	Cotton
2001-02	212.85	93.24	72.77	33.37	13.37	20.66	297.21	10.00
2002-03	174.77	71.83	65.76	26.07	11.13	14.84	287.38	8.62
2003-04	213.19	88.53	72.16	37.60	14.91	25.19	233.86	13.73
2004-05	198.36	85.13	68.64	33.46	13.13	24.35	237.09	16.43
2005-06	208.30	91.03	69.48	34.67	13.11	27.73	278.39	19.57

Source: Directorate of Economics and Statistics (DES)

The pulses production in the country during the 10th Plan remained at the same around 14 million tonnes, which has been noticed for the past decades. India has not shown any meaningful gain in pulses production over the past four decades as the earlier estimates reveal that in 1958-59 also India produced 13.5 million tonnes of pulses. However, it is to be noted that throughout 10th Plan a consistent import substitution of pulses took place that could be described as a phenomenon unprecedented compared to earlier plan period.

1.4 Demand for Cereals and Pulses

The tenth plan estimates reported by the Planning Commission, GOI, with respect to demand for cereals and pulses in India are based on extrapolation of per capita income

of Rs.1585 for the year 1999-2000 till the terminal year of 10th plan, assuming a growth rate of 4.7 per cent at constant prices, which stands as the actual growth rate in per capita income achieved since 1994-95. The total demand for pulses for 2006-07 was worked out at 19.24 million tonnes, which stood at 15.91 million tonnes in 2002-03 (Table 1.2). The demand for foodgrains for the terminal year of the 10th five-year plan was estimated at 235.98 million tonnes, which stood at 211.36 million tonnes in 2002-03.

**Table 1.2: Projected Demand for Foodgrains on the Behaviouristic Approach
(Assuming that entire per capita incomes goes towards expenditure)**

Year	Projected Population (Million)	Per Capita Income at 1999-2000 Prices (Rs.)	Per Capita Demand of Cereals for Human Consumption (kg/year)	Cereal Demand for Human Consumption	Total Cereal Demand Including Seed, Feed & Wastage	Per Capita Demand for Pulses (kg/year)	Total Demand for Pulses Including Seed, Feed & Wastage	Total Foodgrains Demand
2001-02	1033.52	17376	161.25			14.68		
2002-03	1053.16	18193	162.39	171.02	195.45	15.10	15.91	211.36
2003-04	1073.17	19048	163.53	175.50	200.57	15.55	16.68	217.25
2004-05	1093.56	19943	164.68	180.09	205.82	16.00	17.49	223.31
2005-06	1114.33	20880	165.84	184.81	211.21	16.46	18.35	229.55
2006-07	1135.51	21862	167.01	189.65	216.74	16.94	19.24	235.98

Source: Tenth Five Year Plan Document, Planning Commission, Government of India, New Delhi

Since the current production estimates of foodgrains are lower than the projected demand estimates, there is need to enhance supply of foodgrains and slow down the rate of population growth. Equally important is the need to reduce losses of grains incurred during various harvest and post-harvest operations that account for a significant share in total foodgrain production (Shah, 2009). Foodgrains are not only used for human consumption but also for meeting other requirements like quantity used as seed; quantity supplied to various livestock and poultry birds as feed, etc.

As per the Report of the Working Group on Crop Husbandry, Agricultural Inputs, Demand and Supply Projections and Agricultural Statistics for the Eleventh Five Year Plan (2007-12), the foodgrains requirement under the three scenarios viz. household approach, normative approach and behaviouristic approach, would be 217 million tonnes, 244 million tonnes and 244 million tonnes, respectively (Table 1.3).

Table 1.3: Demand Projections for the Terminal Year of 11th Five Year Plan

Crops	Demand in Million Tonnes
Cereals	224
Pulses	20
Total Foodgrains	244
Oilseeds	53/36
Sugarcane	322
Cotton	28.7 million bales of 170 kg each
Jute and Mesta	9.87 million bales of 180 kg each

As against the demand, the supply for 2011-12 (following alternative approach) would be 214-240 million tonnes of food grains, 45 million tonnes of oilseeds, 278-334 million tonnes of sugarcane, 16-50 million bales of cotton, 11 million bales of jute and mesta. Thus, the supply assessment would improve self sufficiency level in edible oils from existing 55 per cent to 80 per cent. However, the supply of pulses may not catch up with the demand and there is possibility of deficit in this respect.

It is to be noted that earlier though the Government had introduced a number of crop-oriented schemes to improve the output of pulses and coarse cereals, the success of Government schemes depended on the extent of adoption as the farmers grow these crops on poor and unirrigated land with generally low levels of inputs like fertilizers, pesticides, etc. Added to this, pulses crops are more susceptible to pest and disease than cereal crops and, thus, involving high risk. However, in order to augment pulses production in the country, Sidhu and Sidhu (1991) had put forward a number of suggestions, which encompass development of draught-disease-and pest resistant high yielding varieties of pulses for different agro-climatic regions, diversification of agriculture through introduction of pulses crops in wheat-paddy monoculture, etc. On the other hand, Kadrekar (1991) had suggested a number of strategies to increase pulses production, especially, in the state of Maharashtra with major emphasis on protective irrigation, soil fertility management, improved crop production technique, plant protection measures, and diversification of cropping pattern. However, these strategies and schemes could not yield the desired results so far as pulses and coarse cereal production in the country are concerned. The low level of technology adoption in pulses could be the major reason for poor performance of pulses crops in the country.

One of the major issues raised in the 11th Plan Approach Paper is the food security. In view of the food security consideration and large existing potential available in eastern and central parts of India, the Central Government has launched the National Food Security Mission (NFSM) as a Central sector scheme in mission-mode aimed at increasing foodgrains production by at least 20 million tonnes by the end of Eleventh Plan. The major thrust of this programme is on increasing seed replacement and the replacement of older varieties by newer ones. One of the major features of this is that it offers much more than what earlier programmes offered, especially with respect to capacity building, monitoring and planning. The execution of the programme would be within the district planning framework.

1.5 National Food Security Mission

The National Development Council (NDC) in its 53rd meeting held on 29th May, 2007 resolved to launch a Food Security Mission for rice, wheat and pulses, especially for raising the production levels by 10 million tonnes for rice, 8 million tonnes for wheat and 2 million tonnes for pulses by the end of the Eleventh Five Year Plan (2011-12). In view of achieving these targets and operationalising the resolution taken by NDC, the 'National Food Security Mission (NFSM)' was launched in 2007-08 as a Centrally Sponsored Scheme. The NFSM comprises of three components, which include (a) NFSM – Rice, (b) NFSM – Wheat, and (c) NFSM – Pulses.

The NFSM has been initiated with the chief objectives of: (a) raising the level of production of rice, wheat and pulses through area expansion and productivity enhancement in a sustainable manner, (b) restoring soil fertility and productivity at the individual farm level, (c) creating employment opportunities, (d) enhancing farm level economy, i.e. farm profits, to restore confidence amongst the farmers. In order to achieve these objectives, a number of strategies have been formulated that mainly encompass: (i) implementation of the scheme in a mission mode approach through active engagement of all the stakeholders at various levels, (ii) promotion and extension of improved technologies with respect to seed, Integrated Nutrient Management (INM), including micronutrients, soil amendments, Integrated Pest Management (IPM), and resource conservation technologies, and also capacity building of the farmers, (iii) close monitoring of flow of funds to ensure that interventions reach the target beneficiaries on time, (iv) integration of various proposed intervention with the district plan and fixing targets for each identified district, and (v) constant monitoring and concurrent evaluation for assessing the impact of the interventions for a result oriented approach by the implementing agencies.

There are some 136 district of India included in NFSM – Rice, 141 districts in NFSM – Wheat, and 171 districts in NFSM –Pulses. The largest numbers of districts are included under NFSM-Pulses mainly owing to the fact that the production of pulses has remained stagnant in the country for past decades in spite of the fact that India happens to be the largest producer and consumer of pulses. Due to sluggish and erratic growth, the net per capita per day availability of pulses in India declined from 60 grams in 1951 to 31 grams in 2008. This is despite the fact that several policy initiatives, projects and programmes with respect to pulses were undertaken in the past viz. All India Coordinated

Pulses Improvement Project (AICPIP), National Pulses Development Programme (NPDP), Technology Mission on Pulses (TMOP), Centrally Sponsored Integrated Scheme of Oilseeds, Pulses, Oil palm and Maize (ISOPOM), etc. These policies and programmes hardly led to any improvement in pulses production of India. In order to raise pulses production by 2 million tonnes by the end of 2011-12, the existing pulses related programmes were replaced by NFSM-pulses.

At present, the major areas of concern in pulse cultivation are the low yield levels, marginal lands devoted to pulse cultivation, stagnation in production technology, severe abiotic (climate-related) and biotic (insect, pest) stresses, volatility of prices and lack of effective procurement. The present study, therefore, attempts to unravel the degree of importance of these constraints and outline the prospects for pulses production in the state of Maharashtra. The study also intends to assess the effectiveness of NFSM-Pulses, if any, on the pulse production in Maharashtra.

1.6 Objectives of the Study

The study has been undertaken with the following specific objectives:

1. To analyze returns from cultivation of pulses vis-à-vis competing crops
2. To analyze the other major problems and prospects for pulse cultivation, and
3. To assess the impact, if any, of NFSM-Pulses

1.7 Methodology

The methodology includes criteria used for the selection of NFSM and non-NFSM study districts in the state of Maharashtra, selection of sampled villages and farmers, and analysis using primary and secondary data, aside from data sources.

1.7.1 Sampling Design

At present, there are 33 pulse-growing districts in the state of Maharashtra. Among these districts, 18 are covered under National Food Security Mission for Pulse crops. The NFSM districts for pulses crops mainly encompass Ahmednagar, Akola, Amravati, Aurangabad, Buldhana, Chandrapur, Hingoli, Jalgaon, Jalna, Latur, Nagpur, Nanded, Nashik, Osmanabad, Parbhani, Wardha, Washim, and Yavatmal. The non-NFSM district in the state of Maharashtra include Thane, Raigad, Ratnagiri, Sindhudurg, Dhule, Nandurbar, Pune, Solapur, Satara, Sangli, Kolhapur, Beed, Bhandara, Gondia and Gadchiroli. Since the present investigation is confined to the selection of one district from the umbrella of districts covered under NFSM and another one from the umbrella of districts not covered under NFSM, the districts under NFSM and non-NFSM were

arranged in descending order based on area allocation under pulses crops in 2008-09. The figures relating to area allocation under pulses crops in 2008-09 for each district were obtained from the office of Director of Agriculture (Extension and Training -1), Commissionerate of Agriculture, Maharashtra State, Pune. Amravati under the umbrella of NFSM districts of Maharashtra showed the highest area allocation under pulses crops in 2008-09, accounting for 7.28 per cent share in total area allocation under pulses crops in the State. The district of Amravati was, therefore, selected for the present investigation and it was considered as sampled NFSM district of Maharashtra. Similarly, Beed under the umbrella of non-NFSM districts of Maharashtra showed the highest area allocation under pulses crops in 2008-09, accounting for 3.47 per cent share in total area allocation under pulses crops in the State. The district of Beed was, therefore, selected for the present investigation and it was treated as sampled non-NFSM district of Maharashtra. After selection of NFSM and non-NFSM districts in the state of Maharashtra, the subsequent selection followed selection of talukas within the selected districts. In order to select a taluka within the selected districts, a similar procedure was followed and the talukas of Daryapur in Amravati district and Majalgaon in Beed district were selected for the further selection of village within the selected talukas. Since the present study is confined to the selection of only one village from the selected NFSM district of Amravati and non-NFSM district of Beed, the village of Ramagad from Amravati district and Majalgaon from Beed district were further selected randomly for the present investigation subject to the condition that they should be having sufficient area allocation under pulses crops and that farmers belonging to the selected villages should be having cultivation of some other competing field and other crops with a view to evaluate the actual impact of NFSM on pulses vis-à-vis other crops.

A complete enumeration of the two selected villages drawn from the NFSM district of Amravati and non-NFSM district of Beed was done with view to further categorization of farmers into marginal (less than 1 hectare), small (1 to 2 hectares), medium (2-4 hectares) and large (above 4 hectares). Since 50 sampled farmers were supposed to be selected from each of the sampled two villages belonging to the NFSM district of Amravati and non-NFSM district of Beed, the probability proportion to sample size technique was used for further selection of farmers under each of the land holding size category from the selected sampled villages. The number of sampled households/farmers in the selected Ramagad village encompassed 15 in marginal

category, 19 in small, 10 in medium and 6 in large category with a sum of 50 farmers drawn from the district of Amravati. Similarly, the number of sampled households/farmers in the selected Majalgaon village encompassed 14 in marginal category, 17 in small, 13 in medium and 6 in large category with a sum of 50 farmers drawn from the district of Beed (Table 1.4).

Table 1.4: Sampled Farmers from the NFSM District of Amravati and Non-NFSM District of Beed

H.H. Category	NFSM Amravati District		Non-NFSM Beed District	
	Total No. of Farmers	Sampled Farmers	Total No. of Farmers	Sampled Farmers
Marginal	47	15	278	14
Small	60	19	327	17
Medium	30	10	252	13
Large	18	6	129	6
Total	155	50	986	50

Thus, altogether 50 sampled farmers from NFSM district of Amravati and 50 sampled farmers from non-NFSM district of Beed with a sum of 100 sampled farmers from the state of Maharashtra were selected for the present investigation.

1.7.2 Data Collection

Primary data from the sampled farmers belonging to NFSM district of Amravati and non-NFSM district of Beed were collected through the well structured schedule by personal interview method. In-depth information related to family size and composition, education status, caste composition, land use pattern, cropping pattern, irrigated area, sources of irrigation, cost and return structure for various pulses and other crops, knowledge about improved varieties of pulses, sources of knowledge, area under improved varieties of pulses, recommended practices followed by farmers in the cultivation of pulses in terms of sowing practices, seed practices, and other practices, problems with improved varieties of pulses, suggested solutions for improved varieties of pulses, etc, farmers' perceptions with respect to pest problems in the cultivation of various pulses crops, reasons for cultivation of various pulses crops, criteria used for allocation of area under pulses crops cultivation, problems confronted in terms of cultivation of pulses on inferior quality of land, reasons for not growing pulses on irrigated land, reasons for shifting area from other crops to pulses or vis-a-versa, farmers' willingness to grow pulses under assured market conditions, farmers' opinion regarding problems in the cultivation of pulses, and their suggested solutions with respect to cultivation of various pulses crops, farmers' awareness of NFSM for pulses, assistance received and the type of assistance, usefulness of the assistance, area allocation under

pulse crops before and after NFSM programme, production of pulses crops before and after NFSM programme, increase in area under pulses after NFSM programme, extent of increase in area under pulse crops, and their major suggestions for improving NFSM-Pulses programme, etc. was collected from each of the sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed.

1.7.3 Data Sources

In addition to the collection of primary data from the sampled households/farmers, secondary data related to various performance indicators viz. area, production and productivity of various important crops cultivated in the state of Maharashtra encompassing the period between 1996-97 and 2007-8 were collected from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'. In addition to this, secondary data with respect to broad quantitative parameters of agricultural sector of the State viz. Gross Cropped Area (GCA), Net Sown Area (NSA), Net Irrigated Area (NIA), Gross Irrigated Area (GIA), fertilizer consumption in the State, etc., were also collected from various secondary sources such as "Economic Survey of Maharashtra", Directorate of Economics & Statistics, Planning Department, Government of Maharashtra, Mumbai, "Season and Crop Report", Commissionerate of Agriculture, Government of Maharashtra, Pune'.

1.7.4 Reference Period

The reference period for the primary data survey was the period from 2006-07 to 2008-09. The comparative economics (costs and returns) of pulse crops cultivation vis-à-vis other competing crops cultivation was analyzed for the period from 2006-07 to 2008-09. The increase in area under pulses, if any, for 2008-09 (after the operationalisation of NFSM) was also assessed in the present investigation.

1.8 Organization of the Study

The study is organized in VIII chapters. After this introductory Chapter I focusing on significance of pulses sector in national economy, initiation of various programmes relating to pulses sector, reasons for launching NFSM-Pulses, and various other concurrent issues coupled with need of the present study, objectives and methodology of the study, etc., the analysis with respect to secondary data is presented in Chapter II, which not only provides information relating to trend estimates for pulses vis-à-vis other crops cultivated in the state of Maharashtra but also trends with respect to broad quantitative parameters of agricultural sector of the State. Since the socio-economic

characteristics of farmers have a profound influence on the decision making process and profitability of crop enterprise, the Chapter III deals with the socio-economic profile of sampled farmers with focus on their family size and composition, education status, caste composition, land use pattern, cropping pattern, irrigated area, sources of irrigation, etc. The Chapter IV evaluates the cost and return structure in the cultivation various pulses crops vis-à-vis other crops cultivated on the farms belonging to NFSM district of Amravati and non-NFSM district of Beed with a view to assess the extent of profit margin involved in the cultivation of these crops. The major focus of Chapter V is on ascertaining responses of sampled farmers with respect to knowledge about improved varieties of pulses, sources of knowledge, area under improved varieties of pulses, recommended practices followed by them in the cultivation of pulses, problems with improved varieties of pulses, suggested solutions for improved varieties of pulses, etc. In Chapter VI, an attempt is made to analyse the opinion of the sampled farmers with respect to the major pest problems faced by them, reasons for their cultivation of various pulses crops, criteria used to allocate area under pulses crops, problems confronted in pulses cultivation, reasons for shifting area from other crops to pulses, etc. The Chapter VII mainly evaluates the impact of National Food Security Mission (NFSM) on pulse crop production with the help of assessing the responses of the sampled farmers with respect to their awareness of NFSM for pulses, assistance received and the type of assistance, usefulness of the assistance, area allocation under pulse crops before and after NFSM programme, production of pulses crops before and after NFSM programme, increase in area under pulses after NFSM programme, extent of increase in area under pulse crops, etc. The Chapter VIII summarises the key findings of the study with a synthesis of policy implications and conclusions arising out of the present investigation.

CHAPTER – II

PULSES SECTOR IN THE STATE AND THE DISTRICTS

This chapter provides an insight into the estimates relating to area, production and productivity of various important crops cultivated in the state of Maharashtra encompassing the period between 1996-97 and 2007-8. Although growth estimates with respect to area, production and productivity have been evaluated in general for all the important crops cultivated in the state of Maharashtra, the primary focus is on evaluating these growth estimates for various pulses crops, in particular, cultivated across various districts and regions/divisions of the State during the period from 1996-97 to 2007-08, and also evaluating share of different districts in pulses crops acreage and production in the State during the given period of time. This chapter also evaluates trends with respect to broad quantitative parameters of agricultural sector of the State viz. Gross Cropped Area (GCA), Net Sown Area (NSA), Net Irrigated Area (NIA), Gross Irrigated Area (GIA), fertilizer consumption in the State, etc., especially for the period between 1996-97 and 2007-08, besides providing estimates relating to the extent of availability of irrigation for pulses crops in the State. The major thrust of this chapter is, therefore, on providing information relating to trend estimates for pulses vis-à-vis other crops cultivated in the state of Maharashtra, especially during the past one decade.

2.1 Area under Important Crops

The average Gross Cropped Area (GCA) in Maharashtra during the last five years encompassing the period between 2003-04 and 2007-08 was estimated at 22.47 million hectares, which included 40.81 per cent area under cereals and 16.15 per cent area under pulses with a sum of 56.96 per cent area under foodgrains (Table 2.1). The share of other important crops in GCA of Maharashtra during the same period was estimated at 2.86 per cent for sugarcane, 13.16 per cent for cotton, 15.52 per cent for oilseeds, and 11.51 per cent for the crops other than listed in Table 2.1, which chiefly included horticultural crops. Among various pulses crops, kharif pulses like *mung*, *tur* and *udid* accounted for 10.04 per cent share in GCA of Maharashtra during the given period of time, whereas rabi pulses like gram showed a share of 4.72 per cent in the same during the given period. Some other kharif and rabi pulses not enlisted in Table 2.1 accounted for the remaining 1.39 per cent share in GCA of Maharashtra during the given period of time.

Table 2.1: Area under Important Crops in Maharashtra: (Average of 2003-04 to 2007-08)

(Area in '00' Hectare)

Crops	Area Under the Crop	% of Area to GCA
Paddy	15310	6.81
Wheat	9674	4.31
Bajra	14046	6.25
Maize	5045	2.25
T. Jowar	45403	20.21
Ragi	1383	0.62
Total Cereals	91678	40.81
Mung	6248	2.78
Tur	11004	4.90
Udid	5307	2.36
Gram	10614	4.72
Total Pulses	36275	16.15
Foodgrains	127953	56.96
Sugarcane	6423	2.86
Cotton	29558	13.16
Oilseeds	34862	15.52
Others	25855	11.51
Total (GCA)	224650	100.00

Source: Computation are based on the figures/data obtained from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'

In the case of cereal crops, kharif and rabi jowar put together accounted for as much as 20.21 per cent share in GCA of Maharashtra between 2003-04 and 2007-08. The other important cereal crops cultivated in Maharashtra were paddy and *bajra*, each accounting for 6-7 per cent share in GCA of Maharashtra during the given period of time. The share of wheat and maize in GCA of Maharashtra was estimated at 4.31 per cent and 2.25 per cent, respectively, during the given period. A marginal presence of ragi was also noticed in the cropping pattern of Maharashtra, which accounted for only 0.62 per cent share in GCA of the State during the period between 2003-04 and 2007-08. Thus, the area predominance or cropping pattern in Maharashtra was found to be invariably in favour of cultivating *jowar* among cereals and *tur* and gram among pulses crops.

Another important feature of the last one decade is the falling share of cereals and rising share of oilseeds in GCA of Maharashtra (Table 2.1 (a)). The share of cereal crops in GCA of the State has fallen from 48 per cent in 1996-97 to about 40 per cent in 2007-08. On the other hand, the share of pulses in GCA of the State has remained by and large same, and hovered at around 16-17 per cent during the past one decade or so. As a result, the share of foodgrains in GCA of the State has dropped from 63 per cent in 1996-97 to about 58 per cent in 2007-08. The oilseed crops have shown rise in their share in GCA of the State, which increased from 12 per cent in 1996-97 to nearly 17 per cent in 2007-08. The share of cotton in GCA of the State has remained at around 13-14 per cent between

1996-97 and 2007-08. Similarly, share of sugarcane in GCA of the State has remained by and large constant, and hovered at around 3-4 per cent during the past one decade.

Table 2.1(a): Share of Important Major Crops in GCA in Maharashtra: 1996-97 to 2007-08

(in per cent)								
Year	Cereals	Pulses	Foodgrains	Sugarcane	Cotton	Oilseeds	Others	Total
1996-97	47.67	15.40	63.07	2.88	14.32	12.02	7.70	100.00
1997-98	46.67	16.15	62.83	2.33	14.49	12.51	7.85	100.00
1998-99	45.15	16.71	61.86	2.83	14.94	12.58	7.79	100.00
1999-00	44.73	16.66	61.39	3.10	14.92	12.48	8.11	100.00
2000-01	44.16	16.20	60.36	3.06	13.85	11.62	11.11	100.00
2001-02	41.96	15.71	57.67	2.96	13.86	10.64	14.87	100.00
2002-03	41.23	15.84	57.07	2.56	12.51	11.11	16.75	100.00
2003-04	38.58	15.49	54.07	1.99	12.45	12.44	19.04	100.00
2004-05	41.17	15.14	56.31	1.46	12.69	14.87	14.67	100.00
2005-06	41.24	15.21	56.46	2.22	12.75	16.22	12.36	100.00
2006-07	42.63	16.97	59.60	3.76	13.77	17.12	5.75	100.00
2007-08	40.39	17.91	58.29	4.82	14.10	16.88	5.90	100.00

Source: Computation are based on the figures/data obtained from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'

The past one decade also shows significantly high fluctuations in terms of share of other crops in GCA of Maharashtra. The share of other crops in GCA of Maharashtra has fluctuated from as low as 6 per cent in 2007-08 to as high as 19 per cent in 2003-04. The possible explanation for this could be fluctuations in share of oilseeds, cotton and foodgrain crops in GCA of the State during the past one decade or so.

2.2 Growth Trends in Important Crops

Growth rate estimates with respect to area, production and yield of various important crops cultivated in the state of Maharashtra are provided in Table 2.2, which clearly show varied rates of growth in these parameters for foodgrain, sugarcane, cotton and oilseed crops during the period between 1996-97 and 2007-08.

Foodgrain crops in general have shown negative growth in their area and positive growth in their production and yield levels with yield registering faster growth than production during the past one decade or so. The negative area growth of foodgrains during the period between 1996-97 and 2007-08 is noticed mainly due to fall in area under various course cereals in the State during this period. Some of the course cereals like *bajra*, *jowar* and *ragi* have shown significant fall in their area between 1996-97 and 2007-08. It was only in the case of maize that area growth in the State was positive and significantly high during the past decade or so. The negative growth in are under jowar in Maharashtra is a matter of concern since it is one of the major foodgrain crops cultivated in the State, accounting for as much as 20 per cent share in GCA of the State. The pulse

crops of Maharashtra in general have shown a positive area growth mainly due to significantly high growth in area under gram and tur during the period between 1996-97 and 2007-08. However, among pulses, *mung* and *udid* have shown a negative area growth during the past decade. As for other crops, the area under cotton is seen to have marginally declined, whereas sugarcane and oilseeds have recorded positive growth in their area during the given period of time.

Table 2.2: Compound Annual Growth Rates (CAGR) over 1997-2008 (1996-97 to 2007-08) of Area, Production, Yield of Important Crops in Maharashtra

Crops	Area		Production		Yield	
	CAGR (%)	T-Value	(%)CAGR	T-Value	(%)CAGR	T-Value
Paddy	0.19	2.05	0.72	0.57	0.53	0.43
Wheat	2.17	1.20	5.18	1.94	2.94**	2.26
Bajra	-3.25*	5.47	-3.43**	2.26	-0.19	0.15
Maize	10.41	15.50	15.95*	8.76	5.02	2.78
T. Jowar	-1.84	4.37	-2.94**	2.37	-1.11	0.90
Ragi	-1.91*	10.88	-2.07	2.02	-0.17	0.17
Total Cereals	-0.94	2.96	0.13	0.10	1.08	0.99
Mung	-1.01	1.36	-0.96	0.43	0.06	0.03
Tur	0.87	3.66	3.74	1.79	2.84	1.42
Udid	-0.59	0.87	-1.45	0.76	-0.86	0.53
Gram	4.76*	3.76	7.51*	3.01	2.63	1.84
Total Pulses	0.79	1.95	2.91	1.70	2.11	1.40
Foodgrains	-0.47	1.59	0.56	0.45	1.04	0.94
Sugarcane	1.59	0.59	1.97	0.62	0.37	0.35
Cotton	-0.54	1.19	7.41*	2.96	8.00*	3.52
Oilseeds	3.87*	3.99	6.79*	4.79	2.81**	2.35
Others	1.27	0.35	-	-	-	-
Total (GCA)	0.49*	4.97	-	-	-	-

Source: Computation are based on the figures/data obtained from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'

Note: * and ** represent significance of growth rates at 1 and 5 per cent level of probability

In the state of Maharashtra, although total pulses have recorded an area growth of 0.79 per cent per annum between 1996-97 and 2007-08, this growth in area under pulses is seen to have been offset by 0.94 per cent annual decline in area under total cereal crops, resulting in net decline in area under foodgrains at the rate of 0.47 per annum during the same period. The rise in area under pulses crops is mainly due to 4.76 per cent annual growth in area under gram and 0.87 per cent annual growth in area under tur since mung and udid have shown an annual decline in their area at the rate of 1.01 per cent and 0.59 per cent, respectively, during the period between 1996-97 and 2007-08. Sharper decline in area is noticed in the case of bajra and jowar, which have recorded decline in their area at the rate of 3.25 per cent and 1.84 per cent, respectively, during the given period of time.

Notably, despite decline in area, majority of foodgrain crops in Maharashtra have registered a reasonable growth in their production due to rise in their yield levels. For instance, between 1996-97 and 2007-08, the production of various foodgrains grew at the rate of 0.56 per cent per annum, which was mainly due to 1.04 per cent annual growth in their yield levels as the area under these crops declined at the rate of 0.47 per cent per annum. This is also concomitant from the fact that in spite of 0.94 per cent annual decline in area under cereal crops, their production grew at the rate of 0.13 per cent per annum mainly due to 1.08 per cent annual growth in their yield levels during the last one decade. In the case of pulses, much of the production expansion was due to yield growth rather than area growth. The production of various pulses in Maharashtra grew at the rate of 2.9 per cent between 1996-97 and 2007-08, which was due to 2.11 per cent annual growth in their yield levels as the area growth under pulses stood at only 0.79 per cent per annum during this period.

Interestingly, despite 0.54 per cent annual decline in area under cotton crop, its production in Maharashtra grew at an alarming rate of 7.4 per cent per annum between 1996-97 and 2007-08, which was mainly owing to 8.0 per cent annual growth in its yield level during this period. The higher production growth for cotton crop could be attributed to farmers' higher dependence on cultivation of Bt cotton, which is high yielding crop. Another interesting feature of Table 2.2 is the very high growth in area, production and yield of oilseed crops in Maharashtra. Between 1996-97 and 2007-08, various oilseeds in Maharashtra showed an annual growth rate of 3.8 per cent in their area, 6.79 per cent in production and 2.8 per cent in their yield levels. Thus, the production expansion of oilseeds in Maharashtra is noticed due to area expansion rather than yield, though yield has also contributed significantly towards rise in oilseed production. Sugarcane crop in Maharashtra has also shown a positive growth in its area, production and yield during the last one decade with growth in area being faster than yield growth.

Although the general trend in Maharashtra shows a positive production growth in cereals, pulses, sugarcane, cotton and oilseed crops during the last one decade or so, which could be attributed to their higher yield growth, the negative feature of agriculture sector of Maharashtra is the negative growth in area, production and yield of *bajra* and *jowar* among cereals and *udid* among pulses. Not only the production of jowar in the State has fallen from 62 lakh tonnes in 1996-97 to 40 lakh tonnes in 2007-08 but its area

also come down from 56 lakh hectares to 41 lakh hectares during this period. This has adversely affected share of cereals in GCA of Maharashtra.

In fact, the major reason for the falling share of cereals in GCA of Maharashtra over the last one decade is the sharp decline in share of jowar in GCA of the State, which has come down from 26 per cent in 1996-97 to as low as 18 per cent in 2007-08. The share of bajra in GCA of Maharashtra has come down from 9 per cent in 1996-97 to 6 per cent in 2007-08. Consequently, cereal crops have shown a decline in their share in GCA of Maharashtra, which has come down from 48 per cent in 1996-97 to 40 per cent in 2007-08. Since Maharashtra is one of the leading producers of jowar in the country, corrective measures need to be initiated to augment area and production of this important course cereal in the State. Corrective measures also need to be applied in the case of udid and bajra so that their production can be augmented.

2.3 Growth in GCA, NSA and Fertilizer Consumption

The estimates for the state of Maharashtra relating to NSA, GCA, NIA, GIA, ratio of NIA to NSA, GIA to GCA, fertilizer consumption etc. along with growth in the same encompassing the period between 1996-97 and 2007-08 are shown in Table 2.3.

Table 2.3: Growth in Important Variables in Maharashtra

Year	NSA (in '000' Ha)	GCA (in '000' Ha)	NIA (in '000' Ha)	GIA (in '000' Ha)	NIA/ NSA	GIA/ GCA	Fertilizer Consumption (in Lakh MT)	Fertilizer Consumption Per Hectare (Kg.)
1996-97	17848	21836	3087	3769	0.1730	0.1726	13.3	60.8
1997-98	17722	21384	3140	3693	0.1772	0.1727	16.1	75.1
1998-99	17841	21589	3273	3858	0.1835	0.1787	17.7	82.7
1999-2000	17662	21382	3296	3873	0.1866	0.1811	19.3	90.3
2000-01	17636	22256	3249	3852	0.1842	0.1731	16.5	74.1
2001-02	17631	22405	2975	3667	0.1687	0.1637	16.9	75.4
2002-03	17579	22388	2971	3668	0.1690	0.1638	16.5	73.7
2003-04	17432	22190	2944	3636	0.1689	0.1639	14.4	64.9
2004-05	17490	22368	2993	3665	0.1711	0.1639	17.4	77.8
2005-06	17473	22556	3147	3810	0.1801	0.1689	19.7	87.3
2006-07	17478	22557	3246	3958	0.1857	0.1755	22.6	100.1
2007-08	17473	22655	3311	4037	0.1895	0.1782	23.3	109.7
CGR – 1996-97 to 2007-08 (%)	-0.21*	0.49*	0.01	0.30	0.21	-0.20	3.20*	2.94**

Source: i) Economic Survey of Maharashtra, 2009-10, 2007-08 and 2008-09, Directorate of Economics & Statistics, Planning Department, Government of Maharashtra, Mumbai

Note: * and ** represent significance of growth rates at 1 and 5 per cent level of probability

It can be readily discerned from Table 2.3 that the NSA in Maharashtra has marginally declined from 17.85 million hectares in 1996-97 to 17.47 million hectares in 2007-08 with an annual decline in the same at 0.21 per cent during this period. On the

other hand, the GCA of the State has increased from 21.84 million hectares in 1996-97 to 22.66 million hectares in 2007-08 with an annual growth in the same at 0.49 per cent. More perceptible increase in GCA of Maharashtra is noticed after 1999-2000. As against NSA and GCA, the NIA in Maharashtra has fluctuated considerably over the past one decade. The NIA in Maharashtra though increased from 3.09 million hectares in 1996-97 to 3.30 million hectares in 1999-2000, a decline in the same was noticed after 1999-2000 so much so that it declined to 2.99 million hectares by 2004-05. However, the NIA in Maharashtra again increased to 3.31 million hectares in 2007-08. Due to significant fluctuation in NIA over time, there was hardly any overall annual growth in the same during the period from 1996-97 to 2007-08. However, like GCA, the GIA in Maharashtra increased from 3.77 million hectares in 1996-97 to 4.04 million hectares in 2007-08 with an annual growth in the same at 0.30 per cent during this period.

Another important feature of Table 2.3 is the increase in share of NIA in NSA of Maharashtra, which increased from 17.30 per cent in 1996-97 to 18.95 per cent in 2007-08 with an annual growth in the same at 0.21 per cent during this period. Contrary to this, the share of GIA in GCA of Maharashtra though increased from 17.26 per cent in 1996-97 to 18.11 per cent in 1999-2000, it steadily declined subsequently so much so that it was estimated at 16.39 per cent in 2005-08. The share of GIA in GCA of the State again increased after 2005-06 and it was estimated at 17.82 per cent in 2007-08. Due to fluctuating nature of share of GIA in GCA, there was overall annual decline in the same to the tune of 0.20 per cent between 1996-97 and 2007-08. In contrast to the growth in NSA and NIA, the fertilizer consumption in Maharashtra has increased significantly over time. The consumption of fertilizer in Maharashtra has increased from 13.3 lakh MT in 1996-97 to 16.5 lakh MT in 2002-03, and further to 23.3 lakh MT in 2007-08 with an annual growth in the same at 3.20 per cent between 1996-97 and 2007-08. The per hectare fertilizer consumption in Maharashtra has almost doubled between 1996-97 and 2007-08. The per hectare fertilizer consumption in Maharashtra has grown from 61 kg in 1996-97 to as much as 110 kg in 2007-08, showing an annual growth in the same at 2.94 per cent between 1996-97 and 2007-08.

The estimates shown in Table 2.3 clearly underscore the fact that the state of Maharashtra has shown significant progress not only in terms of rise in GCA but also with respect to GIA and consumption of fertilizer over time since GCA, GIA and extent

of fertilizer application in crop cultivation have improved significantly over the past decade or so, leaving aside growth in NSA and share of GIA in GCA.

2.4 Area under Pulses in Maharashtra

The annual average area under pulse crops in Maharashtra during the period between 2003-04 and 2007-08 was estimated at 36.28 lakh hectares, which encompassed 11.00 lakh hectares area under *tur*, 10.61 lakh hectares area under *gram*, 6.25 lakh hectares area under *mung*, 5.31 lakh hectares area under *udid*, and 3.10 lakh hectares area under other pulse crops (Table 2.4).

Table 2.4: Area under Important Pulses in Maharashtra: (Average of 2003-04 to 2007-08)
(Area in '00' Hectare)

Pulse Crop	Area under the Crop	% Area to Total Pulses Area
Mung	6248	17.22
Tur	11004	30.33
Udid	5307	14.63
Gram	10614	29.26
Other Pulses	3102	8.55
Total Pulses	36275	100.00

Source: Computation are based on the figures/data obtained from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'

Thus, kharif pulses like mung, tur and udid accounted for the major share in total acreage under pulse crops in Maharashtra as their combined share was 62 per cent in total area under pulses crops of the State. During the period between 2003-04 and 2007-08, the highest share in total area under pulse crops in Maharashtra was seen to be accounted for by kharif tur (30.33 per cent), followed by rabi gram (29.26 per cent), mung (17.22 per cent), and udid (14.63 per cent).

2.5 Area, Production and Yield of Pulses Crops

The estimates relating to area, production and yield of various pulse crops cultivated in Maharashtra along with their irrigated area encompassing the period between 1996-97 and 2007-08 are brought out separately in Table 5 for *mung*, Table 5 (a) for *tur*, Table 5 (b) for *udid*, Table 5 (c) for *gram*, and Table 5 (d) for total pulses..

In the case of mung, the estimates shown in Table 2.5 reveal that not only the area but production and yield of this pulse crop has fluctuated significantly during the period between 1996-97 and 2007-08. This is evident from the fact that area under mung increased from 6.59 lakh hectares in 1996-97 to 7.34 lakh hectares in 2000-01 with a decline in the same again to 6.61 lakh hectares in 2007-08. Similarly, the production of mung in Maharashtra increased from 3.48 lakh MT in 1996-97 to 3.91 lakh MT in 2003-04 with a drop in the same to 3.67 lakh MT in 2007-08. The yield levels of mung

fluctuated more rapidly than its area and production. The yield level of mung dropped from 529 kg/ha in 1996-97 to 300 kg/ha in 1997-98, which increased again to 566 kg/ha in 1998-99 but dropped to 347 kg/ha in 2005-06 with an increase in the same to 556 kg/ha in 2007-08.

Table 2.5: Area, Production, Yield and Irrigated Area under Pulses in Maharashtra: Mung
(Area in '00'Ha; Production in '00' MT tonnes; Productivity in Kg/Ha)

Year	Area	Production	Yield	Irrigated Area	Area under Improved Varieties
1996-97	6587	3482	529	21	NA
1997-98	6472	1939	300	20	NA
1998-99	6711	3800	566	22	NA
1999-00	6684	3127	468	26	NA
2000-01	7342	2598	354	32	NA
2001-02	7232	2968	410	33	NA
2002-03	7117	3437	483	NA	NA
2003-04	7001	3905	558	NA	NA
2004-05	6560	2278	347	NA	NA
2005-06	5338	1891	354	NA	NA
2006-07	5731	2361	412	NA	NA
2007-08	6608	3671	556	NA	NA

Source: i) Based on the figures/data obtained from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'

ii) 'Season and Crop Report', 1996-97, 1997-98, 1999-2000, 2000-01, 2001-02, Commissionerate of Agriculture, Government of Maharashtra, Pune'

Very high yield level fluctuation in mung is disquieting feature of the pulse sector of the State as it not only affects production of the crop but also its supply to the urban as well as rural population. The yield level of mung in the State has to be made stable to make its steady production level, and also with respect to its supply to the consuming population at reasonable price.

Interestingly, despite the fact that area under mung in Maharashtra has stagnated over time, the irrigated area under the crop in the State increased with a rise in the same from 2100 hectares in 1996-97 to 3300 hectares in 2001-02. It may be mentioned that estimates relating to irrigated area under various pulse crops in Maharashtra are available only up to 2001-02 and, thereafter, such estimates are not available for any of the pulse crop cultivated in the State. As for area under improved varieties of pulses in Maharashtra, the estimates in this respect are not so far available.

Unlike mung, the area under tur in Maharashtra increased from 10.56 lakh hectares in 1996-97 to 11.59 lakh hectares in 2007-08 (Table 2.5 (a)). The expansion in production and yield of tur was noticed to be sharper than area expansion under the crop. The production of tur in Maharashtra increased from 7.13 lakh MT in 1996-97 to 10.76 lakh MT in 2007-08. Similarly, the increase in yield level of tur in Maharashtra was

found to be from 675 kg/ha in 1996-97 to 928 kg/ha in 2007-08. However, the irrigated area under tur was found to decline from about 18,000 hectare in 1996-97 to 16,900 hectares in 2001-02.

Table 5 (a): Area, Production, Yield and Irrigated Area under Pulses in Maharashtra: Tur
(Area in '00'Ha; Production in '00' MT tonnes; Productivity in Kg/Ha)

Year	Area	Production	Yield	Irrigated Area	Area under Improved Varieties
1996-97	10555	7126	675	180	NA
1997-98	10053	3491	347	186	NA
1998-99	10379	8388	808	188	NA
1999-00	10400	8680	835	191	NA
2000-01	10965	6668	608	180	NA
2001-02	10173	7706	757	169	NA
2002-03	10599	7771	733	NA	NA
2003-04	10463	6930	662	NA	NA
2004-05	10740	6582	613	NA	NA
2005-06	10999	7922	720	NA	NA
2006-07	11226	8146	726	NA	NA
2007-08	11591	10757	928	NA	NA

Source: i) Based on the figures/data obtained from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'

ii) 'Season and Crop Report', 1996-97, 1997-98, 1999-2000, 2000-01, 2001-02, Commissionerate of Agriculture, Government of Maharashtra, Pune'

In general, tur crop in Maharashtra has shown quite impressive performance in terms of rise in area under the crop as well as expansion in production and yield levels during the past decade or so, leaving aside the area of the crop under irrigation, which has dropped in course of time.

Another pulse crop cultivated in Maharashtra that has shown quite discouraging performance in terms of area, production and yield over the past one decade is the udid. The area under udid was found to decline from 5.42 lakh hectares in 1996-97 to 4.68 lakh hectares in 2006-07 with an increase in the same to 5.64 lakh hectares in 2007-08 (Table 2.5 (b)). Similarly, the production of udid in Maharashtra declined from 3.31 lakh MT in 1996-97 to 2.00 lakh MT in 2006-07 with a rise in the same to 3.20 lakh MT in 2007-08. The yield level of udid dropped from 611 kg/ha in 1996-97 to 362 kg/ha in 2000-01 with a rise in the same to 568 kg/ha in 2007-08. In fact, udid crop in Maharashtra has shown sharp fluctuations not only in its area but also in production and yield levels during the period between 1996-97 and 2007-08. As a result, there has been negative annual growth in area, production and yield of udid in Maharashtra during the period between 1996-97 and 2007-08, with production showing sharper annual decline than area due to significantly high negative growth in yield of the crop during this period (Table 2.2). Further, the irrigated area under udid was found to be negligible in Maharashtra. The

performance of udid crop in Maharashtra over the last one decade, therefore, has been disappointing, which require corrective measures.

Table 2.5 (b): Area, Production, Yield and Irrigated Area under Pulses in Maharashtra: Udid
(Area in '00'Ha; Production in '00' MT tonnes; Productivity in Kg/Ha)

Year	Area	Production	Yield	Irrigated Area	Area under Improved Varieties
1996-97	5416	3307	611	3	NA
1997-98	5338	2147	402	3	NA
1998-99	5524	3373	611	3	NA
1999-00	5573	2737	491	4	NA
2000-01	5927	2143	362	6	NA
2001-02	5997	2626	438	6	NA
2002-03	6002	3109	518	NA	NA
2003-04	6007	3592	598	NA	NA
2004-05	5305	2165	408	NA	NA
2005-06	4684	1987	424	NA	NA
2006-07	4900	1997	408	NA	NA
2007-08	5638	3202	568	NA	NA

Source: i) Based on the figures/data obtained from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'

ii) 'Season and Crop Report', 1996-97, 1997-98, 1999-2000, 2000-01, 2001-02, Commissionerate of Agriculture, Government of Maharashtra, Pune'

Among various pulses crops cultivated in Maharashtra, gram is noticed to be the only crop, which has shown sharp increase in area, production and yield during the past one decade. Between 1996-97 and 2007-08, while area under gram has nearly doubled, the rise in production for this crop is found to be more than two and a half folds during this period. The area under gram in Maharashtra increased from 6.96 lakh hectares in 1996-97 to as much as 13.53 lakh hectares in 2007-08 (Table 2.5 (c)). The expansion in production of gram in Maharashtra was sharper and it increased from 4.63 lakh MT in 1996-97 to as much as 11.16 lakh MT in 2007-08. As against expansion in area and production, the rise in yield level of gram was slower and it increased from 666 kg/ha in 1996-97 to 824 kg/ha in 2007-08.

Table 2.5 (c): Area, Production, Yield and Irrigated Area under Pulses in Maharashtra: Gram
(Area in '00'Ha; Production in '00' MT tonnes; Productivity in Kg/Ha)

Year	Area	Production	Yield	Irrigated Area	Area under Improved Varieties
1996-97	6957	4630	666	2420	NA
1997-98	7068	2842	402	2473	NA
1998-99	9049	5632	622	2559	NA
1999-00	9118	5865	643	2448	NA
2000-01	7892	4121	522	2297	NA
2001-02	7563	4505	596	1941	NA
2002-03	7962	4211	529	NA	NA
2003-04	7952	4211	530	NA	NA
2004-05	8299	4662	562	NA	NA
2005-06	10204	7052	691	NA	NA
2006-07	13081	9251	707	NA	NA
2007-08	13533	11157	824	NA	NA

Source: i) Based on the figures/data obtained from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'

ii) 'Season and Crop Report', 1996-97, 1997-98, 1999-2000, 2000-01, 2001-02, Commissionerate of Agriculture, Government of Maharashtra, Pune'

Another positive feature with respect to cultivation of gram in Maharashtra is noticed to be very high magnitude of its area under irrigation. However, the extent of area under irrigation for gram crop has fallen in course of time. While about 35 per cent of area under gram crop cultivation was irrigated in 1996-97, this share declined to about 25 per cent in 2001-02. After 2001-02, the estimates relating to extent of irrigated area under gram crop are not available for the state of Maharashtra. Nevertheless, in general, gram crop among various pulses has performed very well in Maharashtra due to significant expansion in its area and production during the past one decade.

Although various pulses crops cultivated in Maharashtra have shown varying performances in terms expansion in area, production and yield, the general trend shows an expansion in these parameters for total pulse crop in the State. The area under total pulse crop in Maharashtra has grown from 33.63 lakh hectares in 1996-97 to 40.57 lakh hectares in 2007-08. The rise in production with respect to total pulse crop cultivated in Maharashtra is noticed to be faster than area expansion and it has increased from 20.32 lakh MT in 1996-97 to 30.24 lakh MT in 2007-08 (Table 2.5 (d)). The yield level of total pulse crop or all the pulse crops put together has improved from as low as 353 kg/ha in 1997-98 to as much as 745 kg/ha in 2007-08. However, the irrigated area under total pulse crop in Maharashtra has come down from 2.70 lakh hectares in 1996-97 to 2.27 lakh hectares in 2001-02. Even the share of area under irrigation vis-à-vis total area under pulse crops has come down from 8.03 per cent in 1996-97 to 6.46 per cent in 2001-02.

Table 2.5 (d): Area, Production, Yield and Irrigated Area under Pulses in Maharashtra: Total Pulses
(Area in '00'Ha; Production in '00' MT tonnes; Productivity in Kg/Ha)

Year	Area	Production	Yield	Irrigated Area	Area under Improved Varieties
1996-97	33628	20323	604	2702	NA
1997-98	34537	12189	353	2759	NA
1998-99	36067	23015	638	2853	NA
1999-00	35620	21853	614	2748	NA
2000-01	36063	16965	470	2645	NA
2001-02	35202	19567	556	2275	NA
2002-03	35471	20471	577	NA	NA
2003-04	34364	19553	569	NA	NA
2004-05	33854	16682	493	NA	NA
2005-06	34311	19921	581	NA	NA
2006-07	38281	23048	602	NA	NA
2007-08	40566	30236	745	NA	NA

Source: i) Based on the figures/data obtained from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'

ii) 'Season and Crop Report', 1996-97, 1997-98, 1999-2000, 2000-01, 2001-02, Commissionerate of Agriculture, Government of Maharashtra, Pune'

Despite very low proportion of area under irrigation, pulse crops in Maharashtra, in general, have performed very well with respect to growth in their area, production and yield during the past one decade or so. This holds specifically true in the case of some of the pulse crops like gram and tur, which occupy major share in total pulse crop cultivation in the State.

2.6 Share of Districts in Area and Production of Pulses

Although pulse crops are cultivated across almost all the districts of Maharashtra, their concentration is noticed mainly in those districts that either lack in terms of irrigation facilities or completely fall under rainfed conditions. At present, there are 34 districts in Maharashtra and these districts belong to eight divisions of the State viz. Konkan, Nashik, Pune, Kolhapur, Aurangabad, Latur, Amravati and Nagpur. The districts belonging to Amravati, Latur, Aurangabad, Nagpur and Nashik account for bulk of the area and production of various pulse crops in the state of Maharashtra. The annual average estimates of area and production of various pulse crops cultivated in various districts of Maharashtra during the period between 1996-97 and 2007-08 are brought out separately for *mung*, *tur*, *udid* and gram in Table 2.6 and for total pulses in Table 2.6 (a).

The annual average area under mung crop in Maharashtra during the period between 1996-97 and 2007-08 was estimated at 6.62 lakh hectares. The annual average production of mung crop during the same period was estimated at 2.96 lakh MT (Table 2.6). The districts belonging to Amravati, Latur and Nashik divisions accounted for bulk of the area and production of mung crop in the State during the given period of time. The districts belonging to these three divisions put together showed as much as more than 80 per cent share in total area and production of mung crop in Maharashtra between 1996-97 and 2007-08. Another division showing significant share in terms of area and production of mung in Maharashtra was Aurangabad. The districts belonging to Aurangabad showed about 11 per cent share in total area and production of mung crop in the State. The remaining area and production of mung in Maharashtra was accounted for by other divisions viz. Konkan, Kolhapur, Pune and Nagpur.

The area and production concentration of tur was noticed in those districts that belonged to Amravati, Latur, Nagpur and Aurangabad divisions of Maharashtra. The annual average area under tur crop was estimated at 10.68 lakh hectares and production at 7.51 lakh MT during the period between 1996-97 and 2007-08. The districts belonging to Amravati, Latur, Nagpur and Aurangabad divisions alone accounted for 87 per cent of

total area and 91 per cent of total production of tur crop during the given period of time. Another division showing significant share in area and production of tur crop was Nashik. Among various districts, the highest area under tur crop in Maharashtra was noticed in Amravati district with a share of about 9 per cent in total area of the crop. Similarly, Amravati district also showed highest production of tur crop with share of about 11 per cent in total production of the crop in Maharashtra.

Table 2.6: Share of Districts in Total Area and Production of All Major Pulses Crops in Maharashtra: Average of 1996-97 to 2007-08

(Area in '00'Ha; Production in '00' MT tonnes; Share in %)

Districts/ Divisions	Mung				Tur				Udid				Gram			
	Area	Share	Prod.	Share	Area	Share	Prod.	Share	Area	Share	Prod.	Share	Area	Share	Prod.	Share
Thane	7	0.10	4	0.14	29	0.27	16	0.21	50	0.90	39	1.43	39	0.43	26	0.45
Raigad	4	0.06	2	0.07	11	0.10	6	0.08	7	0.13	6	0.21	19	0.21	13	0.22
Ratnagiri	2	0.03	1	0.05	5	0.05	3	0.04	4	0.07	4	0.15	0	0.00	0	0.00
Sindhudurg	1	0.02	1	0.04	0	0.00	0	0.00	4	0.06	3	0.10	0	0.00	0	0.00
Konkan Div.	347	5.24	341	11.55	45	0.42	25	0.33	64	1.16	51	1.89	60	0.66	39	0.69
Nashik	88	1.33	63	2.14	90	0.85	53	0.71	124	2.25	94	3.49	426	4.70	260	4.58
Dhule	238	3.60	163	5.51	115	1.08	58	0.78	134	2.43	99	3.67	177	1.96	129	2.27
Nandurbar	161	2.43	96	3.24	233	2.18	108	1.44	202	3.65	125	4.63	150	1.65	101	1.77
Jalgaon	377	5.71	190	6.43	264	2.47	166	2.20	579	10.48	309	11.46	473	5.22	402	7.09
Nashik Div.	864	13.07	512	17.32	703	6.58	365	4.86	1002	18.13	603	22.35	1200	13.25	874	15.39
Ahmednagar	148	2.24	64	2.17	160	1.50	78	1.04	40	0.72	16	0.61	624	6.89	367	6.46
Pune	71	1.07	32	1.09	41	0.38	23	0.30	23	0.42	17	0.64	486	5.36	297	5.24
Solapur	30	0.45	16	0.56	240	2.24	83	1.10	48	0.86	27	1.02	386	4.26	213	3.74
Pune Div.	249	3.76	113	3.83	440	4.12	184	2.44	111	2.00	61	2.26	1495	16.51	877	15.44
Satara	52	0.79	28	0.96	63	0.59	25	0.34	45	0.82	28	1.03	248	2.74	153	2.69
Sangli	62	0.94	30	1.01	123	1.15	50	0.66	74	1.34	46	1.71	277	3.06	198	3.48
Kolhapur	22	0.33	11	0.36	28	0.26	11	0.15	30	0.55	18	0.66	113	1.25	84	1.48
Kolhapur Div.	136	2.06	69	2.33	214	2.00	86	1.15	150	2.71	92	3.40	638	7.05	435	7.65
Aurangabad	125	1.89	58	1.96	413	3.87	186	2.47	62	1.13	40	1.48	417	4.61	247	4.36
Jalna	506	7.65	229	7.74	474	4.44	262	3.49	177	3.21	92	3.42	153	1.68	89	1.56
Beed	125	1.88	48	1.63	489	4.58	242	3.22	96	1.74	45	1.66	278	3.07	146	2.57
Aurangabad Div.	756	11.42	335	11.33	1376	12.89	690	9.18	335	6.07	177	6.56	848	9.36	482	8.49
Latur	257	3.88	65	2.20	714	6.69	525	6.98	753	13.62	227	8.41	405	4.47	218	3.84
Osmanabad	180	2.73	51	1.73	820	7.68	472	6.28	436	7.90	143	5.28	544	6.01	271	4.78
Nanded	379	5.73	157	5.31	526	4.92	398	5.30	550	9.95	257	9.51	364	4.02	218	3.83
Parbhani	677	10.23	213	7.20	599	5.61	302	4.02	184	3.34	67	2.49	461	5.09	246	4.33
Hingoli	218	3.30	97	3.28	258	2.41	194	2.58	182	3.29	82	3.05	269	2.97	162	2.86
Latur Div.	1693	25.59	576	19.50	2811	26.32	1857	24.71	2062	37.31	764	28.31	1985	21.92	1088	19.17
Buldhana	737	11.15	366	12.40	604	5.66	425	5.65	686	12.41	345	12.78	395	4.37	270	4.75
Akola	684	10.34	319	10.79	544	5.09	479	6.37	270	4.89	150	5.57	391	4.32	283	4.98
Washim	479	7.24	275	9.30	431	4.03	402	5.34	524	9.48	323	11.97	331	3.66	223	3.92
Amravati	604	9.13	228	7.72	917	8.59	806	10.73	82	1.48	36	1.32	501	5.53	397	6.99
Yavatmal	413	6.24	184	6.23	1199	11.23	1154	15.36	206	3.73	98	3.63	287	3.17	205	3.61
Amravati Div.	2918	44.10	1372	46.44	3695	34.60	3202	42.61	1667	30.17	889	32.92	1873	20.68	1352	23.81
Wardha	10	0.16	5	0.16	537	5.03	522	6.94	5	0.09	2	0.08	230	2.54	133	2.34
Nagpur	26	0.39	11	0.36	514	4.81	338	4.50	24	0.44	10	0.36	422	4.65	251	4.43
Bhandara	37	0.57	15	0.52	77	0.72	57	0.76	51	0.92	24	0.90	66	0.73	32	0.55
Gondia	17	0.25	10	0.32	44	0.41	37	0.49	9	0.17	4	0.14	33	0.36	15	0.26
Chandrapur	45	0.68	20	0.68	269	2.52	145	1.93	34	0.62	16	0.61	178	1.97	87	1.53
Gadchiroli	18	0.27	8	0.27	23	0.21	17	0.22	16	0.29	8	0.28	36	0.39	16	0.29
Nagpur Div.	150	2.27	67	2.26	1459	13.67	1106	14.72	135	2.45	62	2.31	957	10.56	531	9.36
Maharashtra	6615	100.0	2955	100.0	10679	100.0	7514	100.0	5526	100.0	2699	100.0	9057	100.0	5678	100.0

Source: Computation are based on the figures/data obtained from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'

The cultivation of udid was mainly confined to Amravati, Latur and Nashik divisions. During the period between 1996-97 and 2007-08, the annual average area under udid crop in Maharashtra was estimated at 5.53 lakh hectares and production at 2.70 lakh MT. The districts belonging to Amravati, Latur and Nashik showed bulk of the area and production of udid crop in Maharashtra with their combined share being 86 per cent in terms of area and 84 per cent with respect to production udid in Maharashtra. Some of the districts like Latur, Osmanabad, Buldhana, Nanded, and Jalgaon showed as much as 10-12 per cent share in total area and production of udid in Maharashtra. Thus, cultivation of udid was not only confined to few divisions but also quite a few districts of Maharashtra as majority of the districts in the State had marginal presence in terms of its cultivation and contribution towards total production.

Unlike mung, tur and udid, the rabi pulse like gram was found to be cultivated in most of the districts of Maharashtra. However, its concentration in terms of area and production was found in those districts that belonged to Amravati, Latur, Pune, Nashik, and Nagpur divisions of Maharashtra. During the period between 1996-97 and 2007-08, out of the total annual average area of 9.06 lakh hectares under gram crop, 21 per cent belonged to Amravati division, 22 per cent to Latur, 17 per cent to Pune, 13 per cent to Nashik and 11 per cent to Nagpur division of Maharashtra. Similarly, during the same period, out of the total annual production of 5.68 lakh MT of gram crop, 24 per cent belonged to Amravati division, 19 per cent to Latur, 15 per cent each to Pune and Nashik divisions, and 9 per cent to Nagpur division of Maharashtra. Thus, the districts belonging to Amravati, Latur, Pune, Nashik and Nagpur divisions showed 83 per cent share in area and production gram crop in Maharashtra during the given period of time.

In general, pulse crop cultivation in Maharashtra was confined mainly to five divisions of Maharashtra viz. Amravati, Latur, Aurangabad, Nashik and Nagpur. The districts belonging to these five divisions showed as much as 85 per cent share in total area and 87 per cent share in total production of total pulse crops of Maharashtra (Table 2.6 (a)). During the period between 1996-97 and 2007-08, out of the total annual average area of 35.66 lakh hectares under total pulse crops, 28 per cent area belonged to Amravati division, 24 per cent to Latur, 10 per cent to Aurangabad, 12 per cent to Nashik and 10 per cent to Nagpur division of Maharashtra. Similarly, during the same period, out of the total annual production of 20.32 lakh MT of total pulse crop, 33 per cent production belonged to Amravati division, 22 per cent to Latur, 9 per cent to Aurangabad, 13 per

cent to Nashik, and 10 per cent to Nagpur division of Maharashtra. This clearly shows predominance of Amravati and Latur divisions not only in terms of area but also production of pulse crop in Maharashtra. The combined share of Amravati and Latur divisions in terms of both area and production of pulse crops is more than 50 per cent in Maharashtra with rest area and production being accounted for by other divisions.

Table 2. 6 (a): Share of Districts in Total Area and Production of Total Pulses Crops in Maharashtra: Average of 1996-97 to 2007-08
(Area in '00'Ha; Production in '00' MT tonnes; Share in %)

Districts/Divisions	Total Pulses		Total Pulses	
	Area	% Share	Production	% Share
Thane	182	0.51	110	0.54
Raigad	125	0.35	62	0.30
Ratnagiri	63	0.18	31	0.15
Sindhudurg	47	0.13	22	0.11
Konkan Division	416	1.17	225	1.11
Nashik	1003	2.81	579	2.85
Dhule	821	2.30	491	2.42
Nandurbar	862	2.42	464	2.28
Jalgaon	1774	4.97	1101	5.42
Nashik Division	4312	12.09	2546	12.53
Ahmednagar	1182	3.31	600	2.95
Pune	832	2.33	451	2.22
Solapur	866	2.43	400	1.97
Pune Division	2880	8.08	1451	7.14
Satara	883	2.47	425	2.09
Sangli	881	2.47	454	2.24
Kolhapur	262	0.74	151	0.74
Kolhapur Division	2026	5.68	1030	5.07
Aurangabad	1109	3.11	570	2.80
Jalna	1450	4.07	734	3.61
Beed	1103	3.09	530	2.61
Aurangabad Division	3662	10.27	1833	9.02
Latur	2202	6.17	1075	5.29
Osmanabad	2025	5.68	977	4.81
Nanded	1842	5.16	1057	5.20
Parbhani	1954	5.48	854	4.21
Hingoli	944	2.65	549	2.70
Latur Division	8744	24.52	4419	21.75
Buldhana	2548	7.14	1391	6.84
Akola	1910	5.36	1230	6.05
Washim	1773	4.97	1218	5.99
Amravati	2148	6.02	1477	7.27
Yavatmal	2129	5.97	1641	8.08
Amravati Division	10133	28.41	6742	33.18
Wardha	796	2.23	636	3.13
Nagpur	1073	3.01	1022	5.03
Bhandara	435	1.22	217	1.07
Gondia	186	0.52	98	0.48
Chandrapur	815	2.29	379	1.87
Gadchiroli	231	0.65	104	0.51
Nagpur Division	3490	9.79	2073	10.20
Maharashtra State	35664	100.00	20319	100.00

Source: Computation are based on the figures/data obtained from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'

As for area and production of pulse crops in Maharashtra, some of the districts alone have shown very high share. Important among these are Buldhana, Amravati and Yavatmal districts belonging to Amravati division, and Latur, Osmanabad, Nanded and Parbhani districts belonging to Latur division of Maharashtra. These districts alone have shown 5-6 per cent share in area and production of pulse crop in Maharashtra during the period between 1996-97 and 2007-08. The districts belonging to Konkan division have shown the lowest share in terms of area and production of pulse crop in Maharashtra during the given period of time.

2.7 District-wise Growth in A, P, Y of Pulses

District-wise growth rate estimates with respect to area, production and yield of various pulses crops cultivated in Maharashtra during the period between 1996-97 and 2007-08 are brought out separately for mung, tur, udid and gram, and also for total pulses cultivated in the State. The annual average growth rate estimates with respect to area, production and yield of mung crop for different districts as well as divisions of Maharashtra encompassing the period from 1996-97 to 2007-08 are shown in Table 2.7.

The observance of trend over the last one decade shows negative area growth for mung crop across almost all the districts of Maharashtra with negative annual growth in area under mung crop being sharper in districts like Bhandara, Chandrapur, Gadchiroli, Kolhapur, Raigad, and Thane. These districts have shown 15-30 per cent annual decline in area under mung crop in Maharashtra. In fact, districts belonging to Nagpur and Konkan divisions have shown very high magnitude of annual decline in area under mung crop in Maharashtra, which may not be a matter of serious concern due to their very low share in total area under mung crop of the State. However, decline in area under mung crop in districts belonging to Amravati and Latur divisions is certainly a matter of concern due to their significantly high share in total area under mung crop of the State. Although Nashik division of Maharashtra shows 1.00 per cent annual growth in area under mung crop in Maharashtra during the period between 1996-97 and 2007-08, the annual decline in area under this crop at the rate of 2.81 per cent in Amravati division, 0.62 per cent in Latur division, and 3.43 per cent in Aurangabad division has resulted in overall annual decline in area under mung crop in Maharashtra at the rate of 1.01 per cent during this period, indicating the positive annual growth in area under mung crop in Nashik division being nullifying due to negative annual growth in the same in majority of the districts of Maharashtra during the given period of time.

Table 2.7: Compound Annual Growth Rates (CAGR) over 1997-2008 (1996-97 to 2007-08) of Area, Production, Yield of Important Pulses Crops in Maharashtra: Mung

Districts/Divisions	Area		Production		Yield	
	CAGR (%)	T-Value	CAGR (%)	T-Value	CAGR (%)	T-Value
Thane	23.98*	4.09	13.67*	2.98	-8.32**	2.41
Raigad	-16.00*	3.36	-8.17	2.15	9.32	1.88
Ratnagiri	7.19	1.69	-0.68	0.19	-7.34*	3.54
Sindhudurg	-0.82	0.34	-1.84	0.70	-1.03	1.35
Konkan Division	-29.12**	2.62	-30.88**	2.53	6.97	1.44
Nashik	2.65*	3.82	4.13**	2.46	1.44	0.99
Dhule	-1.11	0.59	-3.96	1.26	-2.88	1.41
Nandurbar	0.97	1.57	-2.26	0.74	-3.2	1.06
Jalgaon	2.49*	4.07	1.78	0.78	-0.68	0.36
Nashik Division	1.00	1.90	-0.79	0.36	-1.75	0.97
Ahmednagar	0.7	0.26	4.83	0.65	4.1	0.69
Pune	-1.21	0.36	-0.48	0.11	0.73	0.27
Solapur	0.82	0.20	2.89	0.44	2.05	0.52
Pune Division	-0.08	0.03	2.68	0.48	2.76	0.69
Satara	0.95	0.59	1.85	0.47	0.89	0.27
Sangli	0.26	0.10	-2.55	0.34	-2.81	0.55
Kolhapur	10.59*	4.65	8.89*	4.34	-1.53	0.61
Kolhapur Division	1.95	1.31	1.09	0.30	-0.85	0.37
Aurangabad	-3.13	1.65	5.68	1.78	9.1**	2.67
Jalna	-2.98*	2.89	-1.07	0.31	1.97	0.62
Beed	-5.44**	2.35	7.52	1.32	13.71**	2.39
Aurangabad Division	-3.43*	2.78	1.24	0.35	4.83	1.49
Latur	-0.85	1.36	-2.92	0.55	-2.09	0.39
Osmanabad	5.89*	5.04	10.44	1.68	4.3	0.71
Nanded	-1.11	0.82	-1.77	0.49	-0.67	0.18
Parbhani	-2.37	1.05	5.88	1.05	8.45	1.74
Hingoli	-0.72	0.87	3.56	1.37	4.3	1.93
Latur Division	-0.62	0.65	2.91	0.81	4.41	1.13
Buldhana	0.41	0.28	-0.62	0.14	-1.02	0.26
Akola	-4.48**	2.46	-8.04	2.03	-3.72	0.99
Washim	-5.17*	6.23	-6.49**	2.69	0.52	0.28
Amravati	3.42*	2.85	-3.35	1.20	-6.55*	3.45
Yavatmal	-11.3*	4.78	-11.72*	4.80	-0.48	0.18
Amravati Division	-2.81*	3.52	-5.57	2.06	-2.29	0.88
Wardha	-7.43*	5.13	-3.52	1.11	4.22	1.46
Nagpur	-6.51*	4.54	-6.31	1.66	0.22	0.08
Bhandara	-33.72*	8.75	-27.67*	3.45	9.13	1.30
Gondia	-34.52*	6.29	-30.23*	7.20	6.55*	3.26
Chandrapur	-25.8*	9.63	-24.09*	5.59	2.31	0.69
Gadchiroli	-30.27*	5.99	-23.81*	3.03	9.26	1.79
Nagpur Division	-21.33*	9.87	-19.64*	5.35	3.31	1.01
Maharashtra State	-1.01	1.36	-0.96	0.43	0.06	0.03

Source: Computation are based on the figures/data obtained from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'

Note: 1) * and ** represent significance of growth rates at 1 and 5 per cent level of probability

2) Some of the districts of Maharashtra were carved after 1996-07, and, therefore, growth rates are from 1998-99 to 2007-08 for Nandurbar and Washim, from 1999-2000 to 2007-08 for Hingoli and Gondia

The production of mung crop has also declined in those districts and divisions of Maharashtra that mainly concentrate on cultivating mung crop. As against area decline,

the annual decline in production of mung crop in Amravati division of Maharashtra is noticed to be sharper at 5.57 per cent during the period between 1996-97 and 2007-08. However, districts belonging to Latur division of Maharashtra have shown a positive 2.91 per cent annual growth in production of mung during the period between 1996-97 and 2007-08 despite 0.62 per cent annual decline in area during this period, which should be attributed to 4.41 per cent annual yield growth of mung in this division during this period. Even districts belonging to Aurangabad division have shown 1.24 per cent annual growth in production of mung despite 3.43 per cent annual decline in area under this crop during the given period of time, which again can be attributed to 4.83 per cent annual yield growth of mung in this division during the given period. However, despite positive and significantly high annual production growth of mung in districts belonging to Latur and Aurangabad divisions, the overall annual production growth in mung crop turned out to be negative and estimated at 0.96 per cent between 1996-97 and 2007-08 mainly due to sharp annual decline in production of mung in almost all the districts belonging to Amravati division, which alone account for more than 46 per cent share in total production of mung crop of Maharashtra. The marginal positive annual yield growth of mung between 1996-97 and 2007-08 has not made any effect in production growth of this crop in Maharashtra during the given period of time.

As against the fall in area under mung, the area under tur crop in Maharashtra has increased significantly with an annual growth rate of 0.87 per cent between 1996-97 and 2007-08, which could be attributed to higher growth in area under this crop in districts belonging to Amravati, Latur, Nagpur and Aurangabad divisions that account for major share in total area under tur crop of the State (Table 2.8). Although some of the districts of Maharashtra show very high negative area growth under tur crop, this negative area growth has not affected overall annual growth in area under tur crop in Maharashtra mainly due to the fact that the share of these districts is not much in total area of tur crop under cultivation in the State.

Interestingly, the production and yield growth of tur in Maharashtra is much faster than area growth under the crop during the period between 1996-97 and 2007-08. The annual production expansion of tur crop in Maharashtra at the rate of 3.74 per cent during the given period of time is mainly contributed by districts that have significant presence of the cultivation of tur crop viz. Nagpur, Wardha, Parbhani, Nanded, Osmanabad, Latur, Jalna, Beed and Aurangabad. These districts have shown 5-10 per cent annual production

growth of tur during the past one-decade. However, some of the major tur crop producing districts like Amravati and Yavatmal showed less than 1 per cent annual production growth of tur mainly due to negative yield growth of the crop during the given period.

Table 2.8: Compound Annual Growth Rates (CAGR) over 1997-2008 (1996-97 to 2007-08) of Area, Production, Yield of Important Pulses Crops in Maharashtra: Tur

Districts/Divisions	Area		Production		Yield	
	CAGR (%)	T-Value	CAGR (%)	T-Value	CAGR (%)	T-Value
Thane	-0.22	0.33	1.95	1.16	2.17	1.45
Raigad	-0.77	1.00	1.01	0.50	1.79	1.17
Ratnagiri	2.55*	3.08	4.47**	2.61	1.87	0.98
Sindhudurg	-	-	-	-	-	-
Konkan Division	-0.05	0.11	1.99	1.19	2.04	1.36
Nashik	1.64*	4.25	5.45**	2.40	3.75	1.78
Dhule	-5.81	1.46	-3.18	0.48	2.8	0.88
Nandurbar	1.89*	4.63	0.56	0.20	-1.3	0.50
Jalgaon	2.48*	5.38	7.89*	3.55	5.29**	2.27
Nashik Division	0.14	0.17	4.84*	3.02	2.48	1.61
Ahmednagar	-5.85*	3.91	-7.41	2.16	-1.66	0.68
Pune	-2.41**	2.62	-1.83	0.65	0.6	0.22
Solapur	-5.96	1.25	-2.57	0.30	3.61	0.76
Pune Division	-5.61	2.10	-4.4	1.03	1.28	0.60
Satara	-4.43*	3.32	-3.14	1.05	1.35	0.71
Sangli	-0.09	0.04	1.39	0.36	1.48	0.78
Kolhapur	0.38	0.28	1.8	0.70	1.41	0.78
Kolhapur Division	-1.27	0.79	0.13	0.04	1.42	0.75
Aurangabad	-0.95	0.89	9.29	1.94	10.33**	2.43
Jalna	2.35*	3.76	10.9*	2.98	8.35**	2.52
Beed	0.24	0.37	8.06	1.73	7.8	1.84
Aurangabad Division	0.57	0.86	9.46**	2.41	8.84**	2.54
Latur	-0.15	0.31	10.58	1.36	10.75	1.41
Osmanabad	1.94*	2.78	10.75	1.43	8.64	1.18
Nanded	2.03*	4.64	6.36	1.19	4.24	0.85
Parbhani	-1.72	1.15	5.46	0.92	7.3	1.19
Hingoli	-0.27	0.48	8.99*	5.50	9.29*	6.50
Latur Division	0.51	0.44	10.29	1.65	9.03	1.43
Buldhana	0.45	0.77	1.84	0.70	1.39	0.59
Akola	-0.98	0.56	-2.03	0.91	-1.06	0.53
Washim	3.54*	9.72	2.1	1.94	-1.39	1.22
Amravati	0.55	0.89	0.82	0.61	0.26	0.21
Yavatmal	0.62	1.08	0.43	0.22	-0.19	0.10
Amravati Division	0.57**	2.53	1.38	0.97	0.04	0.03
Wardha	1.94*	3.00	4.93	1.39	2.93	0.82
Nagpur	0.61*	2.89	4.51	1.21	3.88	1.05
Bhandara	-1.1	0.63	1.47	0.51	2.59	0.83
Gondia	2.74*	6.37	-0.41	0.31	-3.07**	2.34
Chandrapur	-0.58	0.71	-2.5	0.72	-1.92	0.60
Gadchiroli	-0.5	0.23	2.13	0.71	2.65	0.82
Nagpur Division	0.89	1.85	3.66	1.19	2.55	0.82
Maharashtra State	0.87*	3.66	3.74	1.79	2.84	1.42

Source: Computation are based on the figures/data obtained from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'

Note: 1) * and ** represent significance of growth rates at 1 and 5 per cent level of probability

2) Some of the districts of Maharashtra were carved after 1996-07, and, therefore, growth rates are from 1998-99 to 2007-08 for Nandurbar and Washim, from 1999-2000 to 2007-08 for Hingoli and Gondia

In fact, all the districts belonging to Latur division showed very high production and yield growth of tur during the period between 1996-97 and 2007-08. Contrary to this, the districts belonging to Amravati division showed either negative yield growth of tur or positive but very low production growth of the crop during the given period of time. The yield growth of tur estimated at 2.84 per cent per annum for the state of Maharashtra during the period between 1996-97 and 2007-08 was mainly due very high annual yield growth of this crop in Latur division of the State as Amravati division showed hardly any yield growth of tur during the given period of time. However, the annual yield growth of tur was found to be very high in some other districts belonging to Aurangabad and Nashik division. For instance, Jalgaon district not only showed positive and significantly high area growth of tur but also substantially high production and yield growth of this important pulse crop cultivated in the district. The districts belonging to Aurangabad division like Aurangabad, Jalna and Beed showed 8-10 per annual yield growth of tur between 1996-97 and 2007-08. Similarly, the districts belonging to Latur like Parbhani, Osmanabad and Latur showed 7-11 per cent annual yield growth of tur during the same period. Such high yield growth of tur in these districts, therefore, translated into significantly high overall yield growth of the crop for the state of Maharashtra.

In terms of growth in area, production and yield, the most disappointing performance was noticed in the case udid crop cultivation in Maharashtra, which not only showed negative area growth but also negative growth in terms of production and yield of the crop during the period between 1996-97 and 2007-08 (Table 2.9). While the area under udid crop in Maharashtra declined at the rate of 0.59 per cent per annum during the period between 1996-97 and 2007-08, this decline in production was at the rate of 1.45 per cent per annum during the same period. The decline in yield of udid in Maharashtra turned out to be at the rate of 0.86 per cent per annum during the given period of time.

In the cultivation of udid crop in Maharashtra, the districts belonging to Amravati, Latur and Nashik divisions account for more than 80 per cent share in area and production of the crop. In this sequel, the districts of Amravati division alone account for more than 30 per cent share in total area and production of udid crop in Maharashtra, and these districts have shown very sharp annual decline in area and production of udid crop during the period between 1996-97 and 2007-08 with an annual decline of 3.4 per cent in area and 4.5 per cent in production during the same period. The districts of Amravati have not only shown negative area and production growth of udid crop but also negative

yield growth of the crop. The yield of udid crop in districts belonging to Amravati division is estimated to have declined at the rate of 1.1 per cent per annum during the period between 1996-97 and 2007-08.

Table 2.9: Compound Annual Growth Rates (CAGR) over 1997-2008 (1996-97 to 2007-08) of Area, Production, Yield of Important Pulses Crops in Maharashtra: Udid

Districts/Divisions	Area		Production		Yield	
	CAGR (%)	T-Value	CAGR (%)	T-Value	CAGR (%)	T-Value
Thane	0.38	0.62	0.44	0.29	0.06	0.04
Raigad	-2.44	1.50	-2.08	1.02	0.37	0.28
Ratnagiri	7.01*	3.04	-1.7	0.29	-8.14	1.42
Sindhudurg	1.21	0.96	3.54	1.90	2.3	2.14
Konkan Division	0.33	0.62	-0.47	0.29	-0.8	0.52
Nashik	-0.23	0.44	3.71**	2.43	3.95*	2.72
Dhule	-6.35	1.72	-10.24	2.15	-4.16	1.51
Nandurbar	-2.45*	4.58	-4.69	1.65	-2.3	0.87
Jalgaon	1.02	2.21	-0.44	0.14	-1.45	0.49
Nashik Division	0.23	0.69	-1.41	0.56	-1.63	0.72
Ahmednagar	15.39*	6.66	13.16*	4.32	-1.94	0.60
Pune	-0.06	0.07	2.2	1.01	2.26	1.34
Solapur	14.53*	3.36	16.91	1.75	2.08	0.30
Pune Division	11.19*	5.00	11.41*	2.96	0.21	0.07
Satara	3.55*	4.47	-0.25	0.11	-3.67	1.82
Sangli	1.27	0.39	-1.35	0.12	-2.58	0.33
Kolhapur	-1.06	0.80	-1.85	0.54	-0.8	0.27
Kolhapur Division	1.61	0.96	0.28	0.08	-1.3	0.58
Aurangabad	-5.61*	5.73	-3.25	1.14	2.49	0.87
Jalna	1.82	1.98	2.89	0.90	1.05	0.36
Beed	0.53	0.27	14.79*	3.15	14.18*	3.23
Aurangabad Division	0.09	0.09	3.55	1.40	3.47	1.53
Latur	-2.14	1.78	-6.91	1.48	-4.87	1.00
Osmanabad	6.61*	6.02	7.13	1.16	0.48	0.08
Nanded	1.7	1.46	0	0.00	-1.67	0.49
Parbhani	-3.13	1.66	-0.79	0.17	2.41	0.56
Hingoli	0.44	0.43	8.87*	2.91	8.4*	3.53
Latur Division	1.56	1.52	1.04	0.29	-0.51	0.15
Buldhana	-1.48	1.43	-3.3	0.72	-1.85	0.46
Akola	-10.63**	2.65	-15.52*	3.29	-5.47	1.48
Washim	-5.26*	4.67	-4.84	2.05	0.44	0.24
Amravati	-2.39	1.28	-6.52	1.92	-4.23	1.84
Yavatmal	-7.44*	3.83	-6.94	1.85	0.55	0.18
Amravati Division	-3.4*	3.47	-4.46	1.49	-1.1	0.44
Wardha	-3.84	1.60	-0.89	0.21	3.07	0.92
Nagpur	-7.09*	8.12	-3.59	1.25	3.76	1.35
Bhandara	-37.88*	6.94	-37.97*	6.68	-0.15	0.11
Gondia	-18.6*	7.34	-18.07*	5.43	0.66	0.40
Chandrapur	-29.95*	9.46	-32.04*	9.85	-2.99	1.42
Gadchiroli	-28.5*	7.38	-28.09*	7.47	0.57	0.79
Nagpur Division	-22.11*	9.37	-22.28*	7.87	-0.22	0.16
Maharashtra State	-0.59	0.87	-1.45	0.76	-0.86	0.53

Source: Computation are based on the figures/data obtained from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'

Note: 1) * and ** represent significance of growth rates at 1 and 5 per cent level of probability

2) Some of the districts of Maharashtra were carved after 1996-07, and, therefore, growth rates are from 1998-99 to 2007-08 for Nandurbar and Washim, from 1999-2000 to 2007-08 for Hingoli and Gondia

In contrast to Amravati division, the division of Latur has shown positive area and production growth and negative yield growth of udid crop. The districts belonging to Latur division have shown area expansion under udid crop at the rate of 1.56 per cent per annum and production expansion at the rate of 1.04 per cent per annum between 1996-97 and 2007-08. The yield level of udid crop in Latur division has declined at the rate of 0.51 per annum during the given period of time.

Like Amravati division, the districts belonging to Nashik have also shown negative production and yield growth of udid crop. However, there has been positive area growth under udid crop in Nashik division. The districts belonging to Nashik division have shown decline in area under udid crop at the rate of 1.41 per cent per annum and decline in yield at the rate of 1.63 per cent per annum between 1996-97 and 2007-08. On the other hand, area under udid crop in Nashik division has grown at the rate of 0.23 per cent per annum during the above period of time.

Although there has been positive area growth of udid crop in Latur and Nashik divisions of Maharashtra, the negative growth in the same in Amravati division outweighed positive area growth, and, consequently, overall area under udid crop in Maharashtra declined between 1996-97 and 2007-08. Similarly, the positive production growth of udid crop in Latur division could not offset overall production decline in the same for the state of Maharashtra as negative production growth of udid in Amravati and Nashik divisions outweighed positive production growth of udid in Latur division.

Among various pulse crops, gram was found to be the only crop that showed positive area, production and yield growth for the state of Maharashtra during the period between 1996-97 and 2007-08 with production growth being faster than area and yield growth of gram during this period (Table 2.10). All the districts of Maharashtra have shown significant annual growth in area, production and yield of gram crop during the given period of time with the exception of districts like Bhandara, Kolhapur, Jalgaon, Dhule, Nashik and Raigad, which showed negative area growth under gram between 1996-97 and 2007-08. However, the negative area growth of gram crop in these districts has not affected the overall rise in area under the crop since these districts have very marginal presence in terms of gram crop cultivation. In general, the area under gram crop cultivation in Maharashtra has grown at 3-6 per cent per annum across various gram producing divisions of Maharashtra with an overall growth rate in the same at 4.76 per cent per annum between 1996-97 and 2007-08. During the same period, the production of

gram crop in Maharashtra increased at the rate of 7.51 per cent per annum. In this sequel, the districts belonging to divisions like Nagpur, Amravati, Latur, Pune and Nashik have shown as much as more than 10 per cent annual growth in gram crop production.

Table 2.10: Compound Annual Growth Rates (CAGR) over 1997-2008 (1996-97 to 2007-08) of Area, Production, Yield of Important Pulses Crops in Maharashtra: Gram

Districts/Divisions	Area		Production		Yield	
	CAGR (%)	T-Value	CAGR (%)	T-Value	CAGR (%)	T-Value
Thane	0.93	0.55	2.3	1.32	1.35	1.20
Raigad	-3.82	1.89	-2.42	1.13	1.46	1.36
Ratnagiri	-	-	-	-	-	-
Sindhudurg	-	-	-	-	-	-
Konkan Division	-1.03	0.53	0.23	0.12	1.28	1.16
Nashik	-2.4	1.07	-0.5	0.15	1.94	1.44
Dhule	-0.09	0.03	2.05	0.51	2.14	1.19
Nandurbar	0.63	0.32	3.45	1.18	2.79	1.17
Jalgaon	-1.47	0.70	2.32	1.11	3.84*	3.73
Nashik Division	-0.57	0.30	2.48	1.02	3.07*	2.77
Ahmednagar	6.42*	4.33	7.85**	2.52	1.35	0.61
Pune	0.92	0.60	1.03	0.40	0.11	0.05
Solapur	0.92	0.49	1.76	0.30	0.83	0.18
Pune Division	3.09**	2.26	3.91	1.17	0.8	0.32
Satara	2.38	1.02	3.63	1.13	1.22	0.62
Sangli	1.28	0.88	0.64	0.23	-0.62	0.34
Kolhapur	-1.42	0.98	1.06	0.72	2.52*	3.56
Kolhapur Division	1.31	0.83	1.88	0.83	0.56	0.43
Aurangabad	1.16	0.71	6.46	1.93	5.23**	2.33
Jalna	1.19	1.21	6.46**	2.47	5.21*	2.67
Beed	7.48*	5.55	11.15*	3.53	3.41	1.66
Aurangabad Division	3.12*	2.98	7.72*	2.74	4.46**	2.25
Latur	6.48*	7.08	11.36*	3.44	4.59	1.50
Osmanabad	4.41*	4.77	9.3	1.80	4.69	0.96
Nanded	7.02*	3.54	13.76*	3.87	6.3*	2.69
Parbhani	1.33	0.78	4.03	1.30	2.67	1.15
Hingoli	5.29*	4.27	10.83*	5.80	5.26*	5.61
Latur Division	6.00*	8.40	11.01*	3.74	4.73	1.94
Buldhana	7.13**	2.24	6.57	1.22	-0.52	0.20
Akola	5.76	1.58	9.2	1.51	3.25	1.06
Washim	12.19*	5.82	11.03**	2.66	-1.03	0.48
Amravati	4.63	1.78	8.3	2.21	3.51	1.72
Yavatmal	14.5*	3.63	20.31*	4.21	5.08**	2.44
Amravati Division	9.13*	3.26	11.38**	2.53	2.06	0.99
Wardha	8.67*	6.04	13	4.75	3.98	1.67
Nagpur	6.56*	3.71	10.22*	3.97	3.44	1.57
Bhandara	-4.27	1.05	0.1	0.02	4.56	1.89
Gondia	1.98	0.82	3.96	0.82	1.94	0.70
Chandrapur	9.4*	4.50	13.38*	4.91	3.64	1.53
Gadchiroli	-2.4	0.67	-1.94	0.39	0.47	0.17
Nagpur Division	6.45*	4.48	10.38*	4.34	3.69	1.73
Maharashtra State	4.76*	3.76	7.51*	3.01	2.63	1.84

Source: Computation are based on the figures/data obtained from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'

Note: 1) * and ** represent significance of growth rates at 1 and 5 per cent level of probability

2) Some of the districts of Maharashtra were carved after 1996-07, and, therefore, growth rates are from 1998-99 to 2007-08 for Nandurbar and Washim, from 1999-2000 to 2007-08 for Hingoli and Gondia

The substantial yield growth of gram is noticed in those districts that belonged to Amravati, Latur, Aurangabad and Nashik divisions of Maharashtra. About 2-5 per cent annual yield growth rates of gram in districts belonging to Amravati, Latur, Aurangabad and Nashik divisions of Maharashtra have ultimately resulted in 2.63 per cent annual yield growth of gram crop for the state of Maharashtra during the period between 1996-97 and 2007-08. In fact, gram happens to be the only rabi pulse crop, which is cultivated in almost all the districts of Maharashtra with the sole exception of some of the districts of Konkan division of Maharashtra. However, different divisions have not only shown varying level of their share in area and production of the crop but also varying annual growth with respect to area, production yield of gram crop during the past one decade.

It is to be noted that though mung and urid crops showed negative area, production and yield growth, the positive area, production and yield growth of tur and gram have ultimately led to significant expansion in area, production and yield of total pulse crop in the state of Maharashtra during the period between 1996-97 and 2007-08. This is mainly due to the fact that tur and gram account for more than 60 per cent share in total area under pulse crops of Maharashtra, and that these two important pulse crops have shown significant growth in their area production and yield during the past one decade. District-wise annual growth rate estimates with respect to area, production and yield of total pulse crops in Maharashtra encompassing the period between 1996-97 and 2007-08 are shown in Table 2.11.

In the state of Maharashtra, the districts belonging to Nagpur, Amravati, Latur, Aurangabad and Nashik divisions account for more than 90 per cent area and production of pulse crops. Although Nashik and Aurangabad divisions have shown a decline in area under total pulse crop cultivation during the period between 1996-97 and 2007-08, this decline in area has not affected the overall expansion of area under pulse crops for the state of Maharashtra as divisions like Nagpur, Amravati and Latur are marked with about 1 per cent annual growth in area under pulse crops during this period. As a result, the area under various pulse crops in Maharashtra has grown at the rate of 0.79 per cent per annum between 1996-97 and 2007-08. Similarly, the production of pulse crops in Maharashtra has increased at the growth rate of 2.91 per cent per annum during the period between 1996-97 and 2007-08, mainly due to 2-5 per cent annual growth in pulse crop production during this period in districts belonging to Nagpur, Amravati, Latur, Aurangabad and Nashik divisions of Maharashtra. The yield growth of total pulses in

Maharashtra is estimated at 2.11 per cent per annum between 1996-97 and 2007-08, which could be attributed to substantial annual growth in yield level of pulses in districts belonging to Aurangabad, Nashik and Nagpur divisions of the State.

Table 2.11: Compound Annual Growth Rates (CAGR) over 1997-2008 (1996-97 to 2007-08) of Area, Production, Yield of Important Pulses Crops in Maharashtra: Total Pulses

Districts/Divisions	Area		Production		Yield	
	CAGR (%)	T-Value	CAGR (%)	T-Value	CAGR (%)	T-Value
Thane	2.35	2.12	2.46*	2.84	0.1	0.11
Raigad	3.4*	3.26	2.5**	2.25	-0.87	1.28
Ratnagiri	9.15*	4.45	6.17**	2.58	-2.73	1.19
Sindhudurg	15.36*	4.94	14.53*	4.70	-0.72	0.52
Konkan Division	4.72*	3.96	3.76*	4.00	-0.92	1.08
Nashik	-2.02**	2.24	0.39	0.22	2.46	2.22
Dhule	-4.56	2.12	-4.37	1.31	0.2	0.13
Nandurbar	-1.01	2.05	-1.39	0.79	-0.38	0.21
Jalgaon	0.19	0.49	1.72	1.02	1.53	0.96
Nashik Division	-0.32	0.79	0.78	0.55	1.1	0.83
Ahmednagar	1.25	0.88	3.34	1.13	2.07	1.09
Pune	0.39	0.27	0.54	0.28	0.15	0.18
Solapur	-3.13	1.29	-0.26	0.05	2.96	0.96
Pune Division	-0.39	0.25	1.46	0.49	1.86	1.14
Satara	-2.74	1.64	-2.5	1.18	0.26	0.22
Sangli	-1.81	0.81	-0.4	0.10	1.44	0.66
Kolhapur	0.29	0.40	1.76**	2.30	1.46	1.73
Kolhapur Division	-1.95	1.31	-0.87	0.37	1.1	0.91
Aurangabad	-1.62*	2.69	5.29	1.97	7.02*	3.08
Jalna	-1.2*	3.65	3.3	1.24	4.55	1.88
Beed	1.36	1.72	7.82*	2.84	6.37**	2.46
Aurangabad Division	-0.55	1.27	5.27	2.15	5.86	2.66
Latur	-0.04	0.08	3.91	1.01	3.95	0.99
Osmanabad	3.71*	10.48	9.36	1.83	5.46	1.10
Nanded	2.39*	3.39	5.06	1.34	2.61	0.78
Parbhani	-1.25	0.85	4.44	1.11	5.76	1.52
Hingoli	1.5**	2.45	8.74*	4.93	7.12*	5.60
Latur Division	2.14*	5.29	7.4	2.00	5.15	1.44
Buldhana	1	0.89	1.27	0.39	0.26	0.09
Akola	-2.31	0.96	-2.51	0.75	-0.21	0.09
Washim	0.36	0.60	0.27	0.15	-0.09	0.07
Amravati	2.1*	3.27	2.23	1.19	0.13	0.09
Yavatmal	0.09	0.13	1.24	0.63	1.15	0.62
Amravati Division	1.31**	2.64	1.88	0.93	0.56	0.33
Wardha	3.33*	5.50	6.1	2.06	2.69	0.93
Nagpur	1.9	1.99	2.82	0.46	0.91	0.14
Bhandara	-7.9*	3.23	-6.12	1.93	1.94	1.21
Gondia	1.03	0.75	-0.77	0.37	-1.78	1.80
Chandrapur	0.73	0.50	-0.09	0.03	-0.81	0.43
Gadchiroli	-1.22	0.80	-1.95	0.74	-0.73	0.39
Nagpur Division	0.86	0.86	2.94	1.39	2.06	1.05
Maharashtra State	0.79	1.95	2.91	1.70	2.11	1.40

Source: Computation are based on the figures/data obtained from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'

Note: 1) * and ** represent significance of growth rates at 1 and 5 per cent level of probability

2) Some of the districts of Maharashtra were carved after 1996-07, and, therefore, growth rates are from 1998-99 to 2007-08 for Nandurbar and Washim, from 1999-2000 to 2007-08 for Hingoli and Gondia

The overall analysis drawn from growth trends with respect to area, production and yield of various pulses crops cultivated in Maharashtra clearly bring us closer to the fact that the pulse sector of Maharashtra has performed very well during the past one decade as major pulse crops like kharif tur and rabi gram cultivated in the State showed positive and significantly high area, production and yield growth during this period. However, negative growth rates associated with mung and udid with respect to their area, production and yield could be considered as a matter of concern, though these declining trends in area production and yield of mung and udid crops have not affected overall rise in area, production and yield of total pulse crops cultivated in Maharashtra during the period between 1996-97 and 2007-08. Another positive feature of pulse sector of Maharashtra is the rising share of pulse crops in GCA of Maharashtra in the face of falling share of cereals in GCA of the State, especially in more recent times. Not only this, the yield growth of pulse crops is found to be even higher than sugarcane and cotton crop cultivated in the state of Maharashtra. Even the production growth of pulse crop is noticed to be higher than production growth of sugarcane during the past one decade. However, the pulse sector of Maharashtra has to still do lot of catching especially when some of the pulse crops like mung and udid are showing negative growth in their area, production and yield. Since the demand for these two pulses has always exceeded supply, there is need to bring more area under mung and udid crop cultivation in order to augment their production in the state of Maharashtra. Equally important is the improvement in yield levels of mung and udid crop as they have been showing negative yield growth in Maharashtra over the past one decade.

CHAPTER – III

DEMOGRAPHIC PROFILE AND CROPPING PATTERN OF THE STUDY REGION

This chapter mainly deals with the socio-economic profile of sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed since the socio-economic characteristics of farmers have a profound influence on the decision making process and profitability of crop enterprise. The resource endowments have been compared for different categories of sampled farmers belonging to Amravati and Beed districts of Maharashtra. The information relating to family size and composition, education status, caste composition, land use pattern, cropping pattern, irrigated area, sources of irrigation, etc. has been analysed and discussed for various categories of sampled farmers of Amravati and Beed districts. The knowledge of the background of the sampled farmers is essential since the viability of any enterprise heavily depends on the favorable attitudinal changes towards adoption of superior technical inputs or technique of production, which in turn, depends on technical skills and resource position of the farmers. Apart from providing general background information of the sampled farmers, this chapter also provides a general overview of Maharashtra and also the selected sampled districts of the state of Maharashtra.

3.1 General Overview: Maharashtra State

Maharashtra, positioned between $16^{\circ}.4'$ and $22^{\circ}.1'$ North Latitude and $72^{\circ}.6'$ and $80^{\circ}.9'$ East Longitudes, and located on the west coast abutting the Arabian Sea and carved out as a linguistic entity of Marathi speaking people, is the second largest state in terms of population and the third largest in terms of area. As per 2001 census figures, Maharashtra accounted for 9.42 per cent of total human population of India with its spread over 3,07,713 square kilometers. The per capita income of Maharashtra is estimated to be 40 per cent higher than the all-India average. Secondary and tertiary sectors account for significant share in total annual income of Maharashtra. Agriculture has not only made the state self-sufficient in foodgrains but also an inclination towards cultivation of commercial crops has also given rise to a vibrant agro-processing industry in the state, though mostly confined to sugarcane and to some extent cotton and fruits and

vegetables. The extensive cultivation of sugarcane in western region of the state has reduced the scope for equity in sharing a precarious resource, i.e., water for irrigation.

Maharashtra also occupies second position in India in terms of urban population with about 43 out of every 100 persons living in towns and cities. States like Gujarat, Madhya Pradesh, Chhatisgarh, Andhra Pradesh and Karnataka surround the state of Maharashtra. It has 720 km long coastline stretched from Daman in the north to Goa in the south. It falls in the resource development zone called the Western Plateau and Hill Regions, which is one of the 15 such zones of India divided on the basis of agro-climatic features. Maharashtra's topography is diverse. It is classified into five broad regional groups such as Greater Mumbai, Western Maharashtra, Marathwada, Konkan and Vidarbha, and six revenue divisions for administrative purposes like Navi Mumbai, Nashik, Pune, Aurangabad, Nagpur and Amravati. All the 35 districts of Maharashtra are divided amongst these six divisions.

Konkan division consists of Mumbai, Thane, Raigad, Ratnagiri and Sindhudurg districts on the coast where landholdings are small but evenly distributed with no irrigation facilities. Nashik, Dhule, Nandurbar, Jalgaon and Ahmednagar districts with characteristics like large tribal population, large landholdings, high level of landlessness, forests, a few fertile tracts and good rainfall comprise the Nashik division. Pune division is comprised of Pune, Sangli, Satara, Kolhapur and Solapur districts and witnesses relatively lower rainfall with its smaller landholding being served by canal and wells. The districts belonging to Marathwada region like Aurangabad, Jalna, Parbhani, Hingoli, Nanded, Osmanabad, Beed and Latur constitute the Aurangabad division and are culturally well tied as all of them represent the erstwhile State of Hyderabad. The region is rocky and dry with low and uncertain rainfall, large landholdings and some landlessness. One part of Vidarbha region comprising Buldhana, Akola, Amravati, Washim and Yavatmal districts is administered by Amravati division and rest of this region comprising Nagpur, Wardha, Bhandara, Gondia, Chandrapur and Gadchiroli districts stands governed by Nagpur division. The two divisions of Vidarbha cover part of a plateau characterized by deep block soil, assured rainfall, medium and large landholdings, and high levels of landlessness. The districts like Bhandara, Gondia, Chandrapur and Gadchiroli have a large tribal population and forest cover.

The total human population of Maharashtra stood at 7,89,37,000 according to 1991 census and 9,68,79,000 as per 2001 census with 61 per cent population belonging to

rural and 39 per cent to urban area. These estimates are concomitant of the fact that there has been 23 per cent rise in human population in Maharashtra in 2001 over 1991-census figures. The population density in the state has also grown from 257 persons per square km in 1991 to 315 persons per square km in 2001.

The state of Maharashtra is comprised of 336 towns, 326 talukas, 43,027 villages and 1,53,44,435 households with 60 per cent belonging to rural and 40 per cent to urban areas. Out of the total human population, around 11 per cent belong to scheduled castes and 9 per cent to scheduled tribes. The overall literacy rate of Maharashtra is relatively high among males as compared to females. The literacy rate of Maharashtra among males is found to be 86 per cent in contrast to 67 per cent among females. Further, occupational break-up of Maharashtra reveals that out of the total population, about 57 per cent are non-workers, 4 per cent marginal workers and 39 per cent main workers with 13 per cent cultivators and 11 per cent agricultural labourers. The remaining 15 per cent of total 39 per cent working population of Maharashtra are engaged in other activities such as livestock, forestry, fishing, horticulture, etc., activities, mining and quarrying, manufacturing, processing, repairing, etc., construction, trade and commerce, transport, storage and communication, etc.

Maharashtra's net sown area stands at around 1,77,44,000 hectares, of which 18.5 per cent is irrigated. Well irrigation accounts for around 55 per cent of the total irrigated area of Maharashtra. The lower proportion of area under irrigation renders agriculture vulnerable to draughts, resulting in periodic fluctuation in farm output, which in a normal year is only 90 per cent of the State's total foodgrain requirement. The cropping intensity of Maharashtra is relatively higher than irrigation intensity.

In spite of Maharashtra's higher level of economic growth and despite being one of the higher-income States with growth rates exceeding several other States, Maharashtra was ranked third among 17 states in 1991 in terms of Human Development Index (HDI) with a HDI value of 0.532.

Though India has become self sufficient in foodgrains production in spite of tremendous increase in population, mere self sufficiency in agriculture is not the chief objective of Maharashtra, which accords higher priority to assuring more remunerative net income to the farmers through efficient and sustainable use of available resources. The state has been implementing various schemes from time to time not only to increase agricultural production and exports but also to encourage agro-processing industries with

a view to reap the benefits of liberalized economy and global trade. Agricultural department in the state is firmly heading towards economic progress along with self-sufficiency through agriculture with the ultimate goal of achieving important position in the global agriculture produce market. The innovative horticulture plantation scheme under employment guarantee scheme implemented by the state is a part of this policy.

3.2 General Overview: Study Districts

The NFSM Amravati district is situated between $20^{\circ}.32'$ and $21^{\circ}.46'$ North Latitudes and $76^{\circ}.37'$ and $78^{\circ}.27'$ East Longitudes. This essentially indicates that Amravati District is located in the Deccan plateau. The district occupies an area of 12,235 km². The district is bounded by Betul district of Madhya Pradesh in the north, and by the districts of Maharashtra like Nagpur in the northeast, Wardha in the east, Yavatmal in the south, Washim in the southwest, and Akola and Buldhana in the west. The Amravati district is divided into 14 Talukas namely, Dharni, Chikhaldara, Ajangaon, Achalpur, Chandurbajar, Morshi, Barud, Tivsa, Amravati, Bhatkuli, Daryapur, Nandgaon Khed, Chandur (Rly), Dhamangaon (Rly), and six sub-divisions viz. Amravati, Daryapur, Achalpur, Morshi, Dharni and Chandur (Rly).

Amravati is one of the most fertile districts of the Vidharva region. Agriculture assumes prime importance in the economy of the district since it is the main occupation of people. Rainfall plays an important role in determining cropping pattern of the district. In 2008, the minimum rainfall of 389.00 mm was noticed in Achalpur center and maximum of 1212.20 mm in Chikhaldara center during the period between June and September. Average annual rainfall in the district stands at 841.80 mm. Soils along the banks of rivers are deep and clayey. The main rivers in Amravati district are Tapi, Purna, Chandrabhaga, Pedhi, Wardha and Shahanoor, whereas the dams in Amravati District include Upper Wardha Project, Lower Wardha Project, Chandrabhaga Project, Bembala Project, Sapan Project, and Purna Project.

The 2001 census figures reveal the total human population of Amravati district to be 26,06,063 persons with 65 per cent of it belonging to rural and 35 per cent to urban area. For every 1000 male population of the district, the female population works out at 938. The literacy rate of the district stands at 82.54 per cent with 79.2 per cent rural and 88.8 per cent in urban area. The male literacy is noticed to be higher at 88.91 per cent as against female literacy of 75.73 per cent. The major crops cultivated in Amravati district encompass wheat, gram, cotton, jowar, tur, mung, sesamum, gram, sunflower, orange,

groundnut, soybean, chilli, banana and orange. The general profile of Amravati district also shows several schemes being implemented by the department of agriculture, which among others mainly include: (a) integrated Watershed Development Programme, (b) Fruit Cultivation under EGS, and (c) National Agriculture Insurance scheme, and (d) scheme of National food Security Mission for pulse crops.

The non-NFSM Beed district is situated in the Deccan black basalt stone, ranges of Balaghat that constitutes main range from Ahmednagar in the west, to the border of district Beed in the East. This range divides the district into two parts. The plain area in the North is called as Gangathadi (bank of Ganga-Godavari) and the higher part is called as Ghat at Balaghat. The district is positioned between $18^{\circ}.3'$ and $19^{\circ}.3'$ North Latitude and $74^{\circ}.5'$ and $76^{\circ}.6'$ East Longitude. The district receives about 666 mm annual average rainfalls. The district encompasses 1365 villages, 11 talukas, 11 Panchayat Samitees, 1018 Grampanchayat and is spread over 10,615 square km.

As per 2001 census figures, the total human population of Beed district is 2,160 thousand persons. About 82 per cent of the total human population of Ahmednagar district belongs to rural area and the remaining 18 per cent to urban area. The sex ratio is noticed to be invariably in favour of males. The female population of Ahmednagar district works out at 904 for every 1000 males. The literacy rate of the district stands at 60.48 per cent with male literacy being 80.69 per cent and female literacy being 55.38 per cent. As per recent estimates, the district encompasses 1069 thousand hectares of geographical area, 881 thousand hectares of cropped area, 961 thousand hectares of net sown area, and 305 thousand hectares of total irrigated area. The major crops cultivated in Beed district encompass wheat, paddy, kharif jowar, gram, tur, mung, udid, sugarcane, chilli, onion, tomato, cotton, groundnut, sunflower, sesamum, etc. The statistics also reveal that by the end of June 2002, some 3 major and 16 medium irrigation projects were completed in the district of Beed.

Having provided broad overview with respect to the state of Maharashtra and also for the study NFSM and non-NFSM districts, especially in terms of their population, geographical position, soil type, extent of irrigation, rainfall, implementation of various schemes, and the crops under cultivation, the subsequent section chiefly throws light on the estimates relating to socio-economic status of sampled farmers and their land utilization and cropping pattern with extension to area under irrigation for various crops for the sampled districts of the state of Maharashtra.

3.3 Family Size of NFSM and Non-NFSM District Farmers

Running a crop enterprise is generally a labour intensive operation where the composition and size of the family of a farmer are important considerations. The viability of a crop enterprise at village level often depends on such important factors. Information on family size of sampled farmers of NFSM district of Amravati and non-NFSM district of Beed is presented in Table 3.1 and Table 3.2.

The average size of family consisted of 5 persons with 4 adults and 1 child in the case of sampled farmers drawn from Amravati district since 50 sampled farmers consisted of 249 family members encompassing 197 persons belonging to adult males and females and 52 children (Table 3.1). The sex ratio of adults was invariably in favour of males in this district. All the categories of sampled farmers belonging to Amravati district showed a family size of 5 persons with by and large same number of adult and child population on an average per household basis.

Table 3.1: Family Size Composition of NFSM Amravati District

Category	Sample Size	Adults			Children	Total
		Males	Females	Total		
Marginal	15	29	26	55	17	72
Small	19	44	36	80	15	95
Medium	10	21	18	39	12	51
Large	6	11	12	23	8	31
Total	50	105	92	197	52	249

In the case of sampled farmers belonging to Beed district, the average family size consisted of nearly 6 members with 5 adult males and females and one child. This was mainly due to the fact that the 50 sampled farmers of this district had 277 members encompassing 206 persons belonging to adult males and females and 71 children (Table 3.2). The sex ratio of adults was again invariably in favour of males in Beed district. The family size for the sampled farmers belonging to Beed district was estimated at 5 persons for marginal and small category, nearly 6 for medium and 8 for large category with an overall average of the same at nearly 6 persons for the average category of farmers belonging to non-NFSM district of Beed.

Table 3.2: Family Size Composition of Non-NFSM Beed District

Category	Sample Size	Adults			Children	Total
		Males	Females	Total		
Marginal	14	26	20	46	24	70
Small	17	35	32	67	22	89
Medium	13	31	28	59	13	72
Large	6	15	19	34	12	46
Total	50	107	99	206	71	277

Thus, the family size of sampled farmers of Amravati and Beed district differed considerably. While the family size of sampled farmers belonging to Amravati district remained by and large same at 5 persons for various categories of farmers, the size of family was found to increase from 5 to 8 persons with an average of 6 persons in the case of sampled farmers belonging to Beed district, showing a rise in family size with the increase in land holding size of farmers.

3.4 Educational Status of NFSM and Non-NFSM District Farmers

The standard of education has a definite bearing on a farmer's response to improved technology and extension services. A responsive and enlightened farmer only acts to improve technology and market performance because of his higher motivation that helps him to take effective managerial decisions to contribute more to the market, to diversify his farm business and thereby, to earn more. Such motivated responsive farmers are very much needed to run any professional enterprise that warrants quality managerial inputs. In a village set up, the decision maker of a family is usually either its head or any other elderly economically active person of this family. All decisions regarding primary and secondary occupations that should be practiced by a family are taken by such a person. However, the level of education of other members of the family could be equally important in the decision making process if they have motivation towards gaining knowledge about modern techniques of production. Since such decision makers have important roles in determining the health of a crop enterprise, it was thought prudent and desirable to ascertain the education level of such members in case of producer family.

Information relating to the educational status of head of the household and also the education profile of adult population encompassing males and females is provided in Table 3.3 for the sampled farmers belonging to Amravati district and in Table 3.4 in the case of sampled farmers of Beed district.

The educational status of head of the household was found to be quite high in the case of sampled farmers of Amravati district as 41 out of 50 heads of households' attained education either up to secondary level or beyond (Table 3.3). Among various categories of farmers of Amravati district, the marginal category showed higher number of their heads attaining education up to secondary and higher level as compared to other categories of farmers since 14 out of 15 heads for marginal category, 16 out of 19 heads of small, 6 out of 10 heads of medium category, and 5 out of 6 heads of large category had obtained education up to secondary and above level. There were only two heads of

households in Amravati district who turned out to be illiterate. In this sequel, 7 heads of households in Amravati district attained education up to primary level.

Table 3.3: Education Status of Head of Household of NFSM Amravati District

Category	Sample Size	Illiterates	Primary	Secondary and Above	Total
Marginal	15	1	-	14	15
Small	19	1	2	16	19
Medium	10	-	4	6	10
Large	6	-	1	5	6
Total	50	2	7	41	50

As for educational status, about 93 per cent heads of households in marginal category, 84 per cent in small, 60 per cent in medium and 83 per cent in large category attained education up to secondary and higher level in the NFSM district of Amravati (Table 3.3 (a)). The general trend in Amravati district showed that 82 per cent heads of households had attained education up to secondary and above level, 14 per cent up to primary level and 4 per cent did not attain any education and turned out to be illiterate.

Table 3.3 (a): % Distribution of Education Status of Head of Household of NFSM Amravati District (Percent Distribution)

Category	Sample Size	Illiterates	Primary	Secondary and Above	Total
Marginal	15	6.67	-	93.33	100.00
Small	19	5.26	10.53	84.21	100.00
Medium	10	-	40.00	60.00	100.00
Large	6	-	16.67	83.33	100.00
Total	50	4.00	14.00	82.00	100.00

The education profile of adult population among the sampled farmers of Amravati district was also high as 153 out of 197 adult members in this district had attained education up to secondary and higher level with small large category of farmers showing higher number of their members attaining education up to secondary and above level as compared to marginal and medium category (Table 3.3 (b)). In Amravati district, 24 out of 197 adult members were illiterate, whereas 20 out 197 adult members attained education up to primary level.

Table 3.3 (b): Education Profile of the Adult Population in NFSM Amravati District

Category	Sample Size	Illiterates	Primary	Secondary and Above	Total
Marginal	15	7	6	42	55
Small	19	7	5	68	80
Medium	10	8	7	24	39
Large	6	2	2	19	23
Total	50	24	20	153	197

The percentage distribution of education profile of adult population belonging to NFSM Amravati district revealed that 78 per cent members of sampled farmers in general

attained education up to secondary and above level, 10 per cent up to primary level and 12 per cent members were illiterate (Table 3.3 (c)). The illiteracy among members of sampled farmers of Amravati district was more pronounced in the case of marginal and medium category.

Table 3.3 (c): % Distribution Education Profile of the Adult Population in NFSM Amravati District (Percent Distribution)

Category	Sample Size	Illiterates	Primary	Secondary and Above	Total
Marginal	15	12.73	10.91	76.36	100.00
Small	19	8.75	6.25	85.00	100.00
Medium	10	20.51	17.95	61.54	100.00
Large	6	8.70	8.70	82.61	100.00
Total	50	12.18	10.15	77.66	100.00

Among various categories of sampled farmers belonging to Amravati district, the proportion of members of attaining education up to secondary and above level was 76 per cent for marginal category, 85 per cent for small, 62 per cent for medium and 83 per cent for large category with an average of 78 per cent for the average category of farmer. Similarly, the proportion of members attaining education up to primary level was 11 per cent for marginal category, 6 per cent for small, 18 per cent for medium and 9 per cent for large category with an average of 10 per cent for the average category of farmer.

In the case of non-NFSM Beed district, there were 34 out of 50 heads of households who attained education up to secondary and higher level, indicating relatively low education status of heads of the households of this district as compared to the households belonging to Amravati district (Table 3.4). The educational status of heads of the households increased with size of land holding in the district of Beed since 7 out of 14 heads of marginal category, 11 out of 17 heads of small category, 10 out of 13 heads of medium category and 6 out of 6 heads of large category had attained education up to secondary and higher level. There were 6 heads of households who were illiterate in the district of Beed, whereas 10 heads of households attained education up to primary level.

Table 3.4: Education Status of Head of Household of Non-NFSM Beed District

Category	Sample Size	Illiterates	Primary	Secondary and Above	Total
Marginal	14	3	4	7	14
Small	17	3	3	11	17
Medium	13	-	3	10	13
Large	6	-	-	6	6
Total	50	6	10	34	50

Among various categories of sampled farmers drawn from Beed district, the heads of households receiving education up to secondary and higher level was 50 per cent in

marginal category, 65 per cent in small, 77 per cent in medium and 100 per cent in large category with an average of 64 per cent for the average category of farmers, indicating rise in proportion of heads of households receiving education up to secondary and higher level with the rise in their land holding size (Table 3.4 (a)). The proportion of heads of households attaining education up to primary level was found to be 20 per cent in Beed district, whereas 12 per cent of heads of households did not attain any education and turned out to be illiterate.

Table 3.4 (a): % Distribution of Education Status of Head of Household of Non-NFSM Beed District (Percent Distribution)

Category	Sample Size	Illiterates	Primary	Secondary and Above	Total
Marginal	14	21.43	28.57	50.00	100.00
Small	17	17.65	17.65	64.71	100.00
Medium	13	-	23.08	76.92	100.00
Large	6	-	-	100.00	100.00
Total	50	12.00	20.00	68.00	100.00

The overall education profile of adult population of sampled farmers drawn from Beed district showed that out of 206 adult members, 136 attained education up to secondary and higher level, 33 up to primary level and 37 adult members did not receive any education (Table 3.4 (b)). Among various categories, adult members of sampled farmers drawn from Beed district showed trend similar to the education level of their heads of the households as members receiving education up to secondary and higher level was 22 out of 46 in marginal category, 44 out of 67 in small, 43 out of 59 in medium, and 27 out of 34 in large category with a sum of 136 out of 206 in the case of average category of farmer. In Beed district, 37 out of 206 adult members did not receive any formal education, whereas 33 adult members received education up to primary level.

Table 3.4 (b): Education Profile of the Adult Population in Non-NFSM Beed District

Category	Sample Size	Illiterates	Primary	Secondary and Above	Total
Marginal	14	15	9	22	46
Small	17	10	13	44	67
Medium	13	9	7	43	59
Large	6	3	4	27	34
Total	50	37	33	136	206

In the non-NFSM district of Beed, the proportion of adult population receiving education up to secondary and higher level increased with the rise in land holding size of farmers as it was noticed to be 48 per cent for marginal category, 66 per cent for small, 73 per cent for medium and 79 per cent for large category with an average of 66 per cent for the average category of farmers (Table 3.4 (c)). A negative trend in this respect was noticed for those adult members who received education up to primary level or did not

receive any education as proportion of adult members receiving education up to primary level declined with the rise in land holding size of farmers, and the proportion of illiterate adult members also declined with the rise in land holding size of sampled farmers. .

Table 3.4 (c): % Distribution Education Profile of the Adult Population in Non-NFSM Beed District (Percent Distribution)

Category	Sample Size	Illiterates	Primary	Secondary and Above	Total
Marginal	14	32.61	19.57	47.83	100.00
Small	17	14.93	19.40	65.67	100.00
Medium	13	15.25	11.86	72.88	100.00
Large	6	8.82	11.76	79.41	100.00
Total	50	17.96	16.02	66.02	100.00

The general trend in Beed district showed that about 66 per cent of adult members belonging to sampled farmers received education up to secondary and higher level, 16 per cent up to primary level and the remaining 18 per cent did not receive any formal education and, therefore, were treated as illiterate.

The foregoing observations clearly underscore the fact that the sampled farmers belonging to NFSM Amravati district were relatively more educated as compared to their counterpart in non-NFSM Beed district. While about 82 per cent head of the sampled households of Amravati district received education up to secondary and higher level, this proportion for Beed district stood at only 68 per cent. Even the adult members of sampled households showed higher educational status in Amravati district as 77 per cent adult members of sampled households of Amravati district attained education up to secondary and higher level, whereas this proportion for Beed district was only 66 per cent. The illiteracy among heads of households was found to be more in the district of Beed as against Amravati district. Similarly, the illiteracy among adult members was more pronounced in the case of Beed district as compared to Amravati district. However, the proportion of head of the households attaining education up to primary level was relatively higher in Beed district as compared to Amravati district, which also held true in the case of adult population.

3.5 Caste Composition of NFSM and Non-NFSM Farmers

Information relating to caste composition of various categories of sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed is provided in Table 3.5 and Table 3.6.

In the case of NFSM district of Amravati, majority of the sampled farmers belonged to Other Backward Class (OBC) since 37 out of 50 sampled farmers belonged

to this category (Table 3.5). The number of sampled farmers belonging to Scheduled Caste (SC) and Scheduled Tribe (ST) was 7 and 5, respectively, whereas only 1 sampled farmer belonged to general category in the district of Amravati. Large, medium and small category invariably showed higher number of farmers belonging to OBC category in the district of Amravati.

Table 3.5: Caste Composition of Farmers in NFSM Amravati District

Category	Sample Size	SC	ST	OBC	Others	Total
Marginal	15	6	3	6	-	15
Small	19	1	1	17	-	19
Medium	10	-	1	8	1	10
Large	6	-	-	6	-	6
Total	50	7	5	37	1	50

A further analysis with respect to cast composition revealed that 74 per cent of the total sampled farmers of Amravati district belonged to OBC category, 10 per cent to ST, 14 per cent to SC and 2 per cent to general category (Table 3.5 (a)). Among various categories of sampled farmers drawn from Amravati district, the proportion of farmers belonging to OBC category was 100 per cent for large category, 80 per cent for medium, 89 per cent for small and 40 per cent for marginal category.

Table 3.5 (a): % Distribution of Caste Composition of Farmers in NFSM Amravati District

Category	Sample Size	SC	ST	OBC	Others	Total
Marginal	15	40.00	20.00	40.00	-	100.00
Small	19	5.26	5.26	89.47	-	100.00
Medium	10	-	10.00	80.00	10.00	100.00
Large	6	-	-	100.00	-	100.00
Total	50	14.00	10.00	74.00	2.00	100.00

As for the non-NFSM district of Beed, as many as 41 out of 50 sampled farmers belonged to general category, 4 to OBC and 5 to SC category (Table 3.6). Interestingly, all the sampled farmers in small and large category belonged to general category in the district of Beed.

Table 3.6: Caste Composition of Farmers in Non-NFSM Beed District

Category	Sample Size	SC	ST	OBC	Others	Total
Marginal	14	5	-	2	7	14
Small	17	-	-	-	17	17
Medium	13	-	-	2	11	13
Large	6	-	-	-	6	6
Total	50	5	-	4	41	50

As for per cent distribution, about 82 per cent of the total sampled farmers of Beed district belonged to general category, 8 per cent to OBC and 10 per cent to SC category (Table 3.6 (a)). Among various categories of sampled farmers drawn from Beed

district, the proportion of farmers belonging to general category was 100 per cent for large category, 85 per cent for medium, 100 per cent for small and 50 per cent for marginal category. In the district of Beed, a significant proportion of marginal category of farmers belonged to SC category.

Table 3.6 (a): % Distribution of Caste Composition of Farmers in Non-NFSM Beed District

Category	Sample Size	SC	ST	OBC	Others	Total
Marginal	14	35.71	-	14.29	50.00	100.00
Small	17	-	-	-	100.00	100.00
Medium	13	-	-	15.38	84.62	100.00
Large	6	-	-	-	100.00	100.00
Total	50	10.00	-	8.00	82.00	100.00

Thus, two differing scenarios emerged in terms of caste composition of sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed. While majority of the sampled farmers in Amravati district belonged to the category of OBC, the district of Beed was found to show a significant proportion of total sampled farmers belonging to general category since 74 per cent of total sampled farmers in Amravati district belonged to OBC category and 82 per cent of sampled farmers of Beed district belonged to general category.

3.6 Irrigated Area in NFSM Amravati and Non-NFSM Beed District

Details regarding extent of area under irrigation and sources of irrigation on the farms belonging to sampled farmers of NFSM district of Amravati and non-NFSM district of Beed are provided in Table 3.7 and 3.8.

In the district of Amravati, the total operational holding was estimated at 30.65 acres for marginal category, 68.58 acres for small, 71.00 acres for medium and 76.56 acres for large category with a sum of 246.79 acres for all the sampled farmers put together. All the categories of sampled farmers belonging to Amravati district showed their entire area under rainfed conditions (Table 3.7). The area under irrigation was, therefore, nil in the NFSM district of Amravati as the entire area of sampled farmers of this district was unirrigated (Table 3.7 (a)).

Table 3.7: Irrigation Details for NFSM Amravati District

Category	Sample Size	Irrigated					Unirrigated	Total
		Canal	Tubewell	Tank	Others	Total		
Marginal	15	-	-	-	-	-	30.65	30.65
Small	19	-	-	-	-	-	68.58	68.58
Medium	10	-	-	-	-	-	71.00	71.00
Large	6	-	-	-	-	-	76.56	76.56
Total	50	-	-	-	-	-	246.79	246.79

Table 3.7 (a): % Distribution of Irrigated Area by Source in NFSM Amravati District

Category	Sample Size	Irrigated					Unirrigated	Total
		Canal	Tubewell	Tank	Others	Total		
Marginal	15	-	-	-	-	-	100.00	100.00
Small	19	-	-	-	-	-	100.00	100.00
Medium	10	-	-	-	-	-	100.00	100.00
Large	6	-	-	-	-	-	100.00	100.00
Total	50	-	-	-	-	-	100.00	100.00

As for the non-NFSM district of Beed, the total operational holding was estimated at 27.88 acres for marginal category, 73.25 acres for small, 92.43 acres for medium and 185.25 acres for large category with a sum of 378.81 acres for all the sampled farmers put together (Table 3.8). The unirrigated area in the district of Beed was estimated at 27.88 acres for marginal category, 59.25 acres for small, 71.43 acres for medium and 100.25 acres for large category with a sum of 258.81 acres for all the sampled farmers put together. In general, the area under irrigation with respect to average category of sampled farmers of Beed district was found to be 31.68 per cent of the total operational holding with large farmers showing higher proportion of their operational holding under irrigation since proportion of irrigated area to total operational holding was found to be 45.88 per cent for large category, 22.72 per cent for medium and 19.11 per cent for the small category of farmers (Table 3.8 (a)).

Table 3.8: Irrigation Details for Non-NFSM Beed District

(Area in Acres)

Category	Sample Size	Irrigated					Unirrigated	Total
		Canal	Tubewell	Tank	Others	Total		
Marginal	14	-	-	-	-	-	27.88	27.88
Small	17	-	-	-	14.00	14.00	59.25	73.25
Medium	13	-	-	-	21.00	21.00	71.43	92.43
Large	6	-	15.00	-	70.00	85.00	100.25	185.25
Total	50	-	15.00	-	105.00	120.00	258.81	378.81

Note: Other irrigated include area irrigated by open well in the case of small category, and open well and river lift for medium and large categories of farmers

Table 3.8 (a): % Distribution of Irrigated Area by Source in Non-NFSM Beed District

Category	Sample Size	Irrigated					Unirrigated	Total
		Canal	Tubewell	Tank	Others	Total		
Marginal	15	-	-	-	-	-	100.00	100.00
Small	19	-	-	-	19.11	19.11	80.89	100.00
Medium	10	-	-	-	22.72	22.72	77.28	100.00
Large	6	-	8.10	-	37.79	45.88	54.12	100.00
Total	50	-	3.96	-	27.72	31.68	68.32	100.00

In the case of non-NFSM district of Beed, about 4 per cent of the total operational holding of average category of sampled farmers was under tubewell irrigation and 28 per

cent under other sources of irrigation that encompassed open well and river lift. Tubewell irrigation was noticed only in the case of medium category of sampled farmers who showed 8 per cent of their operational holding under this source of irrigation. Majority of the farmers belonging to the district of Beed showed open well and river lift as the major source of irrigation since other source of irrigation accounted for 38 per cent of the total operational holding in the case of large category, 23 per cent for medium category and 19 per cent for large category with an average of 28 per cent for the average category of sampled farmers of Beed district.

Thus, the irrigation status was found to be entirely different in the NFSM district of Amravati and non-NFSM district of Beed. While the entire area of sampled farmers in Amravati district was under unirrigated or rainfed conditions, the sampled farmers of non-NFSM Beed district showed 32 per cent of their total operational holding under irrigation and 68 per cent under rainfed conditions. In the non-NFSM district of Beed, open well and river lift were the main sources of irrigation. The irrigated area under open well and river lift accounted for as much as 28 per cent share in total operational holding of the average category of sampled farmers of Beed district. The area under tubewell irrigation was only 4 per cent for the average category of sampled farmers of Beed district. The marginal category of sampled farmers of Beed district showed their entire area under rainfed conditions.

3.7 Cropping Pattern of NFSM and Non-NFSM Farmers

Cropping pattern assumes considerable significance in determining farmer's net annual income through crop husbandry. Though farmers prefer to grow those crops that yield higher net returns, they are constrained to grow several high value field crops due to varied agro-climatic conditions as well as topography and soil type across various regions or within the same region. In general, the cropping pattern of irrigated area differs from the cropping pattern of un-irrigated area. While on one hand, high value commercial field crops are usually grown under irrigated conditions, low value subsistence crops, on the other hand, find place under rainfed conditions. However, there are several important course cereal and pulses crops like *jowar*, *mung*, *tur*, *etc.* that find place in terms of output and area allocation even under dry or rainfed conditions. The information on average area allocation (average of 2006-07, 2007-08, 2008-09) under different crops grown under different seasons by the sampled farmers of NFSM district of Amravati and non-NFSM district of Beed is provided in Table 3.9 and Table 3.10. The cropping pattern

of various categories of sampled farmers of Amravati and Beed districts for individual years of 2006-07, 2007-08 and 2008-09 is brought out in Appendix 1 and 2.

In the NFSM district of Amravati, the cropping pattern of sampled farmers was seen to be in favour of cultivating soybean, jowar, cotton, bajra, sunflower, ladyfinger, mung and tur in kharif season and gram and sunflower in rabi season. All the categories of sampled farmers put together of Amravati district showed a net sown area of 227.74 acres in kharif season, which encompassed 167.06 acres of area under pulse crops like mung and tur, and 60.67 acres area under other crops like soybean, jowar, cotton, bajra and some other crops viz. sunflower and ladyfinger (Table 3.9). The net sown area with all the sampled farmers of Amravati district put together was estimated at 158.23 acres in rabi season, which encompassed 149.69 acres under gram and 8.54 acres under other crop like sunflower. Thus, pulses crops predominated in the cropping pattern of sampled farmers of Amravati district since the average category of farmer of this district showed 73 per cent of net sown area under pulses crops in kharif season and as high as 95 per cent in rabi season (Table 3.9 (a)). The other crops that dominated the cropping pattern of sampled farmers of Amravati district in kharif season were cotton and jowar with a share of 8-9 per cent in the net sown area of the average category of farmers.

Table 3.9: Cropping Pattern – Over All Seasons: NFSM Amravati District
(Area in Acres; Average of 2006-07, 2007-08, 2008-09)

Category	Area Sown														
	Kharif Season										Rabi Season				
	Other Crops						Pulses				G. Total	Pulse	Other	Total	G Total
	Soybean	Jowar	Cotton	Bajra	Others	Total	Mung	Tur	Total	Gram		Sunflower			
Marginal	2.75	1.33	1.00	-	0.67	5.75	19.25	1.58	20.83	26.58	21.33	2.42	23.75	50.33	
Small	3.52	4.49	5.23	0.87	4.24	18.34	39.45	5.22	44.66	63.00	39.69	1.79	41.48	104.48	
Medium	3.50	5.25	7.00	-	3.00	18.75	44.08	5.42	49.50	68.25	43.17	2.00	45.17	113.42	
Large	4.33	6.50	6.67	-	0.33	17.83	47.40	4.67	52.07	69.90	45.50	2.33	47.83	117.73	
Total	14.10	17.57	19.90	0.87	8.24	60.67	150.18	16.88	167.06	227.74	149.69	8.54	158.23	385.97	

Note: In 2007-08 'Others' under other crops include Kharif Sunflower and in 2008-09, 'Others' under other crops include Kharif Sunflower and Ladyfinger

Table 3.9 (a): Cropping Pattern – Over All Seasons: NFSM Amravati District
(% of Total Area Sown; Average of 2006-07, 2007-08, 2008-09)

Category	Area Sown													
	Kharif Season										Rabi Season			
	Other Crops						Pulses				G. Total	Pulse	Other	Total
	Soybean	Jowar	Cotton	Bajra	Others	Total	Mung	Tur	Total	Gram		Sunflower		
Marginal	10.35	5.00	3.76	-	2.52	21.63	72.42	5.94	78.37	100.00	89.81	10.19	100.00	
Small	5.59	7.13	8.30	1.38	6.73	29.11	62.62	8.29	70.89	100.00	95.68	4.32	100.00	
Medium	5.13	7.69	10.26	-	4.40	27.47	64.59	7.94	72.53	100.00	95.57	4.43	100.00	
Large	6.19	9.30	9.54	-	0.47	25.51	67.81	6.68	74.49	100.00	95.13	4.87	100.00	
Total	6.19	7.71	8.74	0.38	3.62	26.64	65.94	7.41	73.36	100.00	94.60	5.40	100.00	

Among various categories of sampled farmers of Amravati district, marginal category of farmers showed higher proportion of net sown area under pulses crops in kharif season, and small, medium and large categories of farmers in rabi season. During kharif season, the area under pulses crops as proportion to net sown area was found to be about 78 per cent for marginal category, 71 per cent for small, 73 per cent for medium and 74 per cent for large category with an average of 73 per cent for the average category of farmer belonging to Amravati district. As for rabi season, the area under pulses crops as proportion to net sown area stood at about 90 per cent for marginal category, 96 per cent for small, 96 per cent for medium and 95 per cent for large category with an average of 95 per cent for the average category of farmer belonging to Amravati district.

The sampled farmers belonging to non-NFSM district of Beed showed their cropping pattern in favour of cultivating soybean, jowar, cotton, bajra, mung and tur in kharif season, and gram, sugarcane, jowar, wheat, onion, banana, etc. in rabi season. The sampled farmers of Beed district with all the categories put together showed a net sown area of 244.24 acres in kharif season, which encompassed 87.07 acres of area under pulse crops like mung and tur, and 157.17 acres area under other crops like soybean, jowar, cotton and bajra (Table 3.10). The net sown area with all the sampled farmers of Beed district put together was estimated at 190.78 acres in rabi season, which encompassed 85.63 acres under gram, 66.33 acres under sugarcane and 38.82 acres under other crops like jowar, wheat, sunflower, onion, banana, etc. Thus, the predominance of pulses crops in the cropping pattern of sampled farmers of Beed district was relatively much lower as compared to sampled farmers belonging to the district of Amravati.

Table 3.10: Cropping Pattern – Over All Seasons: Non-NFSM Beed District
(Area in Acres; Average of 2006-07, 2007-08, 2008-09)

Category	Area Sown														
	Kharif Season										Rabi Season				
	Other Crops						Pulses				G. Total	Pulse			Total
	Soybean	Jowar	Cotton	Bajra	Others	Total	Mung	Tur	Total	Gram		Sugarcane	Other		
Marginal	1.50	0.43	11.32	0.83	-	14.08	2.42	5.60	8.02	22.10	8.37	1.50	-	9.87	
Small	7.33	0.00	23.75	4.17	-	35.25	15.50	9.90	25.40	60.65	18.37	5.33	5.83	29.53	
Medium	5.67	0.92	38.67	0.17	-	45.42	7.25	18.07	25.32	70.73	11.57	6.17	12.89	30.63	
Large	10.08	0.00	37.00	15.33	-	62.42	14.67	13.67	28.33	90.75	47.33	53.33	20.09	120.75	
Total	24.58	1.35	110.73	20.50	-	157.17	39.83	47.24	87.07	244.24	85.63	66.33	38.82	190.78	

Note: i) In 2006-07, the total area under Rabi season include area under Gram, Sugarcane, and some other crops like Sunflower, Rabi Jowar, Wheat, Kardi, and Banana
ii) In 2007-08, the total area under Rabi season include area under Gram, Sugarcane, and some other crops like Rabi Jowar, Sunflower,, Wheat, Onion, and Banana
iii) In 2008-09, the total area under Rabi season include area under Gram, Sugarcane, and some other crops like Rabi Jowar, Wheat, Onion, and Kardi

The average category of farmer in Beed district showed 36 per cent of net sown area under pulses crops in kharif season and 45 per cent in rabi season (Table 3.10 (a)). In the non-NFSM district of Beed, the major crop that predominated in the cropping pattern of sampled farmers during kharif season was cotton, which alone accounted for 45 per cent share in the net sown area of the average category of farmers. During rabi season, sugarcane accounted for as much as 35 per cent share in the net sown area of the average category of farmer belonging to Beed district.

Table 3.10 (a): Cropping Pattern – Over All Seasons: Non-NFSM Beed District
(% of Total Area Sown; Average of 2006-07, 2007-08, 2008-09)

Category	Area Sown														
	Kharif Season									Rabi Season					
	Other Crops						Pulses			G. Total	Pulse		Other		Total
	Soybean	Jowar	Cotton	Bajra	Others	Total	Mung	Tur	Total		Gram	Sugarcane	Other		
Marginal	6.79	1.95	51.22	3.76	-	63.71	10.95	25.34	36.29	100.00	84.80	15.20	-	100.00	
Small	12.09	0.00	39.16	6.88	-	58.12	25.56	16.32	41.88	100.00	62.21	18.05	19.74	100.00	
Medium	8.02	1.30	54.67	0.24	-	64.22	10.25	25.55	35.80	100.00	37.77	20.14	42.09	100.00	
Large	11.11	0.00	40.77	16.89	-	68.78	16.17	15.06	31.22	100.00	39.20	44.17	16.63	100.00	
Total	10.06	0.55	45.34	8.39	-	64.35	16.31	19.34	35.65	100.00	44.88	34.77	20.35	100.00	

- Note: i) In 2006-07, the total area under Rabi season include area under Gram, Sugarcane, and some other crops like Sunflower, Rabi Jowar, Wheat, Kardi, and Banana
ii) In 2007-08, the total area under Rabi season include area under Gram, Sugarcane, and some other crops like Rabi Jowar, Sunflower,, Wheat, Onion, and Banana
iii) In 2008-09, the total area under Rabi season include area under Gram, Sugarcane, and some other crops like Rabi Jowar, Wheat, Onion, and Kardi

As for various categories of sampled farmers belonging to Beed district, medium category of farmers showed higher proportion of net sown area under pulses crops in kharif season, and marginal and small categories of farmers in rabi season. During kharif season, the area under pulses crops as proportion to net sown area was found to be about 36 per cent for marginal category, 42 per cent for small, 36 per cent for medium and 31 per cent for large category with an average of 36 per cent for the average category of farmer belonging to Beed district. In the case of rabi season, the area under pulses crops as proportion to net sown area was estimated at about 85 per cent for marginal category, 62 per cent for small, 38 per cent for medium and 39 per cent for large category with an average of 45 per cent for the average category of farmer belonging to Beed district. The large category of farmers of Beed district showed significantly high acreage under sugarcane crop in rabi season as 44 per cent of the net sown area of large category was under sugarcane during this season. Similarly, medium category of farmers of Beed district showed significantly high acreage under cotton crop in kharif season since 55 per cent of the net sown area of medium category was under cotton during this season.

The foregoing observations bring us closer to the fact that the cropping pattern of sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed differed significantly. While pulses crops predominated the cropping pattern of sampled farmers of Amravati district during both kharif and rabi seasons, the area predominance with respect to pulses crops was less for the sampled farmers drawn from the district of Beed. This is concomitant from the fact that the average category of farmer belonging to Amravati district showed 73 per cent of the net sown area under pulses crops in kharif season and 95 per cent in rabi season, whereas these proportions in the district of Beed were worked out at 36 per cent and 45 per cent. The average category of sampled farmers belonging to the district of Beed had about 45 per cent of net sown area under cotton crop in kharif season and 35 per cent of the net sown area under sugarcane in rabi season. In the case of non-NFSM district of Beed, some other rabi crops like jowar, banana, wheat, onion, etc. accounted for significant share in net sown area for the average category of sampled farmers.

3.8 Area under Pulses for NFSM and Non-NFSM Farmers

The empirical estimates with respect to average area (average of 2006-07, 2007-08, 2008-09) under pulses crops during kharif and rabi seasons across various categories of sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed are provided in Table 3.11 and Table 3.12.

In the NFSM district of Amravati, the average area under pulses encompassing the period between 2006-07 and 2008-09 was estimated at 167.06 acres in kharif season and 149.09 acres in rabi season for all the sampled farmers put together drawn from the district of Amravati, which included 150.18 acres of area under mung and 16.88 acres of area under tur in kharif season and entire 149.09 acres of area under gram in rabi season (Table 3.11). The area under mung and tur in kharif season and gram in rabi season increased with the increase in land holding size of sampled farmers of Amravati district. However, the proportion of area under mung to net sown area under pulses crops stood at 92 per cent for marginal category, 88 per cent for small, 89 per cent for medium and 91 per cent for large category with an overall average of 90 per cent for the average category of farmers drawn from the district of Amravati, whereas for tur crop this proportion was estimated at 8 per cent for marginal category, 12 per cent for small, 11 per cent for medium and 9 per cent for large category with an overall average of 10 per cent for the average category of farmers. In the case of rabi season, the entire net sown area under

pulse crop was found to be under gram crop for various categories of sampled farmers drawn from the district of Amravati (Table 3.11 (a)).

Table 3.11: Area Under Pulses: Over All Seasons: NFSM Amravati District

(Area in Acres; Average of 2006-07, 2007-08, 2008-09)

Category	Area Sown				
	Kharif Season			Rabi Season	
	Mung	Tur	Total	Gram	Total
Marginal	19.25	1.58	20.83	21.33	21.33
Small	39.45	5.22	44.66	39.69	39.69
Medium	44.08	5.42	49.50	43.17	43.17
Large	47.40	4.67	52.07	45.50	45.50
Total	150.18	16.88	167.06	149.69	149.69

Table 3.11 (a): % Distribution of Area Under Pulses: Over All Seasons: NFSM Amravati District

(Area in Acres; Average of 2006-07, 2007-08, 2008-09)

Category	Area Sown				
	Kharif Season			Rabi Season	
	Mung	Tur	Total	Gram	Total
Marginal	92.41	7.59	100.00	100.00	100.00
Small	88.33	11.69	100.00	100.00	100.00
Medium	89.05	10.95	100.00	100.00	100.00
Large	91.03	8.97	100.00	100.00	100.00
Total	89.90	10.10	100.00	100.00	100.00

As for the non-NFSM district of Beed, the average area under pulses for the period between 2006-07 and 2008-09 was estimated at 87.07 acres in kharif season and 85.63 acres in rabi season for all the sampled farmers put together drawn from the district of Beed, which encompassed 39.83 acres of area under mung and 47.24 acres of area under tur in kharif season and entire 85.63 acres of area under gram in rabi season (Table 3.12). In general, the area under pulses increased with the increase in land holding size of sampled farmers of Beed district, particularly in kharif season. However, the proportion of area under mung to net sown area under pulses in kharif season stood at 30 per cent for marginal category, 61 per cent for small, 29 per cent for medium and 52 per cent for large category with an overall average of 46 per cent for the average category of farmers drawn from the district of Beed, whereas for tur crop this proportion was estimated at 70 per cent for marginal category, 39 per cent for small, 71 per cent for medium and 48 per cent for large category with an overall average of 54 per cent for the average category of farmers. In the case of rabi season, the entire net sown area of pulse crop was found to be under gram crop for various categories of sampled farmers drawn from the district of Beed (Table 3.12 (a)). Therefore, in the non-NFSM district of Beed, tur crop in kharif season and gram in rabi season cornered significantly high share in net pulses sown area of the sampled farmers for the respective seasons.

Table 3.12: Area Under Pulses: Over All Seasons: Non-NFSM Beed District

(Area in Acres; Average of 2006-07, 2007-08, 2008-09)

Category	Area Sown				
	Kharif Season			Rabi Season	
	Mung	Tur	Total	Gram	Total
Marginal	2.42	5.60	8.02	8.37	8.37
Small	15.50	9.90	25.40	18.37	18.37
Medium	7.25	18.07	25.32	11.57	11.57
Large	14.67	13.67	28.33	47.33	47.33
Total	39.83	47.24	87.07	85.63	85.63

Table 3.12 (a): % Distribution of Area Under Pulses: Over All Seasons: Non-NFSM Beed District

(Area in Acres; Average of 2006-07, 2007-08, 2008-09)

Category	Area Sown				
	Kharif Season			Rabi Season	
	Mung	Tur	Total	Gram	Total
Marginal	30.17	69.83	100.00	100.00	100.00
Small	61.02	38.98	100.00	100.00	100.00
Medium	28.63	71.37	100.00	100.00	100.00
Large	51.78	48.25	100.00	100.00	100.00
Total	45.74	54.26	100.00	100.00	100.00

Thus, the sampled farmers belonging to the NFSM district of Amravati showed much higher area under pulses crops as against the sampled farmers drawn from the non-NFSM district of Beed. The area under pulses crops with all the sampled farmers put together was estimated at 167.06 acres in kharif and 149.69 acres in rabi season for the district of Amravati and 87.07 acres in kharif and 85.63 acres in rabi season for the district of Beed. During kharif season, while sampled farmers of Amravati district showed very high share (90 per cent) of mung crop in net sown area under pulse crops, this share was found to be high for tur crop (54 per cent) with respect to the sampled farmers of Beed district. However, all the sampled farmers of Amravati and Beed district showed the entire pulse crop area of rabi season under gram crop, though the area under this crop was much higher in the NFSM district of Amravati as against the non-NFSM district of Beed.

3.9 Share of Size-Groups in Pulse Farming for NFSM and Non-NFSM Districts

The estimates relating to average share (average of 2006-07, 2007-08, 2008-09) of various categories of sampled farmers in total area under pulse crops cultivated during both kharif and rabi seasons in the NFSM district of Amravati and non-NFSM district of Beed are provided in Table 3.13 and Table 3.14.

In the NFSM district of Amravati, the estimated 167.06 acres of area under pulses crops in kharif season encompassed 12.47 per cent share for marginal category, 26.73 per

cent share for small, 29.63 per cent share for medium and 31.17 per cent share for large category of sampled farmers, showing a rise in share in total area under kharif pulse crops with the rise in land holding size of farmers (Table 3.13). Similarly, the estimated 149.69 acres of area under pulses crops in rabi season in Amravati district encompassed 14.25 per cent share for marginal category, 26.51 per cent share for small, 28.84 per cent share for medium and 30.40 per cent share for large category of sampled farmers, showing an increase in share in total area under rabi pulse crops with the increase in land holding size of farmers (Table 3.13).

Table 3.13: Share of Different Size-Groups in Pulse Farming: Over All Seasons: NFSM Amravati District (Area in Acres; Average of 2006-07, 2007-08, 2008-09)

Category	Area Sown			
	Kharif Season		Rabi Season	
	Total Area Under Pulses	% Share in Total Area	Total Area Under Pulses	% Share in Total Area
Marginal	20.83	12.47	21.33	14.25
Small	44.66	26.73	39.69	26.51
Medium	49.50	29.63	43.17	28.84
Large	52.07	31.17	45.50	30.40
Total	167.06	100.00	149.69	100.00

In the total area under pulses crops in kharif season estimated at 87.07 acres in the non-NFSM district of Beed, while the marginal category of sampled farmers showed a share of 9.21 per cent, 29.17 per cent share was accounted for by small category, 29.08 per cent share by medium category and 32.54 per cent by large category of sampled farmers, indicating a rise in share in total area under kharif pulse crops with the rise in land holding size of farmers (Table 3.14). However, in the total area under pulses crops in rabi season estimated at 85.63 acres in the non-NFSM district of Beed, the marginal, small, medium and large category of farmers showed a share of 9.77 per cent, 21.45 per cent, 13.51 per cent and 55.27 per cent, respectively, indicating higher share of large category of sampled farmers in total area under pulse crops grown during rabi season.

Table 3.14: Share of Different Size-Groups in Pulse Farming: Over All Seasons: Non-NFSM Beed District (Area in Acres; Average of 2006-07, 2007-08, 2008-09)

Category	Area Sown			
	Kharif Season		Rabi Season	
	Total Area Under Pulses	% Share in Total Area	Total Area Under Pulses	% Share in Total Area
Marginal	8.02	9.21	8.37	9.77
Small	25.40	29.17	18.37	21.45
Medium	25.32	29.08	11.57	13.51
Large	28.33	32.54	47.33	55.27
Total	87.07	100.00	85.63	100.00

Thus, the sampled farmers of NFSM district of Amravati and non-NFSM district of Beed showed a rise in their share in total area under pulses crops cultivated during kharif and rabi seasons with the rise in their land holding size. In the NFSM district of Amravati, the share of marginal, small, medium and large category in total area under pulses crops was estimated at 12.47 per cent, 26.73 per cent, 29.63 per cent and 31.17 per cent, respectively, in kharif season and, 14.25 per cent, 26.51 per cent, 28.84 per cent, and 30.40 per cent, respectively, in rabi season. As for the non-NFSM district of Beed, the share of marginal, small, medium and large category in total area under pulses crops was estimated at 9.21 per cent, 29.17 per cent, 29.08 per cent and 32.54 per cent, respectively, in kharif season and, 9.77 per cent, 21.45 per cent, 13.51 per cent, and 55.27 per cent, respectively, in rabi season.

3.10 Irrigated Area under Pulses in NFSM and Non-NFSM Districts

The estimates relating to the extent of average (average of 2006-07, 2007-08, 2008-09) area under irrigation for various pulses crops cultivated during kharif and rabi seasons by various categories of sampled farmers of NFSM district of Amravati and non-NFSM district of Beed are provided in Table 3.15 and 3.16.

In the NFSM district of Amravati, although the net sown area under pulses crops with all the sampled farmers put together stood at 167.06 acres in kharif season and 149.69 acres in rabi season, the entire area under pulses crops during both kharif and rabi seasons was found to be rainfed or unirrigated, and, therefore, the proportion of irrigated area to net sown area with respect to pulses crops was nil in this district (Table 3.15).

Table 3.15: Percentage of Irrigated Area under Pulses: Over All Seasons: NFSM Amravati District
(Area in Acres; Average of 2006-07, 2007-08, 2008-09)

Category	Irrigated Area				
	Kharif Season			Rabi Season	
	Mung	Tur	Total	Gram	Total
Marginal	-	-	-	-	-
Small	-	-	-	-	-
Medium	-	-	-	-	-
Large	-	-	-	-	-
Total	-	-	-	-	-
	Total Area Under the Crop				
Marginal	19.25	1.58	20.83	21.33	21.33
Small	39.45	5.22	44.66	39.69	39.69
Medium	44.08	5.42	49.50	43.17	43.17
Large	47.40	4.67	52.07	45.50	45.50
Total	150.18	16.88	167.06	149.69	149.69
	% of Irrigated Area				
Marginal	-	-	-	-	-
Small	-	-	-	-	-
Medium	-	-	-	-	-
Large	-	-	-	-	-
Total	-	-	-	-	-

As against the NFSM district of Amravati, the sampled farmers of the non-NFSM district of Beed showed some presence of irrigation with respect to pulses crops as the proportion of irrigated area to net sown area for pulses crops with all the sampled farmers put together was estimated at 18.76 per cent in kharif season and 14.40 per cent in rabi season (Table 3.16). Further, the proportion of irrigated area to net sown area with respect to pulses crops increased with the increase in land holding size of sampled farmers of Beed district, particularly in kharif season. During kharif season, the proportion of irrigated area to net sown area with respect to pulses crops was estimated at 5.24 per cent for small category, 13.15 per cent for medium category, and 41.19 per cent for large category with an overall average of 18.76 per cent for the average category of farmers belonging to the non-NFSM district of Beed. As for rabi season, the small, medium, large and average category of farmers of Beed district showed 7.24 per cent, 25.93 per cent, 16.90 per cent, and 14.40 per cent of their net sown area of pulses crops under irrigation (Table 3.16).

Table 3.16: Percentage of Irrigated Area under Pulses: Over All Seasons: Non-NFSM Beed District
(Area in Acres; Average of 2006-07, 2007-08, 2008-09)

Category	Irrigated Area				
	Kharif Season			Rabi Season	
	Mung	Tur	Total	Gram	Total
Marginal	-	-	-	-	-
Small	1.33	-	1.33	1.33	1.33
Medium	1.33	2.00	3.33	3.00	3.00
Large	9.00	2.67	11.67	8.00	8.00
Total	11.66	4.67	16.33	12.33	12.33
	Total Area Under the Crop				
Marginal	2.42	5.60	8.02	8.37	8.37
Small	15.50	9.90	25.40	18.37	18.37
Medium	7.25	18.07	25.32	11.57	11.57
Large	14.67	13.67	28.33	47.33	47.33
Total	39.83	47.24	87.07	85.63	85.63
	% of Irrigated Area				
Marginal	-	-	-	-	-
Small	8.58	-	5.24	7.24	7.24
Medium	18.34	11.07	13.15	25.93	25.93
Large	61.35	19.53	41.19	16.90	16.90
Total	29.27	9.89	18.76	14.40	14.40

As for various categories of farmers, while the medium category of sampled farmers of Beed district showed significantly large proportion of net sown area of their mung crop under irrigation in kharif season, the area under irrigation for gram crop was relatively high for medium category in rabi season as compared to other categories of sampled farmers. The marginal category of sampled farmers belonging to Beed district cultivated various pulses crops under unirrigated or rainfed condition.

The foregoing observation presented us with two differing scenarios. While the sampled farmers belonging to the NFSM district cultivated various pulses crops under rainfed conditions, the cultivation of these crops by the sampled farmers of non-NFSM district of Beed was under both irrigated and unirrigated conditions. However, the extent of area under irrigation with respect to pulses crops was very low in Beed district, and, in general, the proportion of irrigated area to net sown area for pulses crops with all the sampled farmers put together stood at 18.76 per cent in kharif season and 14.40 per cent in rabi season. It was only in the case of mung that about 61 per cent of net sown area was under irrigation in the case of large category of sampled farmers belonging to the non-NFSM district of Beed.

A further analysis is presented with respect to area under various crops, including crops other than pulses like soybean, jowar, cotton, bajra, sugarcane, etc. and the share of these crops in gross irrigated area (GIA) of the sampled farmers belonging to the NFSM district of Amravati and non-NFSM district of Beed, and these estimates (average of 2006-07, 2007-08, 2008-09) are brought out in Table 3.17 and 3.18.

It is to be noted that since all the crops cultivated by sampled farmers belonging to NFSM district of Amravati were under rainfed conditions, the estimates presented in Table 3.17 pertain to area under various crops cultivated during kharif and rabi seasons and the share of these crops in net sown area under kharif and rabi seasons. These estimates have already been presented in Table 3.9 and Table 3.9 (a) and discussed under cropping pattern with respect to sampled farmers of NFSM district of Amravati.

Table 3.17: Crop-wise Share in Un-irrigated Area – Over All Seasons: NFSM Amravati District
(Area in Acres; Average of 2006-07, 2007-08, 2008-09)

Category	Total Area Un-irrigated													
	Kharif Season										Rabi Season			
	Other Crops						Pulses					Pulse	Other	
	Soybean	Jowar	Cotton	Bajra	Others	Total	Mung	Tur	Total	G. Total	Gram	Sunflower	Total	
Marginal	2.75	1.33	1.00	-	0.67	5.75	19.25	1.58	20.83	26.58	21.33	2.42	23.75	
Small	3.52	4.49	5.23	0.87	4.24	18.34	39.45	5.22	44.66	63.00	39.69	1.79	41.48	
Medium	3.50	5.25	7.00	-	3.00	18.75	44.08	5.42	49.50	68.25	43.17	2.00	45.17	
Large	4.33	6.50	6.67	-	0.33	17.83	47.40	4.67	52.07	69.90	45.50	2.33	47.83	
Total	14.10	17.57	19.90	0.87	8.24	60.67	150.18	16.88	167.06	227.74	149.69	8.54	158.23	
	% of Area Un-irrigated													
Marginal	10.35	5.00	3.76	-	2.52	21.63	72.42	5.94	78.37	100.00	89.81	10.19	100.00	
Small	5.59	7.13	8.30	1.38	6.73	29.11	62.62	8.29	70.89	100.00	95.68	4.32	100.00	
Medium	5.13	7.69	10.26	-	4.40	27.47	64.59	7.94	72.53	100.00	95.57	4.43	100.00	
Large	6.19	9.30	9.54	-	0.47	25.51	67.81	6.68	74.49	100.00	95.13	4.87	100.00	
Total	6.19	7.71	8.74	0.38	3.62	26.64	65.94	7.41	73.36	100.00	94.60	5.40	100.00	

Note: 1) In 2007-08 'Others' under other crops include Kharif Sunflower and in 2008-09, 'Others' under other crops include Kharif Sunflower and Ladyfinger
2) All the crops cultivated in Amravati district are under un-irrigated conditions and, therefore, share is worked out in Un-irrigated Area

In the non-NFSM district of Beed, the average gross irrigated area (GIA) was estimated at 1.50 acres for large category, 12.34 acres for small, 23.49 acres for medium and 115.50 acres for large category with a sum of 152.83 acres with all the sampled farmers put together (Table 3.18). The marginal category of farmers of Beed district showed 100 per cent share in GIA with respect to sugarcane crop. As for small category of farmers of Beed district, 29.74 per cent share in GIA was accounted for by soybean, 5.43 per cent by bajra, 10.78 per cent by mung, 10.78 per cent by gram, and 43.19 per cent by sugarcane. In the case of medium category of farmers of Beed district, 11.37 per cent share in GIA was accounted for by soybean, 1.40 per cent by jowar, 14.18 per cent by cotton, 5.66 per cent by mung, 8.51 per cent by tur, 12.77 per cent by gram, 26.27 per cent by sugarcane, and 19.88 per cent by other rabi crops. Insofar as large category of farmers of Beed district are concerned, 8.08 per cent share in GIA was accounted for by soybean, 14.87 per cent by cotton, 7.79 per cent by mung, 2.31 per cent by tur, 6.93 per cent by gram, 46.17 per cent by sugarcane, and 13.85 per cent by other rabi crops. In general, all the category of farmers of Beed district put together showed a share of 10.25 per cent in GIA for soybean, 0.22 per cent for jowar, 13.41 per cent for cotton, 0.44 per cent for bajra, 7.64 per cent for mung, 3.06 per cent for tur, 8.07 per cent for gram, 43.40 per cent for sugarcane, and 13.52 per cent for other rabi crops.

Table 3.18: Crop-wise Share in Irrigated Area – Over All Seasons: Non-NFSM Beed District
(Area in Acres; Average of 2006-07, 2007-08, 2008-09)

Category	Total Area Irrigated													
	Kharif Season									Rabi Season				
	Other Crops					Pulses				G. Total	Pulse Gram	Sugarcane	Other	G. Total
	Soybean	Jowar	Cotton	Bajra	Total	Mung	Tur	Total	Total					
Marginal	-	-	-	-	-	-	-	-	-	-	1.50	-	1.50	
Small	3.67	-	-	0.67	4.33	1.33	-	1.33	5.67	1.33	5.33	-	6.67	
Medium	2.67	0.33	3.33	-	6.33	1.33	2.00	3.33	9.66	3.00	6.17	4.67	13.83	
Large	9.33	-	17.17	-	26.50	9.00	2.67	11.67	38.17	8.00	53.33	16.00	77.33	
Total	15.67	0.33	20.50	0.67	37.17	11.67	4.67	16.33	53.50	12.33	66.33	20.67	99.33	
	% of Area Irrigated for the Average													
Marginal	-	-	-	-	-	-	-	-	-	-	100.00	-	100.00	
Small	29.74	-	-	5.43	35.09	10.78	-	10.78	45.95	10.78	43.19	-	54.05	
Medium	11.37	1.40	14.18	-	26.95	5.66	8.51	14.18	41.12	12.77	26.27	19.88	58.88	
Large	8.08	-	14.87	-	22.94	7.79	2.31	10.10	33.05	6.93	46.17	13.85	66.95	
Total	10.25	0.22	13.41	0.44	24.32	7.64	3.06	10.69	35.01	8.07	43.40	13.52	64.99	

Note: 1) In 2007-08 'Others' under other crops include Kharif Sunflower and in 2008-09, 'Others' under other crops include Kharif Sunflower and Ladyfinger

2) All the crops cultivated in Amravati district are under un-irrigated conditions and, therefore, share is worked out in Un-irrigated Area

The foregoing observations reveal that though all the crops cultivated by the sampled farmers of NFSM district of Amravati were under rainfed conditions, and,

therefore, GIA in this district stood nil, the sampled farmers of non-NFSM district Beed, however, showed some irrigated area under various crops during both kharif and rabi seasons, and, the GIA in this district was estimated at 152.83 acres for the all the sampled farmers put together, which encompassed 10.25 per cent area under soybean, 0.22 per cent under jowar, 13.41 per cent under cotton, 0.44 per cent under bajra, 7.64 per cent under mung, 3.06 per cent under tur, 8.07 per cent under gram, 43.40 per cent under sugarcane, and 13.52 per cent under other rabi crops like jowar, wheat, onion, banana, etc. The area under pulses crops was not much under irrigated conditions in the district of Beed as the share of kharif pulses in GIA for all the sampled farmers put together stood at 10.69 per cent, and this share with respect to rabi pulses like gram was estimated at only 8.07 per cent. In fact, other crops cornered major share in GIA for various categories of farmers of Beed district since the share of other kharif crops in GIA was 35 per cent and other rabi crops accounted for as much as 65 per cent share in GIA for all the sampled farmers of non-NFSM district of Beed. Among various crops, sugarcane alone accounted for 43 per cent share in GIA with respect to the sampled farmers of Beed. Thus, area under irrigation differed significantly across various crops cultivated by the sampled farmers drawn from the non-NFSM district of Beed.

CHAPTER – IV

ECONOMICS OF PULSES CULTIVATION

Having discussed and evaluated in brief the underlying growth trends in area, production and productivity of various important crops cultivated in the state of Maharashtra with focus on various pulses crops and trends in various other quantitative parameters of agricultural sector of the State in chapter II and socio-economic characteristics, cropping pattern, land utilization pattern, irrigation status, etc. of various categories of sampled farmers belonging to NFSM district of Amravati and non-NFSM district of Beed in chapter III, this chapter examines the extent of profit involved in the cultivation of pulses crops vis-à-vis other crops in both NFSM district of Amravati and non-NFSM district of Beed. The economics of cultivation of pulses crops vis-à-vis other crops is evaluated for all the categories of sampled farmers with respect to three reference years viz. 2006-07, 2007-08 and 2008-09. The reference years 2006-07 and 2007-08 represent the scenario obtaining in terms of profitability of crops before initiation of NFSM for pulses crops and the reference year 2008-09 shows the scenario obtaining in this respect after the initiation of NFSM for pulses crops, i.e. the impact of the programme. This chapter initially begins with profitability of crops cultivated on the sampled farms of NFSM and non-NFSM districts and subsequently compares the economics of various crops in NFSM vis-à-vis non-NFSM districts.

4.1 Profitability of Pulses and Other Crops in NFSM District

In the NFSM district of Amravati, the sampled farmers were found to cultivate not only various pulses crops like mung, tur and gram but also various other crops viz. soybean, jowar, cotton, bajra, kharif sunflower, ladyfinger, and rabi sunflower. The cost and return structure for three reference years viz. 2006-07, 2007-08 and 2008-09 has been evaluated for all these crops cultivated by the sampled farmers belonging to the NFSM district of Amravati with a view to examine the magnitude of income generation in the cultivation of pulses crops vis-à-vis other crops.

4.1.1 Economics of Pulses Crops in NFSM District

The pulses crops cultivated by the sampled farmers drawn from the NFSM district of Amravati included mung and tur in kharif season and gram in rabi season. The estimates relating to gross returns, paid out cost, net returns, per hectare gross and net

returns, per quintal gross and net returns, and value of marketed surplus for various pulse crops viz. mung, tur and gram, and also for total pulse crops with respect to various categories of sampled farmers of Amravati district for the reference years 2006-07, 2007-08 and 2008-09 are brought out in Table 4.1, Table 4.2, Table 4.3 and Table 4.4.

In the cultivation of mung crop, an increasing trend was noticed in terms per hectare gross and net returns from 2006-07 to 2007-08 and from 2007-08 to 2008-09, indicating a steady increase in the same throughout the period between 2006-07 and 2008-09 (Table 4.1). All the categories of sampled farmers of Amravati district showed an increase in per hectare gross and net returns for mung crop during the given period of time. Even per quintal returns from mung crop increased during the period between 2006-07 and 2008-09 across all the categories of sampled farmers of Amravati district.

Table 4.1: Profitability in Mung Crop Farming: NFSM Amravati District

(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value Marketed Surplus
Marginal											
2006-07	19.20	128996	71761	57235	6718.54	16796.35	2980.99	7452.47	3583.22	1589.86	1159
2007-08	17.50	139428	72568	66860	7967.31	19918.29	3820.57	9551.43	3873.00	1857.22	1218
2008-09	21.05	198623	92403	106220	9435.77	23589.43	5046.08	12615.20	4053.53	2167.76	1796
Small											
2006-07	45.78	336543	179708	156835	7351.31	18378.28	3425.84	8564.60	3698.27	1723.46	2929
2007-08	35.70	300112	154855	145257	8406.50	21016.25	4068.82	10172.06	3847.59	1862.27	2610
2008-09	36.86	379571	175037	204534	10297.64	25744.10	5548.94	13872.35	4264.84	2298.13	3331
Medium											
2006-07	43.00	338595	179900	158695	7874.30	19685.76	3690.58	9226.45	3847.67	1803.35	2823
2007-08	49.50	407854	228484	179370	8239.47	20598.69	3623.64	9059.09	3959.75	1741.46	3627
2008-09	39.75	412070	200748	211322	10366.54	25916.35	5316.28	13290.69	4337.58	2224.44	3622
Large											
2006-07	41.20	315114	171084	144030	7648.40	19121.00	3495.87	8739.68	3796.55	1735.30	2743
2007-08	43.00	354880	190650	164230	8253.02	20632.56	3819.30	9548.26	3943.11	1824.78	3231
2008-09	58.00	579028	284930	294108	9983.24	24958.10	5070.83	12677.07	4386.58	2228.09	5147
Total											
2006-07	149.18	1119225	602453	516772	7502.51	18756.28	3464.08	8660.21	3755.79	1734.13	9660
2007-08	145.70	1197212	646557	550655	8216.97	20542.42	3779.38	9448.44	3899.71	1793.66	10631
2008-09	155.66	1569580	753117	816463	10083.39	25208.47	5245.17	13112.92	4300.22	2236.88	13903

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

Although cost and return structure for mung crop differed across various categories of sampled farmers drawn from the district of Amravati, the per hectare net return from gram crop cultivation for the average category of farmer was estimated at

Rs.8,660 in 2006-07, Rs.9,448 in 2007-08, and Rs.13,113 in 2008-09. The per quintal net return in the cultivation of gram crop for the average category of farmer was estimated at Rs.1,734 in 2006-07, Rs.1,794 in 2007-08, and Rs.2,237 in 2008-09. The per hectare value of marketed surplus of mung crop for the average category of farmers of Amravati district increased from Rs.16,190 in 2006-07 to Rs.18,255 in 2007-08, and further to Rs.22,329 in 2008-09, showing a sharp rise in the same between 2006-07 and 2008-09.

The pulse crop like tur also showed an increase in per hectare gross and net returns, and also per quintal gross and net returns from 2006-07 to 2007-08 and from 2007-08 to 2008-09 for all the categories of sampled farmers drawn from the district of Amravati. The net returns from tur crop cultivation on per hectare basis and on per quintal basis were substantially high in 2008-09 as compared to the reference years 2006-07 and 2007-08 (Table 4.2).

Table 4.2: Profitability in Tur Crop Farming: NFSM Amravati District
(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	1.25	13500	5756	7744	10800.00	27000.00	6195.20	15488.00	2700.00	1548.80	11250.00
2007-08	2.50	28550	12035	16515	11420.00	28550.00	6606.00	16515.00	2855.00	1651.50	27000.00
2008-09	1.00	14650	5363	9287	14650.00	36625.00	9287.00	23217.50	2930.00	1857.40	13750.00
Small											
2006-07	5.70	67056	27064	39992	11764.21	29410.53	7016.14	17540.35	2853.45	1701.79	58638.00
2007-08	4.00	49258	21171	28087	12314.50	30786.25	7021.75	17554.38	3078.62	1755.44	45151.50
2008-09	5.95	89150	33541	55609	14983.19	37457.98	9346.05	23365.13	3128.07	1951.19	85699.50
Medium											
2006-07	8.00	87743	42260	45483	10967.88	27419.69	5685.37	14213.44	2974.34	1541.80	68967.50
2007-08	3.75	40256	20318	19938	10734.93	26837.33	5316.80	13292.00	2981.93	1476.89	36309.00
2008-09	4.50	71840	25868	45972	15964.44	39911.11	10216.00	25540.00	3265.45	2089.64	59755.00
Large											
2006-07	4.50	52456	22730	29726	11656.89	29142.22	6605.78	16514.44	2914.22	1651.44	47039.00
2007-08	7.50	88090	39988	48102	11745.33	29363.33	6413.60	16034.00	2936.33	1603.40	83490.00
2008-09	2.00	33600	11800	21800	16800.00	42000.00	10900.00	27250.00	3360.00	2180.00	28800.00
Total											
2006-07	19.45	220746	97810	122936	11349.41	28373.52	6320.62	15801.54	2904.55	1617.58	186041.50
2007-08	17.75	206159	93511	112648	11614.59	29036.48	6346.37	15865.92	2951.93	1620.83	192005.50
2008-09	13.45	207695	76571	131124	15442.01	38605.02	9749.00	24372.49	3170.92	2001.89	188374.50

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

The area allocation under tur crop was not much in the NFSM district of Amravati. However, the cost and return structure for tur varied across different categories of sampled farmers of Amravati district. Although the per hectare and per quintal net

returns for tur crop increased with the increase in land holding size of sampled farmers of NFSM district of Amravati, the general trend showed that the average category of sampled farmers in Amravati district generated per hectare net return from tur crop cultivation to the tune of Rs.15,802 in 2006-07, Rs.15,866 in 2007-08, and Rs.24,372 in 2008-09, showing a sharp increase in per hectare net returns from tur crop cultivation in 2008-09 as compared to 2006-07 and 2007-08. The per quintal net return in tur crop cultivation for the average category of farmer of Amravati district was estimated at Rs.1,618 in 2006-07, Rs.1,621 in 2007-08, and Rs.2,002 in 2008-09. The per hectare value of marketed surplus of tur for the average category of farmers was estimated at Rs.23,913 in 2006-07, Rs.27,043 in 2007-08, and Rs.35,014 in 2008-09, showing a sharp rise in the same in 2008-09 as compared to the reference years 2006-07 and 2007-08.

Like mung crop in kharif season, the gram crop cultivated during rabi season showed significant area allocation of the sampled farmers of Amravati district. The gram crop also showed an increase in per hectare net returns and per quintal net returns with the increase in land holding size of sampled farmers belonging to NFSM district of Amravati (Table 4.3).

Table 4.3: Profitability in Gram Crop Farming: NFSM Amravati District

(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	22.20	150635	86027	64608	6785.36	16963.40	2910.27	7275.68	2063.49	885.04	1260
2007-08	21.75	223454	92600	130854	10273.75	25684.37	6016.28	15040.69	2327.65	964.58	1913
2008-09	20.05	239984	92953	147031	11969.28	29923.19	7333.22	18333.04	2499.83	1531.57	2117
Small											
2006-07	43.58	319651	181807	137844	7334.81	18337.02	3163.01	7907.53	2102.97	906.87	2693
2007-08	37.62	374778	167648	207130	9962.20	24905.50	5505.85	13764.62	2372.01	1310.95	3182
2008-09	37.86	459788	190021	269767	12144.43	30361.07	7125.38	17813.46	2642.46	1550.39	4069
Medium											
2006-07	39.00	287397	166825	120572	7369.15	18422.88	3091.59	7728.97	2097.79	880.09	2355
2007-08	49.50	487827	223125	264702	9855.09	24637.73	5347.52	13368.79	2334.10	1266.52	4295
2008-09	41.00	537156	199490	337666	13101.37	32753.41	8235.76	20589.39	2633.12	1655.23	4701
Large											
2006-07	31.50	260010	137550	122460	8254.29	20635.71	3887.62	9719.05	2166.75	1020.50	2194
2007-08	43.00	425912	195950	229962	9904.93	24762.33	5347.95	13369.88	2392.76	1291.92	3876
2008-09	62.00	858247	306070	552177	13842.69	34606.73	8906.08	22265.20	2707.40	1741.88	7798
Total											
2006-07	136.28	1017611	572208	445403	7467.06	18667.65	3268.29	8170.73	2111.23	924.07	8503
2007-08	151.87	1512016	679323	832693	9955.99	24889.97	5482.93	13707.33	2358.84	1299.05	13266
2008-09	160.91	2095148	788534	1306614	13020.62	32551.55	8120.15	20300.39	2648.73	1651.85	18681

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

It is to be further noted that all the categories of sampled farmers of Amravati district showed more than two folds rise in per hectare net returns from gram crop in 2008-09 as compared to 2006-07 (Table 4.3). Even per quintal net returns from gram crop was more than one and a half times in 2008-09 over that of 2006-07 and this held true for all the categories of sampled farmers of Amravati district. The per hectare net returns from gram crop for the average category of farmer of Amravati district was estimated at Rs.8,171 in 2006-07, which increased to Rs.13,707 in 2007-08, and further to Rs.20,300 in 2008-09. Similarly, the per quintal net returns from gram crop for the average category of farmer of Amravati district was estimated at Rs.924 in 2006-07, which increased to Rs.1,299 in 2007-08, and further to Rs.1,652 in 2008-09. The plausible reason for higher per hectare and per quintal net returns in 2008-09 over that of 2006-07 could be rise in yield and prices of gram crop.

The cost and return estimates with respect to total pulses encompassing kharif mung and tur and rabi gram for various categories of sampled farmers of Amravati district coupled with gross and net returns per quintal and value of marketed surplus of total pulses crops are provided in Table 4.4.

Table 4.4: Profitability in Total Pulses Crops Farming: NFSM Amravati District

(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	42.65	293131	163544	129587	6872.94	17182.36	3038.38	7595.96	2571.32	1136.73	253211.00
2007-08	41.75	391432	177203	214229	9375.62	23439.04	5131.23	12828.08	2756.56	1508.65	340123.00
2008-09	42.10	453257	190719	262538	10766.20	26915.50	6236.06	15590.14	3021.71	1750.25	405141.25
Small											
2006-07	95.06	723250	388579	334671	7608.35	19020.88	3520.63	8801.57	2713.88	1255.8	621006.00
2007-08	77.32	724148	343674	380474	9365.60	23413.99	4920.77	12301.93	287360	1509.82	624403.50
2008-09	80.67	928509	398599	529910	11509.97	28774.92	6568.86	16422.15	3185.28	1817.87	825833.00
Medium											
2006-07	90.00	713735	388985	324750	7930.39	19825.97	3608.33	9020.83	2804.46	1276.03	586889.50
2007-08	102.75	935937	471927	464010	9108.88	22772.19	4515.91	11289.78	2875.38	1425.53	828604.00
2008-09	85.25	1021066	426106	594960	11977.31	29943.28	6979.00	17447.51	3180.89	1853.46	892105.00
Large											
2006-07	77.20	627580	331364	296216	8129.27	20323.19	3836.99	9592.49	2839.73	1340.34	540806.00
2007-08	93.50	868882	426588	442294	9292.86	23232.14	4730.42	11826.04	2915.71	1484.21	794348.00
2008-09	122.00	1470875	602800	868085	12056.35	30140.88	7115.45	17788.63	3204.52	1891.25	1323425.00
Total											
2006-07	304.91	2357582	1272471	1085111	7732.06	19330.15	3558.79	8896.98	2754.18	1267.65	2002406.00
2007-08	315.32	2915387	1419391	1495996	9245.80	23114.51	4744.37	11860.93	2865.25	1470.27	2582596.50
2008-09	330.02	3872423	1618222	2254201	11733.90	29334.76	6830.50	17076.25	3170.22	1845.44	3446885.50

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

In terms of profitability, total pulses crops cultivated by various categories of sampled farmers showed a trend similar to individual pulses crops viz. mung, tur and gram. The extent of per hectare returns from total pulses for various categories of farmers of Amravati district was found to increase from 2006-07 to 2007-08, and from 2007-08 to 2008-09. Even per quintal net returns from total pulses crops farming for various categories of sampled farmers of Amravati district followed a rising trend throughout the period between 2006-07 and 2008-09. The total pulse crop also showed an increase in per hectare net returns and per quintal net returns with the increase in land holding size of sampled farmers belonging to NFSM district of Amravati. The per hectare net returns from total pulses crops for the average category of farmer of Amravati district was estimated at Rs.8,897 in 2006-07, which increased to Rs.11,861 in 2007-08, and further to Rs.17,076 in 2008-09. Similarly, the per quintal net returns from total pulses crops for the average category of farmer belonging to NFSM district of Amravati was estimated at Rs.1,268 in 2006-07, which increased to Rs.1,470 in 2007-08, and further to Rs.1,845 in 2008-09. The per hectare value of marketed surplus of with respect to total pulses crops for the average category of farmers of Amravati district was estimated at Rs.16,418 in 2006-07, Rs.20,476 in 2007-08, and Rs.26,111 in 2008-09, showing a sharp rise in the same in 2008-09 over that of 2006-07 and 2007-08. The per hectare value of marketed surplus with respect to total pulses crops for the average category of sampled farmers of Amravati district, therefore, increased by 24.72 per cent in 2007-08 over that of 2006-07, 27.52 per cent in 2008-09 over that of 2007-08, and by 59.04 per cent in 2008-09 over that of 2006-07, showing a significant rise in the same during the period between 2006-07 and 2009-8-09.

Thus, in the total pulses farming, the average category of sampled farmer of Amravati district generated 33.31 per cent higher per hectare net returns in 2007-08 over that of 2006-07, 43.97 per cent in 2008-09 over that of 2007-08, and 91.93 per cent higher net returns in 2008-09 over that of 2006-07. Similarly, in the total pulses farming, the average category of sampled farmer of Amravati district generated 15.98 per cent higher per quintal net return in 2007-08 over that of 2006-07, 25.52 per cent in 2008-09 over that of 2007-08, and 45.58 per cent higher net returns in 2008-09 over that of 2006-07. The rise in yield level and higher prices on offer for pulses crops in Amravati district could be the reasons for higher amount of net profit generated from pulses crop farming since both net returns per hectare and per quintal from total pulses crops increased

substantially in 2008-09 over that of 2006-07, which also show positive impact of NFSM programme on pulses farming in the NFSM district of Amravati of Maharashtra.

4.1.2 Economics of Other Major Crops in NFSM District

The cropping pattern revealed that the other crops cultivated by the sampled farmers drawn from the NFSM district of Amravati encompassed soybean, kharif jowar, cotton, bajra, kharif sunflower, kharif ladyfinger, and rabi sunflower. The estimates relating to gross returns, paid out cost, net returns, per hectare gross and net returns, per quintal gross and net returns, and value of marketed surplus of these crops for various categories of sampled farmers of Amravati district for the reference years 2006-07, 2007-08 and 2008-09 are brought out separately in Tables 4.5, Table 4.6, Table 4.7, Table 4.8, Table 4.9, Table 4.10, and Table 4.11. These estimates for the given reference years with respect to all other crops put together for various categories of sampled farmers of Amravati district are presented in Table 4.12.

The estimates relating to costs and returns and the value of marketed surplus of soybean crop cultivated on the sampled farms belonging to the farmers of Amravati district for 2006-07, 2007-08 and 2008-09 are presented in Table 4.5.

Table 4.5: Profitability in Soybean Crop Farming: NFSM Amravati District
(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	5.75	55550	28944	26606	9660.86	24152.17	4627.13	11567.82	2020.00	967.49	66330.00
2007-08	1.00	11300	4650	6650	11300.00	28250.00	6650.00	16625.00	2260.00	1330.00	11000.00
2008-09	1.50	19600	7658	11942	13066.67	32666.67	7961.33	19903.33	1960.00	1194.20	19000.00
Small											
2006-07	5.00	51697	23425	28272	10339.40	25848.50	5654.40	14136.00	2110.08	1153.96	50396.50
2007-08	1.75	20450	9338	11112	11685.71	29214.29	6349.71	15874.29	2272.22	1234.67	19800.00
2008-09	3.80	48447	20411	28036	12749.21	31873.03	7377.89	18444.74	2106.39	1218.96	46897.00
Medium											
2006-07	2.00	22700	9500	13200	11350.00	28375.00	6600.00	16500.00	2063.64	1200.00	22000.00
2007-08	3.00	34500	16350	18150	11500.00	28750.00	6050.00	15125.00	2156.25	1134.38	33600.00
2008-09	5.50	69715	30825	38890	12675.45	31688.64	7070.90	17677.27	2112.58	1178.48	67815.00
Large											
2006-07	6.00	64212	31300	32912	10702.00	26755.00	5485.33	13713.33	2071.35	1061.68	63612.00
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	7.00	84193	39510	44683	12027.57	30068.93	6383.29	15958.21	2158.79	1145.72	81393.00
Total											
2006-07	18.75	192118	93169	98949	10246.29	25615.73	5277.28	13193.20	2065.78	1063.97	187405.00
2007-08	5.75	66260	30338	35922	11523.48	28808.70	6247.30	15618.26	2208.67	1197.40	64410.00
2008-09	17.80	221995	98404	123591	12471.63	31179.07	6943.31	17358.29	2114.24	1177.06	215145.00

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

The sampled farmers of Amravati district devoted some area under soybean cultivation though their major cultivation practice was confined to pulses. The cultivation of soybean was found to be a profitable proposition as the average category of sampled farmers belonging to the NFSM district derived a per hectare net return to the tune of Rs.13,193 in 2006-07, Rs.15,618 in 2007-08 and Rs.17,538 in 2008-09, showing a rise in net profitability of the crop in every successive years (Table 4.5). However, the average category of sampled farmer of Amravati showed by and large the same net returns per quintal from soybean crop cultivation as the net returns in this respect stood at Rs.1,064 in 2006-07, Rs.1,197 in 2007-08 and Rs.1,177 in 2008-09. However, the per hectare value of marketed surplus for soybean with respect to average category of sampled farmers of Amravati district increased from Rs.24,987 in 2006-07 to Rs.28,004 in 2007-08, and further to Rs.30,217 in 2008-09, showing about 21 per cent net rise in per hectare value of marketed surplus of soybean in 2008-09 over that of 2006-07.

The cost and return estimates along with value of marketed surplus with respect to kharif jowar cultivated on the farms belonging to sampled farmers of Amravati district for the reference years 2006-07, 2007-08, and 2008-09 are furnished in Table 4.6.

Table 4.6: Profitability in Kharif Jowar Crop Farming: NFSM Amravati District

(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Mark Surp
Marginal											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	3.00	12893	6220	6673	4297.67	10744.17	2224.33	5560.83	889.17	460.21	4
2008-09	1.00	4100	2125	1975	4100.00	10250.00	1975.00	4937.50	820.00	395.00	
Small											
2006-07	6.96	28742	14242	14500	4129.60	10323.99	2083.33	5208.33	809.63	408.45	3
2007-08	4.00	15597	8420	7177	3899.25	9748.13	1794.25	4485.63	820.89	377.74	5
2008-09	2.50	12450	6018	6432	4980.00	12450.00	2572.80	6432.00	830.00	428.80	
Medium											
2006-07	9.00	35100	16235	18865	3900.00	9750.00	2096.11	5240.28	797.73	428.75	5
2007-08	2.75	11597	6194	5403	4217.09	10542.73	1964.73	4911.82	828.14	385.93	
2008-09	4.00	19956	10390	9566	4989.00	12472.50	2391.50	5978.75	831.50	398.58	1
Large											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	15.00	64964	32465	32499	4330.93	10827.33	2166.60	5416.50	902.28	451.38	19
2008-09	4.50	22550	11385	11165	5011.11	12527.78	2481.11	6202.78	835.19	413.52	2
Total											
2006-07	15.96	63872	30477	33395	4002.01	10005.01	2092.42	5231.05	803.42	420.06	5
2007-08	24.75	106395	53299	53096	4298.79	10746.97	2145.29	5363.23	890.33	444.32	25
2008-09	12.00	59024	29918	29106	4918.67	12296.67	2425.50	6063.75	831.32	409.94	3

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns - Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

Unlike soybean, the cultivation of kharif jowar on the farms belonging to the sampled farmers of Amravati district was not a lucrative proposition as the average category of farmers of this district could derive only Rs.5,231 per hectare net returns from the cultivation of this crop in 2006-07, which though marginally increased to Rs.5,363 in 2007-08 and to Rs.6,064 in 2008-09. The net returns per quintal for kharif jowar was also very low, and, for the average category of sampled farmers belonging to Amravati district, it was estimated at Rs.420 in 2006-07, Rs.444 in 2007-08, and Rs.410 in 2008-09, showing hardly any difference in per quintal net returns emanating from the cultivation of kharif jowar in the district of Amravati. The per hectare value of marketed surplus of kharif jowar was very low and for the average category of sampled farmers of Amravati district it was estimated at Rs.1,447 in 2006-07, Rs.2,992 in 2007-08, and Rs.805 in 2008-09, which could be due to higher quantity of production of kharif jowar for home consumption.

Among various crops cultivated by the sampled farmers of Amravati district, cotton turned out to be the most profitable crop as the average category of farmers of the district generated as much as Rs.15,184 per hectare net return in 2006-07, which increased to Rs.16,225 in 2007-08, and further to Rs.21,353 in 2008-09 (Table 4.7).

Table 4.7: Profitability in Cotton Crop Farming: NFSM Amravati District

(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Original											
06-07	1.00	9000	4650	4350	9000.00	22500.00	4350.00	10875.00	2250.00	1087.50	8800.00
07-08	-	-	-	-	-	-	-	-	-	-	-
08-09	2.00	28200	10830	17370	14100.00	35250.00	8685.00	21712.50	2350.00	1447.50	27600.00
Small											
06-07	0.95	8650	4560	4090	9105.26	22763.16	4305.26	10763.16	2162.50	1022.50	8400.00
07-08	8.75	105195	47500	57695	12022.29	30055.71	6593.71	16484.29	2337.67	1282.11	103095.00
08-09	6.00	82900	34285	48615	13816.67	34541.67	8102.50	20256.25	2438.24	1429.85	81600.00
Medium											
06-07	6.00	63610	32200	31410	10601.67	26504.17	5235.00	13087.50	2120.33	1047.00	62010.00
07-08	8.00	94920	42860	52060	11865.00	29662.50	6507.50	16268.75	2373.00	1301.50	93520.00
08-09	7.00	100300	39950	60350	14328.57	35821.43	8621.43	21553.57	2507.50	2338.13	98200.00
Large											
06-07	14.00	167175	73650	93525	11941.07	29852.68	6680.36	16700.89	2229.00	1247.00	164025.00
07-08	1.50	16500	7800	8700	11000.00	27500.00	5800.00	14500.00	2357.14	1242.86	16100.00
08-09	4.50	67088	26825	40263	14908.44	37271.11	8947.33	22368.33	2484.74	1491.22	65988.00
Total											
05-07	21.95	248376	115060	133316	11315.54	28288.84	6073.62	15184.05	2198.02	1179.79	243176.00
07-08	18.25	216604	98160	118444	11868.71	29671.78	6490.08	16225.21	2354.39	1287.43	212704.00
08-09	19.50	278447	111890	166557	14279.33	35698.33	8541.38	21353.46	2464.13	1473.96	273347.00

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

The per quintal net return from cotton crop for the average category of farmers belonging to Amravati district was estimated at Rs.1,180 in 2006-07, Rs.1,287 in 2007-08, and Rs.1,474 in 2008-09. The value of per hectare marketed surplus of cotton crop for the average category of sampled farmers of Amravati district was found to increase from Rs.27,697 in 2006-07 to Rs.29,138 in 2007-08, and further to Rs.35,044 in 2008-09, showing a rise in marketed surplus value of cotton crop to the tune of 26.53 per cent in 2008-09 over that of 2006-07. The rise in per hectare net returns for cotton crop for the average category of sampled farmers of Amravati district was 41 per cent in 2008-09 over that of 2006-07, and on per quintal basis this rise in net return stood at 25 per cent. In general, per hectare and per quintal net returns from cotton crop in Amravati district increased with the increase in land holding size of sampled farmers.

The sampled farmers of Amravati district, particularly small category, allocated very marginal area under bajra crop. The profitability in the cultivation of bajra crop was very low, and the small category of farmers of Amravati district generated only Rs.2,260 per hectare net return in 2006-07, which increased to Rs.3,238 in 2007-08 (Table 4.8).

Table 4.8 Profitability in Bajra Crop Farming: NFSM Amravati District

(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Markete Surplus
Marginal											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Small											
2006-07	1.30	2625	1450	1175	2019.23	5048.08	903.85	2259.62	750.00	335.71	1375
2007-08	1.30	3400	1716	1684	2615.38	6538.46	1295.38	3238.46	850.00	421.00	2100
2008-09	-	-	-	-	-	-	-	-	-	-	-
Medium											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Large											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Total											
2006-07	1.30	2625	1450	1175	2019.23	5048.08	903.85	2259.62	750.00	335.71	1375
2007-08	1.30	3400	1716	1684	2615.38	6538.46	1295.38	3238.46	850.00	421.00	2100
2008-09	-	-	-	-	-	-	-	-	-	-	-

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

The per quintal net return from bajra crop was also very low and the small category of farmers of Amravati district obtained only Rs.336 net returns from one quintal bajra crop in 2006-07, which though marginally increased to Rs.421 in 2007-08. The value of per hectare marketed surplus for bajra crop was estimated at only Rs.2,644 in 2006-07, and Rs.4,038 in 2007-08. The cultivation of bajra crop on the farms of small category of sampled farmers of Amravati district was mainly for family consumption purpose and, therefore, despite very low returns, these farmers cultivated bajra crop.

Another crop generating significant net returns on the farms belonging to sampled farmers of Amravati district was kharif Sunflower. The average category of sampled farmers received by and large same per hectare net returns from kharif sunflower cultivation in 2007-08 and 2008-09, which hovered at around Rs.10,000 (Table 4.9). Even per quintal net return from kharif sunflower for the average category of farmers of Amravati district was same and it hovered at around Rs.1,200 in 2007-08 and 2008-09. However, the per hectare value of marketed surplus with respect to kharif sunflower crop marginally increased from Rs.15,580 in 2007-08 to Rs.16,828 in 2008-09.

Table 4.9: Profitability in Kharif Sunflower Farming: NFSM Amravati District

(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	2.00	11600	5200	6400	5800.00	14500.00	3200.00	8000.00	1933.33	1066.67	11400.00
Small											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	4.06	24500	9947	14553	6034.48	15086.21	3584.48	8961.21	2041.67	1212.75	24000.00
2008-09	4.50	33055	12175	20880	7345.56	18363.89	4640.00	11600.00	2132.58	1347.10	32255.50
Medium											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	2.00	12800	4500	8300	6400.00	16000.00	4150.00	10375.00	1828.57	1185.71	12600.00
2008-09	7.00	48090	19750	28340	6870.00	17175.00	4048.57	10121.43	2185.91	1288.18	47190.00
Large											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	1.00	7550	2400	5150	7550.00	18875.00	5150.00	12875.00	1887.50	1287.50	7400.00
2008-09	-	-	-	-	-	-	-	-	-	-	-
Total											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	7.06	44849	16847	28002	6352.55	15881.37	3966.29	9915.72	1949.96	1217.48	43999.00
2008-09	13.50	92772	37125	55647	6872.00	17180.00	4122.00	10305.00	2132.69	1279.24	90871.50

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

It is to be noted that despite significant amount of profit involved in the cultivation of ladyfinger, only small category of farmers of Amravati district allocated some area under this crop in 2008-09. The per hectare net return from kharif ladyfinger for the small category of farmer of Amravati district was found to be Rs.12,378 in 2008-09 (Table 4.10). The per quintal net return from kharif ladyfinger for the small category of farmer of Amravati district was estimated at Rs.1,468 in 2008-09. The per hectare value of marketed surplus for kharif ladyfinger was estimated at Rs.16,867 in 2008-09 for the small category of sampled farmers drawn from the district of Amravati.

Table 4.10: Profitability in Ladyfinger Crop Farming: NFSM Amravati District
(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Small											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	4.15	28000	7453	20547	6746.99	16867.47	4951.08	12377.71	2000.00	1467.64	28000
Medium											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Large											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Total											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	4.15	28000	7453	20547	6746.99	16867.47	4951.08	12377.71	2000.00	1467.64	28000

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

The sampled farmers of NFSM district of Amravati not only cultivated sunflower in kharif season but also in rabi season. The per hectare and per quintal net returns from rabi sunflower cultivation was found to increase from 2006-07 to 2007-08, and from 2007-08 to 2008-09. The average category of sampled farmers belonging to the district of Amravati generated Rs.5,589 per hectare net returns from rabi sunflower cultivation in 2006-07, which increased to Rs.8,833 in 2007-09, and further to Rs.9,641 in 2008-09,

showing about 72 per cent rise in net returns from this crop in 2008-09 over that of 2006-07 (Table 4.11). The net returns per quintal for rabi sunflower was quite reasonable, and, for the average category of sampled farmers belonging to Amravati district, it was estimated at Rs.903 in 2006-07, Rs.1,178 in 2007-08, and Rs.1,254 in 2008-09, showing about 39 per cent rise in per quintal net returns from this crop in 2008-09 over that of 2006-07. The per hectare value of marketed surplus with respect to rabi sunflower crop for the average category of sampled farmers belonging to the district of Amravati was estimated at Rs.10,239 in 2006-07, Rs.14,250 in 2007-08, and Rs.16,147 in 2008-09, showing about 58 per cent rise in value of marketed surplus of rabi sunflower in 2008-09 over that of 2006-07.

Table 4.11: Profitability in Rabi Sunflower Crop Farming: NFSM Amravati District
(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	2.25	9800	4725	5075	4355.56	10888.89	2255.56	5638.89	1633.33	845.83	9600.00
2007-08	3.00	16650	7400	9250	5550.00	13875.00	3083.33	7708.33	1850.00	1027.78	16200.00
2008-09	2.00	11600	5450	6150	5800.00	14500.00	3075.00	7687.50	1933.33	1025.00	11400.00
Small											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	2.00	11450	4300	7150	5725.00	14312.50	3575.00	8937.50	1908.33	1191.67	11100.00
2008-09	3.38	26396	9764	16632	7809.47	19523.67	4920.71	12301.78	2449.67	1386.00	25896.00
Medium											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	6.00	38200	15900	22300	6366.67	1591.67	3716.67	9291.67	2247.06	1311.76	37400.00
Large											
2006-07	3.00	12300	5640	6660	4100.00	10250.00	2220.00	5550.00	1757.14	951.43	11900.00
2007-08	4.00	24600	9200	15400	6150.00	15375.00	3850.00	9625.00	2050.00	1283.33	24000.00
2008-09	-	-	-	-	-	-	-	-	-	-	-
Total											
2006-07	5.25	22102	10365	11737	4209.90	10524.76	2235.62	5589.05	1700.15	902.85	21502.00
2007-08	9.00	52700	20900	31800	5855.56	14638.89	3533.33	8833.33	1951.85	1177.78	51300.00
2008-09	11.38	75000	31114	43886	6590.51	16476.27	3856.41	9641.04	2142.86	1253.89	73500.00

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

Although sampled farmers belonging to the NFSM district of Amravati cultivated a number of other crops viz. soybean, kharif jowar, cotton, bajra, kharif and rabi sunflower, etc., the amount of per hectare as well as per quintal net returns varied significantly across these crops, and due to significantly high element of profit involved in the cultivation of soybean, cotton, kharif and rabi sunflower, the per hectare net returns

from all the other crops put together was reasonable, though lower than element of profit emanating from total pulses crops cultivated on the farms belonging to sampled farmers of Amravati district. The average category of sampled farmers belonging to the NFSM district of Amravati derived Rs.11,018 per hectare net returns from the cultivation of all other crops put together in 2006-07, which though marginally declined to RS.10,170 in 2007-08 but again increased to Rs.14,022 in 2008-09, showing about 27 per cent rise in per hectare net returns from all other crops in 2008-09 over that of 2006-07, and 38 per cent rise in the same in 2008-09 over that of 2007-08 (Table 4.12). Similarly, the per quintal net returns from all the other crops put together with respect to the average category of sampled farmers of Amravati district though declined to Rs.910 in 2007-08 from Rs.922 in 2006-07 but increased again to Rs.1,152 in 2008-09, indicating 25 per cent rise in per quintal net returns from all other crops in 2008-09 over that of 2006-07, and 27 per cent rise in the same in 2008-09 over that of 2007-08.

Table 4.12: Profitability in All Other Crop Farming: NFSM Amravati District
(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	9	74350	38319	36031	8261.11	20652.78	4003.44	10008.61	1982.67	960.83	84730
2007-08	7	40843	18270	22573	5834.71	14586.79	3224.71	8061.79	1433.07	792.04	31955
2008-09	8.5	75100	31263	43837	8835.29	22088.24	5157.29	12893.24	1925.64	1124.03	69400
Small											
2006-07	14.21	91714	43677	48037	6454.19	16135.47	3380.51	8451.27	1358.73	711.66	63795
2007-08	21.86	180592	81221	99371	8261.30	20653.25	4545.79	11364.48	1900.97	1046.01	165271
2008-09	24.33	231248	90106	141142	9504.64	23761.61	5801.15	14502.88	2037.42	1243.54	214648
Medium											
2006-07	17	121410	57935	63475	7141.76	17854.41	3733.82	9334.56	1428.35	746.76	89635
2007-08	15.75	153817	69904	83913	9766.16	24415.40	5327.81	13319.52	1997.62	1089.78	139726
2008-09	29.5	276261	116815	159446	9364.78	23411.95	5404.95	13512.37	2031.33	1172.40	251893
Large											
2006-07	23	243687	110590	133097	10595.09	26487.72	5786.83	14467.07	2156.52	1177.85	239537
2007-08	21.5	113614	51865	61749	5284.37	13210.93	2872.05	7180.12	1195.94	649.99	67360
2008-09	16	173831	77720	96111	10864.44	27161.09	6006.94	15017.34	1869.15	1033.45	149981
Total											
2006-07	63.21	529093	250521	278572	8370.40	20926.00	4407.09	11017.72	1751.96	922.42	462698
2007-08	66.11	490208	221260	268948	7415.04	18537.59	4068.19	10170.47	1658.91	910.150	404133
2008-09	78.33	755238	315904	439334	9641.75	24104.37	5608.76	14021.89	1979.65	1151.60	684725

Note: i) Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

(ii) All other major crops include Soybean, Jowar, Cotton, Bajra, Kharif Sunflower, Ladyfinger, and Rabi Sunflower

The per hectare value of marketed surplus of all other crops put together for the average category of sampled farmers of Amravati district was estimated at Rs.18,300 in 2006-07, Rs.15,283 in 2007-08, and Rs.21,854 in 2008-09, showing an increase in per hectare value of marketed of all other crops put together to the tune of 19 per cent in 2008-09 over that of 2006-07, and 43 per cent in 2008-09 over that of 2007-08.

Thus, the average category of sampled farmers belonging to the NFSM district of Amravati derived much higher per hectare net returns from the cultivation of pulses crops as compared to other crops since the per hectare net returns for total pulses crops turned out be Rs.8,897 in 2006-07, Rs.11,861 in 2007-08, and Rs.17,076 in 2008-09 as against per hectare net returns from all other crops estimated at Rs.11,012 in 2006-07, Rs.10,170 in 2007-08, and Rs.14,022 in 2008-09. Even per quintal net return was substantially high in the case of pulses crop farming vis-à-vis all other crop farming since the average category of sampled farmer of Amravati district showed a net per quintal return in total pulses crop farming to the tune of Rs.1,238 in 2006-07, Rs.1,470 in 2007-08, and Rs.1,845 in 2008-09 as against per quintal net returns from all other crops estimated at Rs.922 in 2006-07, Rs.910 in 2007-08, and at Rs.1,152 in 2008-09. These estimates clearly show positive impact of NFSM programme on pulses crop farming as the net returns from pulses crops are much as against other crops cultivated by the sampled farmers of Amravati district, especially in 2008-09.

4.2 Profitability of Pulses and Other Crops in Non-NFSM District

The sampled farmers belonging to non-NFSM district of Beed were found to cultivate large number of crops that not only included various pulses crops like mung, tur and gram but a spectrum of other crops like soybean, kharif jowar, cotton, bajra, rabi jowar, wheat, kardi, onion, sugarcane, and banana. The cropping pattern of sampled farmers of non-NFSM district of Beed was, therefore, more diversified with varied area allocation under various crops. The amount of profit involved in the cultivation of these crops was evaluated separately for each crop by taking into account their cost and return structure for three reference years viz. 2006-07, 2007-08 and 2008-09, and this analysis was performed for all the sampled farmers drawn from the non-NFSM district of Beed.

4.2.1 Economics of Pulses Crops in Non-NFSM District

The pulses crops cultivated by the sampled farmers of non-NFSM district of Beed encompassed mung and tur in kharif season and gram in rabi season. The estimates relating to gross returns, paid out cost, net returns, per hectare gross and net returns, per

quintal gross and net returns coupled with and value of marketed surplus for various pulse crops viz. mung, tur and gram, and also for total pulse crops with respect to various categories of sampled farmers of Beed district for the reference years 2006-07, 2007-08 and 2008-09 are furnished in Table 4.13, Table 4.14, Table 4.15 and Table 4.16.

Although the sampled farmers of non-NFSM district of Beed allocated significant area under mung crop cultivation, the profitability in the cultivation of this crop differed across various categories of farmers. However, in general, the average category of sampled farmer of Beed district showed a net per hectare return from mung crop cultivation to the tune of Rs.8,851 in 2006-07, Rs.9,238 in 2007-08, and Rs.13,212 in 2008-09, indicating about 49 per cent higher net return in mung crop cultivation in 2008-09 over that of 2006-07 (Table 4.13). The returns from mung crop not only increased on per hectare basis but also on per quintal basis during the period between 2006-07 and 2008-09. In the case of average category of sampled farmer of Beed district, the per quintal net return from mung crop was estimated at Rs.1,364 in 2006-07, Rs.1,273 in 2007-08, and Rs.1,750 in 2008-09, showing 28 per cent rise per quintal net return from mung crop in 2008-09 over that of 2006-07.

Table 4.13: Profitability in Mung Crop Farming: Non-NFSM Beed District

(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value Marked Surplus
Marginal											
2006-07	3.50	32178	19165	13013	9193.57	22983.93	3718.00	9295.00	3387.16	1369.79	3130
2007-08	1.75	16700	10271	6429	9542.86	23857.14	3673.71	9184.29	3711.11	1428.67	1440
2008-09	2.00	21406	12020	9386	10703.00	26757.50	4693.00	11735.50	3892.00	1706.55	2080
Small											
2006-07	12.00	108510	64010	53160	9042.50	22606.25	4430.00	11075.00	3444.76	1687.62	9680
2007-08	11.50	113436	69515	43921	9864.00	24660.00	3819.22	9548.04	3694.98	1430.65	9410
2008-09	23.00	277072	159663	117409	12046.61	30116.52	5104.74	12761.85	4166.50	1765.55	23700
Medium											
2006-07	6.75	60020	38138	21882	8891.85	22229.63	3241.78	8104.44	3429.71	1250.40	4800
2007-08	3.00	35000	23550	11450	11666.67	29166.67	3816.67	9541.67	3888.89	1272.22	3040
2008-09	12.00	157148	95950	61198	13095.67	32739.17	5099.83	12749.58	4247.24	1654.00	14120
Large											
2006-07	8.00	70400	42700	27700	8800.00	22000.00	3462.50	8656.25	3520.00	1385.00	6460
2007-08	23.00	264510	180970	83540	11500.43	28751.09	3632.17	9080.43	3778.71	1193.43	24740
2008-09	13.00	180948	104700	76248	13919.08	34797.69	5865.23	14663.08	4308.29	1815.43	16240
Total											
2006-07	30.25	271108	164013	107095	8962.25	22405.62	3540.33	8850.83	3453.61	1364.27	24070
2007-08	39.25	429645	284306	145339	10946.37	27365.92	3702.90	9238.47	3762.22	1272.67	38620
2008-09	50.00	636573	372333	264240	12731.46	31828.65	5284.80	13212.00	4215.72	1749.93	56150

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

A significant rise in per hectare value of marketed surplus of mung crop was also seen during the period between 2006-07 and 2008-09. For the average category of farmers of Beed district, the per hectare value of marketed surplus of mung crop increased from Rs.19,898 in 2006-07 to Rs.24,605 in 2007-08, and further to Rs.28,076 in 2008-09, showing a steady increase in per hectare value of marketed surplus of mung crop during the period between 2006-07 and 2008-09.

All the categories of sampled farmers drawn from the non-NFSM district of Beed were also found to cultivate tur crop on their farms and area allocation under this crop was quite high for various categories of farmers. Although no discernable trend was noticed in terms of net returns emanating in the cultivation of tur crop across various categories of farmers, the average category of sampled farmer of Beed district showed an increase in per hectare net returns from tur crop from Rs.14,083 in 2006-07 to Rs.14,386 in 2007-08, and further to Rs.17,302 in 2008-09 (Table 4.14). The average category of sampled farmer of Beed district showed a marginal decline in per quintal net returns from tur crop from Rs.1,449 in 2006-07 to Rs.1,419 in 2007-08 with an increase in the same to Rs.1,674 in 2008-09, showing an overall rise in per quintal net returns from tur crop of the order of 16 per cent in 2008-09 over that of 2006-07.

Table 4.14: Profitability in Tur Crop Farming: Non-NFSM Beed District

(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	7.52	93209	47347	45862	12394.81	30987.03	6098.67	15246.68	3270.49	1661.30	66987.00
2007-08	2.27	23202	9062	14140	10221.15	25552.86	6229.07	15572.69	2508.32	1528.65	17088.25
2008-09	7.02	87422	41662	45760	12453.28	31133.19	6518.52	16296.30	3014.55	1577.93	75285.00
Small											
2006-07	9.60	108784	56222	52562	11331.67	28329.17	5475.21	13688.02	2825.56	1365.25	83506.50
2007-08	10.85	132891	58376	74515	12248.02	30620.05	6867.74	17169.35	2857.87	1602.47	111397.00
2008-09	9.25	121558	59165	62393	13141.41	32853.51	6745.19	16862.97	3116.87	1599.82	104020.00
Medium											
2006-07	18.50	197330	95623	101707	10666.49	26666.22	5497.68	13744.19	2819.00	1452.96	164625.00
2007-08	23.45	280659	161809	118850	11968.40	29921.00	5068.23	12670.58	2938.84	1244.50	239682.00
2008-09	12.25	163813	80090	83723	13372.49	33431.22	6834.53	17086.33	3212.02	1641.63	142429.50
Large											
2006-07	9.25	104071	51435	52636	11250.92	28127.30	5690.38	14225.95	2890.86	1462.11	89463.00
2007-08	16.00	180004	85000	95004	11250.25	28125.63	5937.75	14844.38	2903.29	1532.32	159036.00
2008-09	15.75	212132	97625	114507	13468.70	33671.75	7270.29	18175.71	3314.56	1789.17	183454.00
Total											
2006-07	44.87	503393	250626	252767	11218.92	28047.30	5633.32	14083.30	2909.79	1448.71	404866.00
2007-08	52.57	616755	314247	302508	11732.07	29330.18	5754.38	14385.96	2892.17	1418.56	526765.00
2008-09	44.27	584925	278542	306383	13212.67	33031.68	6920.78	17301.95	3196.31	1674.22	505206.00

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

The average category of farmers belonging to Beed district showed a rise in per hectare value of marketed surplus of tur crop from Rs.22,558 in 2006-07 to Rs.25,051 in 2007-08, and further to Rs.25,530 in 2008-09, revealing about 26 per cent rise in this value in 2008-09 over that of 2006-07.

The sampled farmers of non-NFSM district of Beed derived much lower return from gram crop cultivated during rabi season as compared to kharif pulses like tur and mung since per hectare net returns from gram crop for the average category of sampled farmers of Beed district worked out at Rs.7,220 in 2006-07, Rs.10,842 in 2007-08, and Rs.12,467 in 2008-09 (Table 4.15). However, the average category of sampled farmer derived 73 per cent higher per hectare net return from gram crop in 2008-09 over that of 2006-07. Similarly, the gram crop showed lower per quintal net return as compared to tur and mung crop. The per quintal net return from gram crop with respect to the average category of sampled farmer of Beed district was estimated at Rs.997 in 2006-07, Rs.1,360 in 2007-08, and Rs.1,486 in 2008-09, which though again showed 49 per cent rise in per quintal net returns from gram crop in 2008-09 over that of 2006-07.

Table 4.15: Profitability in Gram Crop Farming: Non-NFSM Beed District
(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value Marketed Surplus
Marginal											
2006-07	12.60	72863	39026	33837	5782.78	14456.94	2685.48	6713.69	1943.01	902.32	61220
2007-08	9.50	69907	29200	40707	7358.63	18396.58	4284.95	10712.37	2255.06	1313.13	58700
2008-09	3.00	25400	10750	14650	8466.67	21166.67	4883.33	12208.33	2540.00	1465.00	22400
Small											
2006-07	13.00	83051	45080	37971	6388.54	15971.35	2920.85	7302.12	2102.56	961.29	66800
2007-08	16.50	120916	47440	73476	7328.24	18320.61	4453.09	11132.73	2218.64	1348.18	97800
2008-09	25.60	225228	99370	125858	8797.97	21994.92	4916.33	12290.82	2559.41	1430.20	181600
Medium											
2006-07	8.50	54358	29970	24388	6395.06	15987.65	2869.18	7172.94	2131.69	956.39	44200
2007-08	10.50	79700	32125	47575	7590.48	18976.19	4530.95	11327.38	2277.14	1359.29	63600
2008-09	15.50	140185	57685	82500	9044.19	22610.48	5254.78	13136.94	2548.82	1500.00	115700
Large											
2006-07	32.00	197382	102670	94712	6168.19	15420.47	2959.75	7399.38	2217.78	1064.18	165000
2007-08	64.00	483900	209805	274095	7560.94	18902.34	4282.73	10706.84	2419.50	1370.48	432300
2008-09	46.00	400350	173050	227300	8703.26	21758.15	4941.30	12353.26	2669.00	1515.33	341800
Total											
2006-07	66.10	407653	216746	190907	6167.22	15418.04	2888.15	7220.39	2128.74	996.90	337400
2007-08	100.50	754423	318570	435853	7506.70	18766.74	4336.85	10842.11	2353.89	1359.92	651500
2008-09	90.30	791163	340855	450308	8761.50	21903.74	4986.80	12467.00	2611.10	1486.17	661300

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

Like tur and mung, the gram crop showed a steady increase in per hectare value of marketed surplus, which, for the average category of sampled farmers of Beed district, increased from Rs.12,761 in 2006-07 to Rs.16,207 in 2007-08, and further to Rs.18,310 in 2008-09, revealing 43 per cent rise in the same in 2008-09 over that of 2006-07. A greater rise in per hectare value of marketed surplus of gram crop was noticed in 2007-08 over that of 2006-07 as against rise in the same between 2007-08 and 2008-09.

Although various pulses crops cultivated on farms belonging to sampled farmers of non-NFSM district of Beed showed varied net returns with tur crop showing higher per hectare net returns and mung showing higher per quintal net returns, the general scenario with all the pulses crops put together revealed a steady rise in per hectare as well per quintal net returns during the period between 2006-07 and 2008-09 with rise in the same being more sharp between 2007-08 and 2008-09. The average category of farmer of Beed district showed an increase in per hectare net returns from total pulses crops from Rs.9,750 in 2006-07 to Rs.11,487 in 2007-08, and further to Rs.13,829 in 2008-09, showing 42 per cent rise in per hectare net returns from total pulses crops cultivation in 2008-09 over that of 2006-07 (Table 4.16).

Table 4.16: Profitability in Total Pulses Crops Farming: Non-NFSM Beed District
(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	23.62	198250	105538	92712	8393.31	20983.28	3925.15	9812.87	2625.83	1227.97	159527
2007-08	13.52	109809	48533	61276	8121.97	20304.92	4532.25	11330.62	2453.83	1369.3	90248.25
2008-09	12.02	134228	64432	69796	11167.05	27917.64	5806.66	14516.64	3016.36	1568.44	118603
Small											
2006-07	34.6	300345	165312	143693	8680.49	21701.23	4152.98	10382.44	2742.88	1312.26	247227.5
2007-08	38.85	367243	175331	191912	9452.84	23632.11	4939.82	12349.55	2788.48	1457.19	303362.3
2008-09	57.85	623858	318198	305660	10784.06	26960.16	5283.66	13209.16	3224.07	1579.64	522733
Medium											
2006-07	33.75	311708	163731	147977	9235.79	23089.48	4384.50	10961.26	2758.48	1309.53	256890.5
2007-08	36.95	395359	217484	177875	10699.84	26749.59	4813.94	12034.84	2834.11	1275.09	333682
2008-09	39.75	461146	233725	227421	11601.16	29002.89	5721.28	14303.21	3224.8	1590.36	399435
Large											
2006-07	49.25	371853	196805	175048	7550.31	18875.79	3554.27	8885.69	2795.89	1316.15	319141
2007-08	103	928414	475775	452639	9013.73	22534.32	4394.55	10986.38	2796.43	1363.37	838851
2008-09	74.75	793430	375375	418055	10614.45	26536.12	5592.71	13981.77	3099.34	1633.03	687700.5
Total											
2006-07	141.22	1182154	631385	550769	8371.01	20927.52	3900.08	9750.19	2668.52	1243.27	983044
2007-08	192.32	1800823	917123	883700	9363.68	23409.20	4594.95	11487.36	2779.26	1363.84	1564584.4
2008-09	184.57	2012661	991730	1020931	10904.59	27261.49	5531.40	13828.51	3159.59	1602.72	1728100.5

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns - Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

As for the average category of sampled farmers belonging to non-NFSM district of Beed, the total pulses crops yielded a per quintal net returns to the tune of Rs.1,243 in 2006-07, Rs.1,364 in 2007-08, and Rs.1,603 in 2008-09, revealing 10 per cent rise in per quintal net returns from total pulse crops in 2007-08 over that of 2006-07, 18 per cent rise in the same in 2008-09 over that of 2007-08, and 29 per cent rise in the same in 2008-09 over that of 2006-07. The average category of sampled farmers of Beed district showed an increase in per hectare value of marketed surplus with respect to total pulses crops from Rs.17,403 in 2006-07 to Rs.20,338 in 2007-08, and further to Rs.23,407 in 2008-09, showing 34 per cent rise in per hectare value of marketed surplus from total pulses crops in 2008-09 over that of 2006-07.

It is to be noted that tough pulses crop farming was lucrative proposition in both NFSM district of Amravati and non-NFSM district of Beed, the amount of net profit involved in the cultivation of pulses crops stood at much higher in the NFSM district of Amravati as against the non-NFSM district of Beed. The extent of net returns per hectare as well as per quintal from pulses crops stood at quite high in 2008-09 as compared to 2007-08 and 2006-09, especially in the NFSM district of Amravati.

The pulses crops like tur yielded the highest net returns per hectare as against mung and gram crop in both NFSM district of Amravati and non-NFSM district of Beed. Although the element of net per hectare profit in tur crop cultivation for the average category of farmers of NFSM district of Amravati was worked out at Rs.15,802 in 2006-07, Rs.15,866 in 2007-08, and as much as Rs.24,372 in 2008-09, the similar estimates with respect to tur crop in the non-NFSM district of Beed stood at Rs.14,083 in 2006-07, Rs.14,386 in 2007-08, and Rs.17,302 in 2008-09. The next important pulse crop generating substantial profit in its cultivation was rabi gram, which, on an average, yielded a net per hectare return to the tune of Rs.8,170 in 2006-07, Rs.13,707 in 2007-08, and Rs.20,300 in 2008-09 in the NFSM district of Amravati as against estimates in this respect generated in non-NFSM district of Beed, which showed a net per hectare return from gram crop cultivation to the tune of Rs.7,220 in 2006-07, Rs.10,842 in 2007-08, and Rs.12,467 in 2008-09. The pulse crop like mung yielded the lowest per hectare returns on the farms belonging to both sampled farmers of NFSM district of Amravati and non-NFSM district of Beed. The element of per hectare profit involved in the cultivation of mung crop in the NFSM district of Amravati, on an average, was estimated at Rs.8,660 in 2006-07, Rs.9,448 in 2007-08, and Rs.13,113 in 2008-09 as against net per hectare return

emanating from this crop to the tune of Rs.8,851 in 2006-07, 9,238 in 2007-08, and Rs.13,212 in 2008-09. Even for the total pulses crops, the element of per hectare net return was substantially high in the NFSM district of Amravati as against the non-NFSM district of Beed since the extent of per hectare net profit from pulses crops, on an average, was Rs.8,897 in 2006-07, Rs.11,861 in 2007-08, and Rs.17,076 in 2008-09 as against similar figures estimated for the non-NFSM district of Beed at Rs.9,750 in 2006-07, Rs.11,487 in 2007-08, and Rs.13,829 in 2008-09. These estimates clearly bring us closer to the fact that not only various pulses crops cultivated in NFSM district of Amravati yielded higher net returns as against pulses crops cultivated in non-NFSM district of Beed but the rise in the element of profit in pulses crop cultivation in 2008-09 vis-à-vis 2007-08 and 2006-07 was quite substantial in NFSM district of Amravati as against its counterpart in non-NFSM district of Beed, which clearly show a positive impact of NFSM programme in the NFSM district of Amravati.

4.2.2 Economics of Other Major Crops in Non-NFSM District

The cropping pattern of sampled farmers drawn from the non-NFSM district of Beed was mainly dominated by other crops as compared to pulses crops. The other crops cultivated on the farms belonging to the non-NFSM district of Beed included soybean, kharif jowar, cotton, bajra, rabi jowar, wheat, kardi, onion, sugarcane and banana. The estimates relating to gross returns, paid out cost, net returns, per hectare gross and net returns, per quintal gross and net returns, and value of marketed surplus of these crops for various categories of sampled farmers of Beed district for the reference years 2006-07, 2007-08 and 2008-09 are brought out separately in Tables 4.17, Table 4.18, Table 4.19, Table 4.20, Table 4.21, Table 4.22, and Table 4.23, Table 4.24, Table 4.25, and Table 4.26. The cost and return estimates along with value of marketed surplus for the given reference years with respect to all other crops put together for various categories of sampled farmers of Beed district are furnished in Table 4.27.

It is to be noted that some of the other crops were common in the cropping pattern of sampled farmers of NFSM district of Amravati and non-NFSM district of Beed, and these crops mainly included soybean, kharif jowar, cotton and bajra. However, the element of profit involved in their cultivation widely differed in the NFSM district of Amravati and non-NFSM district of Beed. The estimated per hectare and per quintal net returns coupled with value of marketed surplus of soybean crop cultivated on the farms belonging to non-NFSM district of Beed are brought out in Table 4.17.

Although per hectare net returns from soybean crop varied significantly across various categories of sampled farmers of Beed district, an increase in the same was noticed with the increase in land holding size of sampled farmers throughout the period between 2006-07 and 2007-08. However, the average category of sampled farmer drawn from the non-NFSM district of Beed showed per hectare net return from soybean crop to the tune of Rs.11,915 in 2006-07, Rs.14,363 in 2007-08, and Rs.15,141 in 2008-09, showing overall rise in the same of the order of 27 per cent in 2008-09 over that of 2006-07. As regards net return from soybean crop on per quintal basis, the average category of sampled farmer of Beed district showed a return of the order of Rs.895 in 2006-07, Rs.975 in 2007-08, and Rs.983 in 2008-09, revealing hardly much difference in net returns per quintal from soybean crop during the period between 2006-07 and 2007-08. However, the per hectare value of marketed surplus of soybean increased substantially as the average category of sampled farmer of Beed district showed an increase in this value from Rs.24,441 in 2006-07 to Rs.29,478 in 2007-08, and further to Rs.30,075 in 2008-09, showing an overall increase in the same to the tune of 23 per cent in 2008-09 over that of 2006-07 with increase in this value being more sharp in 2007-08 over that of 2006-07.

Table 4.17: Profitability in Soybean Crop Farming: Non-NFSM Beed District
(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	4.50	33221	17575	15646	7382.44	18456.11	3476.89	8692.22	1748.47	823.47	31996
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Small											
2006-07	7.00	64694	36150	28544	9242.00	23105.00	4077.71	10194.29	1902.76	839.53	60753
2007-08	11.00	131040	66150	64890	11912.73	29781.82	5899.09	14747.73	2080.00	1030.00	124845
2008-09	4.00	47950	26200	21750	11987.50	29968.75	5437.50	13593.75	1997.92	906.25	46800
Medium											
2006-07	9.00	99090	53850	45240	11010.00	27525.00	5026.67	12566.67	1942.94	887.06	92610
2007-08	5.00	67852	38550	29302	13570.40	33926.00	5860.40	14651.00	2188.77	945.23	66402
2008-09	3.00	36875	18750	18125	12291.67	30729.17	6041.67	15104.67	2048.61	1006.94	36000
Large											
2006-07	18.00	204168	110100	94068	11342.67	28356.67	5226.00	13065.00	2021.46	931.37	190896
2007-08	7.25	91232	51850	39382	12583.72	31459.31	5432.00	13580.00	2121.67	915.86	82960
2008-09	5.00	67050	34250	32800	13410.00	33525.00	6560.00	16400.00	2095.31	1025.00	61500
Total											
2006-07	38.50	401173	217675	183498	10420.08	26050.19	4766.18	11915.45	1956.94	895.11	376398
2007-08	23.25	290124	156550	133574	12478.45	31196.13	5745.12	14362.80	2117.69	974.99	274142
2008-09	12.00	151875	79200	72675	12656.25	31640.63	6056.25	15140.63	2052.36	982.09	144360

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns - Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

The marginal and medium categories of sampled farmers belonging to the non-NFSM district of Beed were found to allocate very small area under kharif jowar cultivation despite very low profit margin involved in its cultivation. The per hectare net profit margin in the cultivation of kharif jowar for the average category of farmer belonging to Beed district was estimated at Rs.6,529 in 2007-08 and Rs.6,175 in 2008-09, revealing a 5 per cent decline in profit margin from kharif jowar cultivation in 2008-09 over that of 2007-08 (Table 4.18). The margin of profit from kharif jowar cultivation on per quintal basis also declined in 2008-09 over that of 2007-08 since per quintal net return from kharif jowar cultivation for the average category of sampled farmer of Beed district was estimated at Rs.499 in 2007-08 and Rs.453 in 2008-09, showing about 9 per cent decline in per quintal net returns from kharif jowar in 2008-09 over that of 2007-08. The decline in per quintal net return from kharif jowar was, therefore, sharper than decline in per hectare net return from this crop. The per hectare value of marketed surplus with respect to kharif jowar was very low as it stood at only Rs.6,423 in 2007-08 for the average category of sampled farmer of Beed district. The major reason for the lower per hectare value of marketed surplus of kharif jowar was the fact that sampled farmers cultivated this crop mainly for home consumption and not for the purpose of marketing.

Table 4.18: Profitability in Kharif Jowar Crop Farming: Non-NFSM Beed District
(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
06-07	-	-	-	-	-	-	-	-	-	-	-
07-08	0.30	1520	630	890	5066.67	12666.67	2966.67	7416.67	844.44	494.44	-
08-09	1.00	5250	2350	2900	5250.00	13125.00	2900.00	7250.00	875.00	483.33	-
Total											
06-07	-	-	-	-	-	-	-	-	-	-	-
07-08	-	-	-	-	-	-	-	-	-	-	-
08-09	-	-	-	-	-	-	-	-	-	-	-
Medium											
06-07	-	-	-	-	-	-	-	-	-	-	-
07-08	1.00	4475	1970	2505	4475.00	11187.50	2505.00	6262.50	895.00	501.00	3375.00
08-09	1.75	7700	3808	3892	4400.00	11000.00	2224.00	5560.00	855.56	432.44	-
Large											
06-07	-	-	-	-	-	-	-	-	-	-	-
07-08	-	-	-	-	-	-	-	-	-	-	-
08-09	-	-	-	-	-	-	-	-	-	-	-
Total											
06-07	-	-	-	-	-	-	-	-	-	-	-
07-08	1.30	5995	2600	3395	4611.54	11528.85	2611.54	6528.85	881.62	499.26	3340.00
08-09	2.75	12950	6158	6792	4709.09	11772.73	2469.82	6174.55	863.33	452.80	-

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns - Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Another very important crop cultivated on the farms of sampled farmers belonging to the non-NFSM district of Beed was cotton since all the sampled farmers allocated substantial area under this crop due to high element of profit margin involved in its cultivation. In the cultivation of cotton crop, the average category of sampled farmer drawn from the non-NFSM district of Beed generated per hectare net return of the order of Rs.14,014 in 2006-07, Rs.15,417 in 2007-08, and Rs.16,659 in 2008-09, showing only 19 per cent overall increase in net per hectare return from cotton crop cultivation in 2008-09 over that of 2006-07 (Table 4.19). Further, the average category of sampled farmer of Beed district by and large generated same per quintal net return from cotton crop in 2006-07, 2007-08 and 2008-09 since it was estimated at Rs.1,026 in 2006-07, Rs.1,097 in 2007-08, and Rs.1,103 in 2008-09, showing hardly any difference in per quintal net returns from cotton crop. However, the average category of sampled farmer of Beed district showed an increase in per hectare value of marketed surplus from cotton crop, which increased from Rs.29,568 in 2006-07 to Rs.32,495 in 2007-08, and further to Rs.34,693 in 2008-09, recording about 17 per cent overall rise in per hectare value of marketed surplus from cotton crop in 2008-09 over that of 2006-07.

Table 4.19: Profitability in Cotton Crop Farming: Non-NFSM Beed District
(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	6.75	61312	36088	25224	9083.26	22708.15	3736.89	9342.22	2189.71	900.86	59612
2007-08	12.95	167298	90083	77215	12918.76	32296.91	5962.55	14906.37	2307.56	1065.03	163922
2008-09	14.25	201415	102038	99377	14134.39	35335.96	6973.82	17434.56	2237.94	1104.19	197640
Small											
2006-07	27.00	348835	193935	154900	12919.81	32299.54	5737.04	14342.59	2250.55	999.35	340983
2007-08	22.50	296760	160625	136135	13189.33	32973.33	6050.44	15126.11	2364.62	1084.74	291034
2008-09	21.75	313352	164263	149089	14406.99	36017.47	6854.67	17136.67	2329.75	1108.47	307600
Medium											
2006-07	36.00	404784	249290	155494	11244.00	28110.00	4319.28	10798.19	2199.91	845.08	395780
2007-08	41.00	558157	297975	260182	13613.59	34033.96	6345.90	15864.76	2355.09	1097.81	547700
2008-09	39.00	533060	297915	235145	13668.21	34170.51	6029.36	15073.40	2390.40	1009.21	546380
Large											
2006-07	52.00	656680	309800	346880	12628.46	31571.15	6670.77	16676.92	2203.62	1164.03	643680
2007-08	18.00	229532	120600	108932	12751.78	31879.44	6051.78	15129.44	2390.96	1134.71	224830
2008-09	41.00	568914	303000	265914	13875.95	34689.88	6485.71	16214.27	2341.21	1094.30	558410
Total											
2006-07	121.75	1471611	789113	682498	12087.15	30217.89	5605.73	14014.33	2212.95	1026.31	1439970
2007-08	94.45	1251746	669283	582463	13253.00	33132.50	6166.89	15417.23	2357.34	1096.92	1227670
2008-09	116.00	1640191	867215	772976	14139.58	35348.94	6663.59	16658.97	2341.46	1103.46	1609740

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

It is to be noted that despite very low element of net profit margin involved in the cultivation of bajra crop, the sampled farmers of Beed district allocated reasonable area under this crop, and this held especially true in the case of small and large categories of farmers. In the case of bajra crop cultivation, the average category of sampled farmers of Beed generated as low as Rs.2,688 per hectare net return in 2006-07, which marginally increased to Rs.2,799 in 2007-08, and further to Rs.3,880 in 2008-09 (Table 4.20). Not only per hectare but per quintal net returns from bajra crop stood at very low as the average category of sampled farmers of Beed district received only Rs.341 per quintal net return from bajra crop in 2006-07, which marginally declined to Rs.331 in 2007-08 with a rise in the same to Rs.416 in 2008-09. The per hectare value of marketed surplus of bajra crop was also very low as the sampled farmers sold very low quantity in the market and consumed most part of the crop. The per hectare value of marketed surplus of bajra crop for the average category of sampled farmers of Beed district was estimated at only Rs.4,736 in 2006-07, Rs.3,667 in 2007-08, and Rs.3,944 in 2008-09, showing nearly 17 per cent decline in per hectare value of marketed surplus of bajra crop in 2008-09 over that of 2006-07.

Table 4.20: Profitability in Bajra Crop Farming: Non-NFSM Beed District
(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	2.00	5748	3225	2523	2874.00	7185.00	1261.50	3153.75	821.14	360.43	3320.00
2008-09	0.50	1700	825	875	3400.00	8500.00	1750.00	4375.00	850.00	437.50	-
Small											
2006-07	5.00	12375	8000	4375	2475.00	6187.50	875.00	2187.50	853.45	301.72	4086.00
2007-08	2.00	5975	3650	2325	2987.50	7468.75	1162.50	2906.25	796.67	310.00	3250.00
2008-09	5.50	17944	8075	9869	3262.55	8156.36	1794.36	4485.91	815.64	448.59	8124.00
Medium											
2006-07	0.50	1300	875	425	2600.00	6500.00	850.00	2125.00	866.67	283.33	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Large											
2006-07	24.00	65284	38360	26924	2720.17	6800.42	1121.83	2804.58	847.84	349.66	51900.00
2007-08	13.00	36040	21850	14190	2772.31	6930.77	1091.54	2728.85	838.14	330.00	18360.00
2008-09	9.00	27488	14950	12538	3054.22	7635.56	1393.11	3482.78	859.00	391.81	15598.00
Total											
2006-07	29.50	78959	47235	31724	2676.58	6691.44	1075.39	2688.47	849.02	341.12	55890.00
2007-08	17.00	47763	28725	19038	2809.59	7023.97	1119.88	2799.71	830.66	331.10	24938.00
2008-09	15.00	47132	23850	23282	3142.13	7855.33	1552.13	3880.33	841.64	415.75	23664.00

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns - Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

The sampled farmers belonging to the non-NFSM district of Beed were found to cultivate jowar during both kharif and rabi season. The element of net return emanating from rabi jowar was found to be much higher than profit margin involved in the cultivation of kharif jowar. In the case of average category of farmer drawn from Beed district, the rabi jowar crop yielded a per hectare net return to the tune of Rs.8,404 in 2006-07, Rs.9,992 in 2007-08, and Rs.10,635 in 2008-09, registering about 27 per cent rise in per hectare net returns from rabi jowar crop in 2008-09 over that of 2006-07 (Table 4.21). The per quintal net return from rabi jowar crop for the average category of sampled farmer of Beed district was found to be Rs.588 in 2006-07, Rs.658 in 2007-08, and Rs.726 in 2008-09. As for value of marketed surplus, the average category of sampled farmer of Beed district showed an increase in per hectare value of marketed surplus of rabi jowar crop from Rs.6,591 in 2006-07, to Rs.8,156 in 2007-08, and further to Rs.9,692 in 2008-09, revealing 24 per cent rise in this value in 2007-08 over that of 2006-07, 19 per cent rise in 2008-09 over that of 2007-08, and 47 per cent rise in the same in 2008-09 over that of 2006-07.

Table 4.21: Profitability in Rabi Jowar Crop Farming: Non-NFSM Beed District
(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Small											
2006-07	6.00	47917	22838	25079	7986.17	19965.42	4179.83	10449.58	1168.71	611.68	14059
2007-08	7.00	56408	24620	31788	8058.29	20145.71	4541.14	11352.86	1282.00	722.45	21672
2008-09	4.50	37608	17243	20365	8357.33	20893.33	4525.56	11313.89	1343.14	727.32	15208
Medium											
2006-07	13.75	87846	47343	40503	6388.80	15972.00	2945.67	7364.18	1140.86	526.01	40159
2007-08	7.00	52086	26770	25316	7440.86	18602.14	3616.57	9041.43	1240.14	602.76	24575
2008-09	6.50	47200	22840	24360	7261.54	18153.85	3747.69	9369.23	1275.68	658.38	19008
Large											
2006-07	10.00	64400	29980	34420	6440.00	16100.00	3442.00	8605.00	1238.46	661.92	23759
2007-08	6.25	46508	22675	23833	7441.28	18603.20	3813.28	9533.20	1256.97	644.14	19688
2008-09	11.00	85816	36950	48866	7801.45	19503.64	4442.36	11105.91	1340.88	763.53	51312
Total											
2006-07	29.75	200163	100160	100003	6728.17	16820.42	3361.45	8403.61	1177.43	588.26	78432
2007-08	20.25	155002	74065	80937	7654.42	19136.05	3996.89	9992.22	1260.18	658.02	66065
2008-09	22.00	170624	77033	93591	7755.64	19389.09	4254.14	10635.34	1322.67	725.51	85292

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

The medium and large categories of sampled farmers belonging to the non-NFSM district of Beed were also found to cultivate wheat crop on their farms and some of the large category of farmers, in particular, had allocated significant area under its cultivation despite not very high returns emanating from this crop vis-à-vis cotton and pulses crops. The extent of per hectare net returns emanating from wheat crop for the average category of sampled farmers of Beed district was found to be Rs.6,375 in 2006-07, Rs.7,025 in 2007-08, and Rs.8,195 in 2008-09. Further, in the cultivation of wheat crop, the average category of farmer received Rs.546 per quintal net return in 2006-07, Rs.562 in 2007-08 and Rs.617 in 2008-09, revealing hardly any rise in per quintal net returns from wheat crop during the period between 2006-07 and 2008-09 (Table 4.22). Nonetheless, the per hectare value of marketed surplus of wheat crop for the average category of sampled farmer increased from Rs.9,000 in 2006-07 to Rs.12,500 in 2007-08, and further to Rs.13,125 in 2008-09, recording 46 per cent rise in per hectare value of marketed surplus of wheat crop in 2008-09 over that of 2006-07. The cultivation of wheat crop on the farms of sampled farmers of Beed district was partly for family consumption purpose and partly for the marketing purpose.

Table 4.22: Profitability in Wheat Crop Farming: Non-NFSM Beed District
(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Small											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Medium											
2006-07	3.00	14400	6750	7650	4800.00	12000.00	2550.00	6375.00	1028.57	546.43	10800.00
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	2.00	12400	5550	6850	6200.00	15500.00	3425.00	8562.50	1127.27	622.73	9000.00
Large											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	10.00	56200	28100	28100	5620.00	14050.00	2810.00	7025.00	1124.00	562.00	50000.00
2008-09	6.00	37075	17700	19375	6179.17	15447.92	3229.17	8072.92	1176.98	615.08	33075.00
Total											
2006-07	3.00	14400	6750	7650	4800.00	12000.00	2550.00	6375.00	1028.57	546.43	10800.00
2007-08	10.00	56200	28100	28100	5620.00	14050.00	2810.00	7025.00	1124.00	562.00	50000.00
2008-09	8.00	49475	23250	26225	6184.38	15460.94	3278.13	8195.31	1164.12	617.06	41998.50

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

Another crop cultivated by the medium and large categories of sampled farmers of Beed district was noticed to be kardi, though area allocation under this crop stood at very low. It seems the cultivation of this crop was mainly for family consumption purpose since the marketing of this crop did not take place in 2008-09 despite its cultivation by the sampled farmers. In the cultivation of kardi crop, the average category of sampled farmer of Beed district could generate per hectare net returns to the tune of only Rs.5,036 in 2006-07 and Rs.5,063 in 2008-09, showing hardly any difference in per hectare net returns from this crop during 2006-07 and 2008-09 (Table 4.23). Further, the per quintal net return from kardi crop was also very low since the average category of sampled farmers could receive only Rs.722 per quintal net returns from this crop in 2006-07 and Rs.810 in 2008-09. The per hectare value of marketed surplus with respect to kardi crop was estimated at Rs.3,913 in 2006-07 despite per hectare gross return from the same to the tune of Rs.11,957 in 2006-07. The lower per hectare value of marketed surplus of kardi crop was mainly due to very low quantity of the crop being marketed and major portion of the crop being used for home consumption.

Table 4.23: Profitability in Kardi Crop Farming: Non-NFSM Beed District
(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Small											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Medium											
2006-07	1.45	7400	4350	3050	5103.45	12758.62	2103.45	5258.62	1850.00	762.50	
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Large											
2006-07	2.00	9100	5200	3900	4550.00	11375.00	1950.00	4875.00	1820.00	780.00	5400
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	1.00	4750	2725	2025	4750.00	11875.00	2025.00	5062.50	1900.00	810.00	
Total											
2006-07	3.45	16500	9550	6950	4782.61	11956.52	2014.49	5036.23	1833.33	772.22	5400
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	1.00	4750	2725	2025	4750.00	11875.00	2025.00	5062.50	1900.00	810.00	

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

Despite the fact that onion crop involves high element of profit, only large category of sampled farmers belonging to non-NFSM district of Beed allocated some area under onion crop cultivation. The large category of sampled farmers of Beed district generated as much as Rs.54,375 net returns from one hectare onion farm in 2007-08 and Rs.64,063 in 2008-09, showing about 18 per cent increase in per hectare net returns from onion crop cultivation in 2008-09 over that of 2007-08 (Table 4.24). The per quintal net return from onion crop cultivation for the large category of farmer was estimated at Rs.335 in 2007-08 and Rs.387 in 2008-09. The per hectare value of marketed surplus of onion crop was significantly high and it stood at as much as Rs.97,500 in 2007-08 and Rs.1,15,938 in 2008-09. Very high fluctuation in the prices of onion crop could be the reason for lower allocation of area under this crop, apart from lack of irrigation facilities in the non-NFSM district of Beed.

Table 4.24: Profitability in Onion Crop Farming: Non-NFSM Beed District

(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Small											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Medium											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Large											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	10.00	390000	172500	217500	39000.00	97500.00	21750.00	54375.00	600.00	334.62	390000.00
2008-09	4.00	185500	83000	102500	46375.00	115937.50	25625.00	64062.50	700.00	386.79	185500.00
Total											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	10.00	390000	172500	217500	39000.00	97500.00	21750.00	54375.00	600.00	334.62	390000.00
2008-09	4.00	185500	83000	102500	46375.00	115937.50	25625.00	64062.50	700.00	386.79	185500.00

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

Another very important crop cultivated by the sampled farmers belonging to non-NFSM district of Beed was sugarcane since all the categories of farmers allocated

reasonable area under sugarcane cultivation, and among various farmers large category, in particular, devoted substantial area under sugarcane crop cultivation. Higher area allocation under sugarcane crop cultivation was mainly due to very high element of profit involved in its cultivation. In order to cultivate sugarcane crop, the sampled farmers belonging to non-NFSM district of Beed mainly used open well and river lift sources of irrigation since other sources of irrigation were not available for the sampled farmers drawn from Beed district. However, a decline in per hectare net return from sugarcane crop cultivation was noticed during the period between 2006-07 and 2008-09. Even per quintal net return from sugarcane cultivation declined during this period. Although there were large variations in terms of per hectare net returns from sugarcane crop cultivation across various categories of farmers, the average category of sampled farmer of non-NFSM district of Beed generated as much as Rs.39,460 per hectare net return from sugarcane crop cultivation in 2006-07, Rs.35,752 in 2007-08 and Rs.35,134 in 2008-09, showing about 11 per cent decline in per hectare net returns in sugarcane crop cultivation in 2008-09 over that of 2006-07 (Table 4.25).

Table 4.25: Profitability in Sugarcane Crop Farming: Non-NFSM Beed District
(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value Marketed Surplus
Marginal											
2006-07	1.50	42759	24300	18459	28506.00	71265.00	12306	30765.00	95.02	41.02	40500
2007-08	1.50	42900	27000	15900	28600.00	71500.00	10600.00	26500.00	95.33	35.33	40500
2008-09	1.50	57500	35700	21800	38333.33	95833.33	14533.33	36333.33	115.00	43.60	55000
Small											
2006-07	5.00	169000	91750	77250	33800.00	84500.00	15450.00	38625.00	99.41	45.44	161500
2007-08	8.00	269000	163250	105750	33625.00	84062.50	13218.75	33046.88	99.63	39.17	256500
2008-09	3.00	123900	78000	45900	41300.00	103250.00	15300.00	38250.00	112.64	41.73	118800
Medium											
2006-07	3.50	122250	68250	54000	34928.57	87321.43	15428.57	38571.43	94.04	41.54	117000
2007-08	5.50	220200	136550	83650	40036.36	100090.91	15209.09	38022.73	100.09	38.02	211200
2008-09	9.50	436250	278400	157850	45921.05	114802.63	16615.79	41539.47	111.86	40.47	421200
Large											
2006-07	65.00	2532100	1498000	1034100	38955.38	97388.46	15909.23	39773.08	97.76	39.93	2434600
2007-08	52.00	2092250	1339400	752850	40235.58	100588.94	14477.88	36194.71	100.83	36.28	2012700
2008-09	43.00	1878000	1302500	575500	43674.42	109186.05	13383.72	33459.30	112.12	34.36	1809000
Total											
2006-07	75.00	2866109	1682300	1183809	38214.79	95536.97	15784.12	39460.30	97.65	40.33	2758900
2007-08	67.00	2624350	1666200	958150	39169.40	97923.51	14300.75	35751.87	100.55	36.71	2531700
2008-09	57.00	2495650	1694600	801050	43783.33	109458.33	14053.51	35133.77	112.16	36.00	2403000

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

As for returns per quintal, the average category of sampled farmers of Beed district received Rs.40 as per quintal net returns from sugarcane crop cultivation in 2006-07, Rs.37 in 2007-08, and Rs.36 in 2008-09. The per hectare value of marketed surplus of sugarcane crop for the average category of sampled farmers of Beed district was estimated at Rs.91,963 in 2006-07, Rs.94,466 in 2007-08 and Rs.1,05,395 in 2008-09, recording about 15 per cent rise in per hectare value of marketed surplus of sugarcane in 2008-09 over that of 2006-07.

Another crop having very marginal presence in the cropping pattern of sampled farmers belonging to non-NFSM district of Beed was banana, which was specifically cultivated by medium category of sampled farmers in 2006-07 and 2007-08. The estimated per hectare net return from banana crop cultivation for medium category of farmer of Beed district was found to be Rs.36,250 in 2006-07 and Rs.39,125 in 2007-08, showing about 8 per cent rise in per hectare return from banana crop in 2007-08 over that of 2006-07 (Table 4.26). Nevertheless, the medium category of farmers of Beed district growing banana crop received by and large same per quintal net returns from banana crop in 2006-07 and 2007-08, which hovered at around Rs.121.

Table 4.26: Profitability in Banana Crop Farming: Non-NFSM Beed District
(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Small											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Medium											
2006-07	2.50	95000	58750	36250	38000.00	95000.00	14500.00	36250.00	316.67	120.83	90000.00
2007-08	2.50	116000	76875	39125	46400.00	116000.00	15650.00	39125.00	362.50	122.27	112000.00
2008-09	-	-	-	-	-	-	-	-	-	-	-
Large											
2006-07	-	-	-	-	-	-	-	-	-	-	-
2007-08	-	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-	-
Total											
2006-07	2.50	95000	58750	36250	38000.00	95000.00	14500.00	36250.00	316.67	120.83	90000.00
2007-08	2.50	116000	76875	39125	46400.00	116000.00	15650.00	39125.00	362.50	122.27	112000.00
2008-09	-	-	-	-	-	-	-	-	-	-	-

Note: Gross Returns = Value of Main Product (Production * Price) + Value of by-product

Net Returns = Gross Returns – Paid-out Costs

Value of Marketed Surplus = Quantity Sold * Price

Gross Returns / Hectare = Gross Returns / Area Sown under the Crop

Gross Returns / Quintal = Gross Returns / Production of the Crop

It is to be noted that since the marginal category of sampled farmers of Beed district diverted most of the banana crop production in the market, the per hectare value of marketed surplus of banana crop was substantially high and it stood at Rs.90,000 in 2006-07 and Rs.1,12,000 in 2007-08, showing about 24 per cent rise in this value of marketed surplus of banana crop in 2007-08 over that of 2006-07.

Since the sampled farmers belonging to the non-NFSM district of Beed cultivated a large number of diversified crops with significantly large area allocation towards highly profitable crops like sugarcane, cotton, soybean, onion and banana, the cost and return structure with respect to other crops put together was influenced by these crops, and, therefore, the average category of sampled farmers drawn from the non-NFSM district of Beed showed per hectare net returns from all other crops put together quite high as compared to net returns emanating from all pulses crops put together. This is evident from the fact that the per hectare net returns from all other crops put together for the average category of farmers of Beed district was estimated at Rs.18,392 in 2006-07, Rs.20,979 in 2007-08, and Rs.19,991 in 2008-09, as against net per hectare returns emanating from total pulses crops at Rs.9,750 in 2006-07, Rs.11,487 in 2007-08, and Rs.13,829 in 2008-09 (Table 4.27 and Table 4.16).

Table 4.27: Profitability in All Other Crops Farming: Non-NFSM Beed District
(Area in Acres; Return, Value and Costs in Rupees)

Category/ Year	Area	Gross Returns	Total Paid out Cost	Net Returns	Gross Returns per Acre	Gross Returns per Hectare	Net Returns per Acre	Net Returns per Hectare	Gross Returns Per Quintal	Net Returns per Quintal	Value of Marketed Surplus
Marginal											
2006-07	12.75	137292	77963	59329	10768.00	26920.00	4653.25	11633.14	276.24	119.37	13210
2007-08	16.75	217466	120938	96528	12983.04	32457.61	5762.87	14407.16	409.31	181.68	20770
2008-09	17.25	265865	140913	124952	15412.46	38531.16	7243.59	18108.99	444.59	208.95	25260
Small											
2006-07	50.00	642821	352673	290148	12856.42	32141.05	5802.96	14507.40	330.58	149.21	58130
2007-08	50.50	759183	418295	340888	15033.33	37583.32	6750.26	16875.64	258.23	115.95	69730
2008-09	38.75	540754	293781	246973	13954.94	34887.35	6373.50	15933.74	413.26	188.75	49650
Medium											
2006-07	69.70	832070	489458	342612	11937.88	29844.69	4915.52	12288.81	430.79	177.38	74630
2007-08	62.00	1018770	578690	440080	16431.77	41079.44	7098.06	17745.16	378.65	155.23	96520
2008-09	61.75	1073485	627263	446222	17384.37	43460.93	7226.27	18065.67	255.11	106.04	103150
Large											
2006-07	171.00	3531732	1991440	1540292	20653.40	51633.51	9007.56	22518.89	133.61	58.27	335020
2007-08	116.50	2941762	1756975	1184787	25251.18	63127.94	10169.85	25424.61	135.76	54.68	279850
2008-09	120.00	2854593	1795075	1059518	23788.28	59470.69	8829.32	22073.29	163.87	60.82	271430
Total											
2006-07	303.45	5143915	2911533	2232382	16951.44	42378.60	7356.67	18391.68	167.98	72.90	481570
2007-08	245.75	4937180	2874898	2062282	20090.25	50225.64	8391.79	20979.47	176.48	73.72	467980
2008-09	237.75	4758147	2857031	1901116	20013.24	50033.09	7996.28	19990.70	202.18	80.78	449350

Note: All other major crops include Soybean, Kharif Jowar, Cotton, Bajra, Rabi Jowar, Wheat, Kardi, Onion, Sugarcane, and Banana

It could be further noted that with all the other crops put together the average category of sampled farmers of the non-NFSM district of Beed received Rs.72.90 per quintal net returns in 2006-07, Rs.73.72 in 2007-08, and Rs.80.78 in 2008-09, as against per quintal net returns emanating from total pulses crops at Rs.1,243 in 2006-07, Rs.1,364 in 2007-08, and Rs.1,603 in 2008-09. The net per quintal net returns from all other crops turned out to be much lower as against per quintal net returns emanating from total pulses crops mainly owing to the fact that sugarcane crop cornered significant area allocation of sampled farmers of Beed district and the prices of sugarcane crop varied from Rs.90-100 per quintal, which had significant bearing on per quintal net returns from all other crops put together in the case of non-NFSM district of Beed. Generally, price of sugarcane crop is reported on per ton basis. However, in this study, the price of sugarcane crop is converted into per quintal basis with a view to keep uniformity since prices of other crops are reported in per quintal basis. The lower per quintal price of or net return from sugarcane has, therefore, greatly influenced the overall per quintal net returns from all other crops put together.

As for all other crops put together, the per hectare value of marketed surplus for the average category of farmers drawn from the non-NFSM district of Beed was estimated at Rs.39,675 in 2006-07, Rs.47,608 in 2007-08, and Rs.47,251 in 2008-09, showing about 19 per cent rise in this value in 2008-09 over that of 2006-07.

The foregoing observations further reveal that the element of profit involved in the cultivation of all other crops put together was much higher in the non-NFSM district of Beed as against the NFSM district of Amravati. This is concomitant from the fact that the average category of farmers drawn from non-NFSM district of Beed generated per hectare net returns from all other crops put together to the tune of Rs.18,392 in 2006-07, Rs.20,979 in 2007-08, and Rs.19,991 in 2008-09 as against corresponding figures for all other crops in NFSM district of Amravati estimated at Rs.11,017 in 2006-07, Rs.10,170 in 2007-08, and Rs.14,022 in 2008-09. In dismal contrast to this, the element of profit involved in the cultivation of all pulses crops put together was much higher in the NFSM district of Amravati as against the non-NFSM district of Beed since the average category of sampled farmers belonging to NFSM district of Amravati derived per hectare net returns from all pulses crops put together of the order of Rs.8,897 in 2006-07, Rs.11,861 in 2007-08, and Rs.17,076 in 2008-09 as against corresponding figures for all pulses crops in non-NFSM district of Beed estimated at Rs.9,750 in 2006-07, Rs.11,487 in

2007-08, and Rs.13,829 in 2008-09. The comparative analysis drawn from the NFSM district of Amravati and non-NFSM district of Beed clearly shows positive impact of NFSM programme in raising various pulses crops since the net returns from these crops are not only higher in NFSM district of Amravati as against non-NFSM district of Beed but net returns from pulses have grown very sharply in 2008-09 over that of 2007-08, especially in NFSM district of Amravati. In fact, the farmers belonging to NFSM district of Amravati derived 44 per cent higher net returns from pulses crop cultivation in 2008-09 over that of 2007-08 as against only 20 per cent higher net returns being generated from pulses crop cultivation in non-NFSM district of Beed in 2008-09 over that of 2007-08. However, the scenario with respect to all other crops was entirely different and sampled farmers of non-NFSM district derived much higher returns from these crops as compared to their counterpart in NFSM district of Amravati.

CHAPTER – V

TECHNOLOGY ADOPTION, MARKETING AND OTHER ISSUES

The major focus of this chapter is on ascertaining responses of sampled farmers of NFSM district of Amravati and non-NFSM district of Beed, especially with respect to knowledge about improved varieties of pulses, sources of knowledge, area under improved varieties of pulses, recommended practices followed by them in the cultivation of pulses in terms of sowing practices, seed practices, and other practices, problems with improved varieties of pulses, suggested solutions for improved varieties of pulses, etc. The other aspects covered in this chapter are relating to responses of sampled farmers of NFSM district of Amravati and non-NFSM district of Beed in terms of channels of marketing of pulses crops followed by them, quantity of various pulses crops sold through various channels, extent of government procurement of pulses crops, etc. The major thrust of this chapter is, therefore, on assessing the extent of involvement of the sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed in terms of adoption of improved technology for pulses crops and marketing of these crops through various channels, apart from assessing the extent of government procurement with respect to pulses crops.

5.1 Area Under Improved Varieties of Pulses in NFSM and Non-NFSM Districts

The responses of the sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed with respect to area allocation under improved as well as traditional varieties of pulses are brought out in Table 5.1 and Table 5.2.

In the NFSM district of Amravati, about 78 per cent of total sampled households were reported to have area under improved varieties of mung crop. The proportion of sampled households reporting area under improved varieties of mung crop increased with the increase in land holding size of farmers. Similarly, about 74 per cent of the total sampled households of Amravati district had reported area under improved varieties of gram crop with rise in this proportion with the increase in land holding size of farmers. As for tur crop, about 30 per cent of total sampled households of Amravati district had reported area under improved varieties with medium and small category of farmers showing higher proportions in this respect as against marginal and large category of farmers (Table 5.1).

Table 5.1: Households Reporting Area Under Improved Varieties of Pulses: NFSM Amravati District

Pulse Crop	No. of Households Reporting Area Under Improved Varieties	Total No. of Households in the Size Group	% of Households Reporting
Mung			
Marginal	11	15	73.33
Small	13	19	68.42
Medium	9	10	90.00
Large	6	6	100.00
All	39	50	78.00
Gram			
Marginal	10	15	66.67
Small	13	19	68.42
Medium	8	10	80.00
Large	6	6	100.00
All	37	50	74.00
Tur			
Marginal	2	15	13.33
Small	7	19	36.84
Medium	4	10	40.00
Large	2	6	33.33
All	15	50	30.00

The NFSM district of Amravati further showed that the area under improved varieties as proportion to net sown area of mung crop was 100 per cent for marginal category, 84 per cent for small, 91 per cent for medium and 100 per cent for large category with an overall average of 94 per cent for the average category of sampled farmers, whereas these proportions for gram crop stood at 100 per cent, 100 per cent, 85 per cent, 100 per cent, and 96 per cent, respectively (Table 5.1 (a)).

Table 5.1 (a): Area under Improved Varieties of Pulses: NFSM Amravati District – for 2008-09
(Area in Acre)

Pulse Crop	Total Area under the Crop	Area under Traditional Varieties	Area Under Improved Varieties	% of Area Under Improved Varieties
Mung				
Marginal	21.05	-	21.05	100.00
Small	36.86	6.00	30.86	83.72
Medium	39.75	3.75	36.00	90.57
Large	58.00	-	58.00	100.00
All	155.66	9.75	145.90	93.73
Gram				
Marginal	20.05	-	20.05	100.00
Small	37.86	-	37.86	100.00
Medium	41.00	6	35.00	85.37
Large	62.00	-	62.00	100.00
All	160.91	6.00	154.91	96.27
Tur				
Marginal	1.00	-	1.00	100.00
Small	5.95	2.00	3.95	66.39
Medium	4.50	1.25	3.25	72.22
Large	2.00	-	2.00	100.00
All	13.45	3.25	10.20	75.84

The proportion of area under improved varieties to net sown area with respect to tur crop in Amravati district was worked out at 100 per cent for marginal category, 66 per cent for small, 72 per cent for medium and 100 per cent for large category with an overall average of 76 per cent for the average category of farmer drawn from the NSFM district of Amravati. Thus, among various pulse crops, gram and mung showed higher proportion of net sown area under improved varieties.

As for pulses crops, in the non-NFSM district of Beed, the proportion of households to total sampled households reporting area under improved varieties was 30 per cent in the case of mung crop, 60 per cent for gram and 66 per cent for tur crop (Table 5.2). There was a rising trend in the proportion of households to total sampled households showing area under improved varieties of pulses with the rise in land holding size of sampled households belonging to the non-NFSM district of Beed.

Table 5.2: Households Reporting Area Under Improved Varieties of Pulses: Non-NFSM Beed District

Pulse Crop	No. of Households Reporting Area Under Improved Varieties	Total No. of Households in the Size Group	% of Households Reporting
Mung			
Marginal	2	14	14.29
Small	8	17	47.06
Medium	3	13	23.08
Large	2	6	33.33
All	15	50	30.00
Gram			
Marginal	3	14	21.43
Small	13	17	76.47
Medium	8	13	61.54
Large	6	6	100.00
All	30	50	60.00
Tur			
Marginal	9	14	64.29
Small	11	17	64.71
Medium	8	13	61.54
Large	5	6	83.33
All	33	50	66.00

In the non-NFSM district of Beed, the proportion of area under improved varieties to net sown area of mung crop was 100 per cent for marginal category, 79 per cent for small, 100 per cent for medium and 85 per cent for large category with an overall average of 87 per cent for the average category of farmer drawn from the non-NFSM district of Beed (Table 5.2 (a)). Interestingly, all sampled farmers of non-NFSM district of Beed showed their entire net sown area of gram crop under improved varieties. However, in the case of gram crop cultivated in non-NFSM district of Beed, the proportion of area under

improved varieties to net sown area was 57 per cent for marginal category, 40 per cent for small, 100 per cent for medium and 100 per cent for large category with an overall average of 81 per cent for the average category of farmers.

Table 5.2 (a): Area under Improved Varieties of Pulses: Non-NFSM Beed District – for 2003-09
(Area in Acre)

Pulse Crop	Total Area under the Crop	Area under Traditional Varieties	Area Under Improved Varieties	% of Area Under Improved Varieties
Mung				
Marginal	2.00	-	2.00	100.00
Small	23.00	4.75	18.25	79.35
Medium	12.00	-	12.00	100.00
Large	13.00	2.00	11.00	84.62
All	50.00	6.75	43.25	86.50
Gram				
Marginal	3.00	-	3.00	100.00
Small	25.60	-	25.60	100.00
Medium	15.70	-	15.70	100.00
Large	46.00	-	46.00	100.00
All	90.30	-	90.30	100.00
Tur				
Marginal	7.02	3.00	4.02	57.26
Small	9.25	5.50	3.75	40.54
Medium	12.25	-	12.25	100.00
Large	15.75	-	15.75	100.00
All	44.27	8.50	35.77	80.80

Thus, among various pulse crops cultivated in the non-NFSM district of Beed, while gram crop showed 100 per cent of the net sown area under improved varieties, this proportion stood at 87 per cent for mung crop and 81 per cent for tur crop.

In general, the sampled farmers of NFSM district of Amravati showed higher proportion of net shown area of mung crop under improved varieties as compared to the sampled farmers belonging to non-NFSM district of Beed. Contrary to this, the sampled farmers of non-NFSM district of Beed showed higher proportion on net sown area of gram crop and tur crop under improved varieties as against the sampled farmers drawn from the NFSM district of Amravati.

5.2 Knowledge of Improved Varieties in NFSM and Non-NFSM Districts

The responses with respect to knowledge of improved varieties of pulses and sources of knowledge were recorded for all the categories of sampled farmers belonging to NFSM district of Amravati and non-NFSM district of Beed, and these responses have been brought out in Table 5.3 and 5.4.

In the NFSM district of Amravati, the proportion of farmers to the total number of sampled farmers showing knowledge about improved varieties of pulses were 80 per cent

in marginal category, 84 per cent in small, 90 per cent in medium and 83 per cent in large category with an overall average of 84 per cent for the average category of farmer belonging to this district (Table 5.3).

Table 5.3: Knowledge of Improved Varieties of Pulses: NFSM Amravati District

Category	No. of Farmers Aware of Improved Varieties	Total No. of Farmers in the Size group	% of Farmers Aware of Improved Varieties
Marginal	12	15	80.00
Small	16	19	84.21
Medium	9	10	90.00
Large	5	6	83.33
Total	42	50	84.00

The farmers belonging to NFSM district of Amravati mainly acquired knowledge about improved varieties of pulses from extension agents, neighbours and also some other sources like relatives and distant friends, newspaper, etc. As for the sources of knowledge, about 50 per cent of sampled households of NFSM district of Amravati received knowledge about improved varieties of pulses from extension agents, 43 per cent from neighbours, 5 per cent from relatives, friends, etc. and 2 per cent from newspaper/media (Table 5.3 (a) and Table 5.3 (b)). The proportion of farmers to the total number of sampled farmers (only reported cases) receiving knowledge about improved varieties of pulses from extension agent increased with the increase in land holding size of sampled farmers of NFSM district of Amravati.

Table 5.3 (a): Source of Knowledge of Improved Varieties of Pulses: NFSM Amravati District

Category	Extension Agent	Neighbours	Newspaper /Media	Others	Total
Marginal	5	5	1	1	12
Small	9	7	-	-	16
Medium	4	4	-	1	9
Large	3	2	-	-	5
Total	21	18	1	2	42

Table 5.3 (b): % Distribution of Source of Knowledge of Improved Varieties: NFSM Amravati District

Category	Extension Agent	Neighbours	Newspaper /Media	Others	Total
Marginal	41.67	41.67	8.33	8.33	100.00
Small	56.25	43.75	-	-	100.00
Medium	44.44	44.44	-	11.11	100.00
Large	60.00	40.00	-	-	100.00
Total	50.00	42.86	2.38	4.76	100.00

As for non-NFSM district of Beed, the proportion of farmers to the total number of sampled farmers showing knowledge about improved varieties of pulses were 64 per cent in marginal category, 100 per cent in small, 54 per cent in medium and 100 per cent

in large category with an overall average of 78 per cent for the average category of farmer belonging to this district (Table 5.4). The small and large categories of sampled farmers of non-NFSM district of Beed, therefore, showed cent per cent knowledge about improved varieties of pulses.

Table 5.4: Knowledge of Improved Varieties of Pulses: Non-NFSM Beed District

Category	No. of Farmers Aware of Improved Varieties	Total No. of Farmers in the Size group	% of Farmers Aware of Improved Varieties
Marginal	9	14	64.29
Small	17	17	100.00
Medium	7	13	53.85
Large	6	6	100.00
Total	39	50	78.00

The major sources of knowledge about improved varieties of pulses were extension agents and neighbours in the case of sampled farmers drawn from the non-NFSM district of Beed. Further, in the non-NFSM district of Beed, about 56 per cent of sampled households received knowledge about improved varieties of pulses from extension agents and 44 per cent from neighbours (Table 5.4 (a) and Table 5.4 (b)). The proportion of farmers to the total number of sampled farmers of Beed district (only reported cases) acquiring knowledge about improved varieties of pulses from extension agent was as high as 78 per cent in marginal category, 41 per cent in small, 57 per cent in medium and 67 per cent in large category. On the other hand, the proportion of farmers to the total number of sampled farmers of Beed district receiving knowledge about improved varieties of pulses from neighbours was 22 per cent in marginal category, 59 per cent in small, 43 per cent in medium and 33 per cent in large category.

Table 5.4 (a): Source of Knowledge of Improved Varieties of Pulses: Non-NFSM Beed District

Category	Extension Agent	Neighbours	Newspaper /Media	Others	Total
Marginal	7	2	-	-	9
Small	7	10	-	-	17
Medium	4	3	-	-	7
Large	4	2	-	-	6
Total	22	17	-	-	39

Table 5.4 (b): % Distribution of Source of Knowledge of Improved Varieties: Non-NFSM Beed District

Category	Extension Agent	Neighbours	Newspaper /Media	Others	Total
Marginal	77.78	22.22	-	-	100.00
Small	41.18	58.82	-	-	100.00
Medium	57.14	42.86	-	-	100.00
Large	66.67	33.33	-	-	100.00
Total	56.41	43.59	-	-	100.00

A comparative analysis revealed that about 84 per cent of the total number of sampled farmers of NFSM district of Amravati and 78 per cent of the non-NFSM district of Beed had acquired knowledge about improved varieties of pulses. Extension agents and neighbours were the major sources of knowledge about improved varieties of pulses in the case of both NFSM district of Amravati and non-NFSM district of Beed. In the case of NFSM district of Amravati, 50 per cent of the sampled farmers received knowledge about improved varieties of pulses from extension agents, 43 per cent from neighbours, and remaining 7 per cent from other sources like friend, relatives, media, etc. As for non-NFSM district of Beed, 56 per cent of the total sampled farmers acquired knowledge about improved varieties of pulses from extension agents and 44 per cent from neighbours, showing higher proportion in this respect from extension agents.

5.3 Recommended Practices in NFSM and Non-NFSM Districts

Although there are some standard package of practices with respect to various crops, farmers in most cases do not follow these practices either due to their ignorance about these practices or due to some other handicaps like variations in soil type, availability of irrigation facilities, topography, agro-climatic differences, etc. As a result, the productivity of crops remains subdued and also returns from the crop. In order to evaluate the extent of technology adoption by the sampled farmers belonging to NFSM district of Amravati and non-NFSM district of Beed, their responses were recorded, especially with respect to sowing practices like time of sowing, no. of tillage, etc., seed practices like seed treatment, seed rate, line/broadcasting, insertion of seed at appropriate depth, etc., and other practices like application of organic manure, chemical fertilizer, no. of weeding and interculture, no. of irrigation, application of plant protection measures, etc. The responses of the sampled farmers of NFSM district of Amravati and non-NFSM district of Beed with respect to sowing, seed and other practices followed by them in the cultivation of various pulses crops are presented in Table 5.5 and 5.6.

Majority of the sampled farmers drawn from the NFSM district of Amravati were found to follow recommended sowing, seed and other practices, especially in the cultivation of pulses crops like mung and gram but not tur crop. In the cultivation of mung crop, 74 per cent of the total number of sampled farmers belonging to the NFSM district of Amravati were noticed to follow recommended sowing practices, 68 per cent followed recommended seed practices and 46-70 per cent followed recommended other practices like application of organic manure, use of chemical fertilizer, application of

plant protection measures, etc. (Table 5.5 and Table 5.5 (a)). Similarly, in the cultivation of gram crop, 70 per cent of the sampled farmers drawn from the NFSM district of Amravati were found to follow recommended sowing practices, 56 per cent followed recommended seed practices and 26-70 per cent followed recommended other practices like application of organic manure, chemical fertilizer, plant protection measures, etc.

Table 5.5: Recommended Practices in Pulses Crops: NFSM Amravati District

Category	Followed Some Practice					Not Followed Any Practice
	Sowing Practices	Seed Practices	Other Practices			
			Organic Manure	Chemical Fertilizer	Plant Protection	
Mung						
Marginal	12	13	10	14	11	1
Small	12	11	9	9	6	7
Medium	8	6	2	7	4	2
Large	5	4	2	5	3	1
Total	37	34	23	35	24	11
Gram						
Marginal	11	11	3	12	9	3
Small	11	11	5	12	7	7
Medium	8	4	3	7	4	2
Large	5	2	2	4	3	1
Total	35	28	13	35	23	13
Tur						
Marginal	3	3	1	3	3	12
Small	5	6	3	5	5	13
Medium	3	3	1	3	2	7
Large	2	1	1	3	1	3
Total	13	13	6	14	11	35

Table 5.5 (a): % of Households Following Recommended Practices: NFSM Amravati District
(in Per cent)

Category	Followed Some Practice					Not Followed Any Practice
	Sowing Practices	Seed Practices	Other Practices			
			Organic Manure	Chemical Fertilizer	Plant Protection	
Mung						
Marginal	80.00	86.67	66.67	93.33	73.33	6.67
Small	63.16	57.89	47.37	47.37	31.58	36.84
Medium	80.00	60.00	20.00	70.00	40.00	20.00
Large	83.33	66.67	33.33	83.33	50.00	16.67
Total	74.00	68.00	46.00	70.00	48.00	22.00
Gram						
Marginal	73.33	73.33	20.00	80.00	60.00	20.00
Small	57.89	57.89	26.32	63.16	36.84	36.84
Medium	80.00	40.00	30.00	70.00	40.00	20.00
Large	83.33	33.33	33.33	66.67	50.00	16.67
Total	70.00	56.00	26.00	70.00	46.00	26.00
Tur						
Marginal	20.00	20.00	6.67	20.00	20.00	80.00
Small	26.32	31.58	15.79	26.32	26.32	68.42
Medium	30.00	30.00	10.00	30.00	20.00	70.00
Large	33.33	16.67	16.67	50.00	16.67	50.00
Total	26.00	26.00	12.00	28.00	22.00	70.00

In contrast to mung and gram crops, the extent of recommended practices followed in the cultivation of tur crop was very less as only 26 per cent of the total number of sampled farmers drawn from the NFSM district of Amravati followed recommended sowing practices and seed practices and 12-28 per cent followed recommended other practices like application of organic manure, chemical fertilizer, plant protection measures, etc. In the NFSM district of Amravati, while about 22 per cent of the total sampled farmers did not follow any recommended practices in the cultivation of mung, this proportion with respect gram crop was 26 per cent, and for tur crop it stood at as high as 70 per cent. In fact, in the case of tur crop, the proportion of total sampled farmers not following any recommended practice declined with the increase in land holding size of sampled farmers belonging to the NFSM district of Amravati.

In terms of adoption of technology, the scenario obtaining in the non-NFSM district of Beed was different as against the scenario obtaining in NFSM district of Amravati. In the cultivation of mung crop, while 68 per cent of the sampled farmers belonging to non-NFSM district of Beed did not follow any recommended practices, the remaining 32 per cent of the total sampled households of this district followed one or the other recommended practices (Table 5.6 and Table 5.6 (a)). This is concomitant from the fact that, in the cultivation of mung crop, the recommended sowing practices were followed by 32 per cent of the total sampled households of non-NFSM Beed district, recommended seed practices by 26 per cent of households, and recommended other practices by 18-30 per cent of sampled households. Small and large categories of sampled households belonging to non-NFSM district of Beed were more positively inclined towards adoption of recommended practices with respect to mung crop cultivation.

As for gram crop cultivation, about 60 per cent of the total number of sampled farmers drawn from the non-NFSM district of Beed followed recommended sowing practices, 52 per cent followed recommended seed practices and 26-70 per cent followed recommended other practices like application of organic manure, chemical fertilizer, plant protection measures, etc., and 40 per cent did not follow any recommended practices. Interestingly, in the non-NFSM district of Beed, all the large category of sampled farmers followed recommended sowing and seed practices.

In the case of tur crop cultivation, about 64 per cent of the total number of sampled farmers of non-NFSM district of Beed followed recommended sowing practices, 60 per cent followed recommended seed practices and 34-58 per cent followed

recommended other practices like application of organic manure, chemical fertilizer, plant protection measures, etc., and 36 per cent did not follow any recommended practices (Table 5.6 and Table 5.6 (a)). Further, like gram crop, the adoption of technology in the case of tur crop cultivation was quite high among large category of sampled farmers of non-NFSM district of Beed since all the sampled large farmers of this district followed recommended sowing and seed practices, and also recommended uses of chemical fertilizer as the response in these respect was cent per cent for large category.

Table 5.6: Recommended Practices in Pulses Crop: Non-NFSM Beed District

Category	Followed Some Practice					Not Followed Any Practice
	Sowing Practices	Seed Practices	Other Practices			
			Organic Manure	Chemical Fertilizer	Plant Protection	
Mung						
Marginal	2	2	1	1	1	12
Small	9	6	8	9	3	8
Medium	2	2	2	2	2	11
Large	3	3	3	3	3	3
Total	16	13	14	15	9	34
Gram						
Marginal	4	4	1	4	-	10
Small	13	9	8	12	3	4
Medium	7	7	2	6	5	6
Large	6	6	-	5	4	-
Total	30	26	11	27	12	20
Tur						
Marginal	8	8	3	6	4	6
Small	12	10	10	11	4	5
Medium	6	6	5	6	5	7
Large	6	6	4	6	4	-
Total	32	30	22	29	17	18

Table 5.6 (a): % of Households Following Recommended Practices: Non-NFSM Beed District
(in Per cent)

Category	Followed Some Practice					Not Followed Any Practice
	Sowing Practices	Seed Practices	Other Practices			
			Organic Manure	Chemical Fertilizer	Plant Protection	
Mung						
Marginal	14.29	14.29	7.14	7.14	7.14	85.71
Small	52.94	35.29	47.06	52.94	17.65	47.06
Medium	15.38	15.38	15.38	15.38	15.38	84.62
Large	50.00	50.00	50.00	50.00	50.00	50.00
Total	32.00	26.00	28.00	30.00	18.00	68.00
Gram						
Marginal	28.57	28.57	7.14	28.57	0.00	71.43
Small	76.47	52.94	47.06	70.59	17.65	23.53
Medium	53.85	53.85	15.38	46.15	38.46	46.15
Large	100.00	100.00	-	83.33	66.67	-
Total	60.00	52.00	22.00	54.00	24.00	40.00
Tur						
Marginal	57.14	57.14	21.43	42.86	28.57	42.86
Small	70.59	58.82	58.82	64.71	23.53	29.41
Medium	46.15	46.15	38.46	46.15	38.46	53.85
Large	100.00	100.00	66.67	100.00	66.67	-
Total	64.00	60.00	44.00	58.00	34.00	36.00

In terms of technology adoption with respect to pulses crops, two differing views emerged in the NFSM district of Amravati and non-NFSM district of Beed. While majority of the sampled farmers belonging to the NFSM district of Amravati followed recommended sowing, seed and other practices in the cultivation of mung and gram crop, this was not the case in the cultivation of tur crop by them as most of the sampled farmers of the NFSM district of Amravati neither followed any of the recommended sowing practices nor recommended seed and other practices like application of organic manure and chemical fertilizer, etc. It was only in the case of large farmers that recommended practices in terms of use of chemical fertilizer was followed on reasonably higher scale. On the other hand, in the case of non-NFSM district of Beed, though majority of the sampled farmers did not follow any recommended practices in the case of mung crop cultivation, the cultivation of other pulses crops like gram and tur was followed as per the recommended practices since 60 per cent of the sampled households of non-NFSM district of Beed favoured their view in terms of following recommended practices in the cultivation of gram crop and 64 per cent in the cultivation of tur crop.

5.4 Problems with Improved Varieties of Pulses in NFSM and Non-NFSM Districts

Although improved varieties of pulses are favoured by the farmers due to their higher levels of yield, there are number of problems in the cultivation of these high yielding pulses crops. Various categories of farmers encounter with different kinds of problems in the cultivation of improved varieties of pulses. The responses of the sampled farmers belonging to the NFSM district of Amravati and non-NFSM district of Beed were also recorded in terms of various problems faced by them in the cultivation various pulses crops and these problems were then ranked from 1 to 6. The reported responses with respect to major problems faced by the sampled farmers of NFSM district of Amravati and non-NFSM district of Beed in the cultivation various pulses crops and their ranking in this respect are brought out in Table 5.7 and Table 5.8 with all the categories of sampled farmers put together. The household category-wise and crop-wise reported responses in terms of problems faced by sampled farmers of NFSM district of Amravati and non-NFSM district of Beed and their ranking are provided in Appendix from 3 to 8.

In the cultivation of improved varieties of pulses crops, the major problems encountered by the sampled farmers of NFSM district of Amravati and non-NFSM district of Beed were: (a) non availability of improved varieties, (b) availability of improved varieties but not on time, (c) higher expenses involved in improved varieties,

(d) improved varieties requiring larger doses of other inputs, (e) much lower yield than expected, and (f) inadequacy of pest resistance measures towards cultivation of improved varieties of pulses crop. The sampled farmers of NFSM district of Amravati and non-NFSM district of Beed aired varying opinion about these six major problems faced by them in the cultivation of improved varieties of pulses crops.

In the cultivation of mung crop in the NFSM district of Amravati, non availability of improved varieties was one of the major problems and this problem was ranked 1 by 19 per cent of the total sampled households, ranked 2 by 11 per cent households, ranked 3 by 26 per cent households, ranked 4 by 15 per cent households, ranked 5 by 19 per cent households, and ranked 6 by 11 per cent households (Table 5.7 and Table 5.7 (a)). Untimely availability of improved variety of mung crop was another problem faced by the farmers and 21 per cent of the total sampled households ranked this problem as no. 1, 11 per cent as no. 2, 14 per cent as no.3, 32 per cent as no. 4, 14 per cent as no. 5, and 7 per cent as no. 6. Expensive nature of improved variety of mung crop was the thirds problem and it was ranked 1 and 2 by 34 per cent of sampled households, ranked 3 by 13 per cent households and ranked 4 by 16 per cent households. The improved variety of mung crop requiring large doses of other inputs was the fourth problem faced by the sampled households of NFSM district of Amravati and this problem was ranked 1 by 32 per cent of households, ranked 2 by 26 per cent households, and ranked 5 by 29 per cent households. Much lower yield than expected was the fifth major problem faced by the sampled cultivators of mung crop drawn from the NFSM district of Amravati and this problem acquired 2nd ranking by 25 per cent households, 3rd ranking by 31 per cent households and 5th ranking by 19 per cent households. Inadequacy of pest resistance measures towards cultivation of improved varieties of mung crop was the sixth problem faced by the cultivators of this crop belonging to the NFSM district of Amravati and this problem acquired 6th ranking by 50 per cent households, and 1st and 4th ranking by 14 per cent households of Amravati district.

As for the cultivation of improved varieties of gram crop in the NFSM district of Amravati, the problem of non-availability of improved varieties was assigned 3rd ranking by 26 per cent of total sampled households, 4th ranking by 30 per cent households and 5th ranking by 22 per cent households. The problem relating to untimely availability improved varieties of gram crop was assigned 2nd ranking by 22 per cent households, 4th ranking by 29 per cent households and 5th ranking by 18 per cent households.

Table 5.7: Households Reporting Problems with Improved Varieties of Pulses: NFSM Amravati District

Problem	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Total
Mung							
Not available at all	5	3	7	4	5	3	27
Available but not on time	6	3	4	9	4	2	28
Very Expensive	11	11	4	5	-	1	32
Need large doses of other inputs	10	8	2	3	9	-	31
Much lower yield than expected	2	8	10	2	6	4	32
Pest resistance not adequate	4	1	3	4	2	14	28
Total	35	35	30	27	26	25	178
Gram							
Not available at all	-	3	7	8	6	3	27
Available but not on time	4	6	2	8	5	3	28
Very Expensive	18	4	3	1	2	3	31
Need large doses of other inputs	3	8	7	6	2	4	30
Much lower yield than expected	8	6	3	-	10	4	31
Pest resistance not adequate	1	3	7	6	2	11	30
Total	34	30	29	29	27	28	177
Tur							
Not available at all	2	3	1	2	-	2	10
Available but not on time	-	-	3	4	3	-	10
Very Expensive	4	4	1	-	1	2	12
Need large doses of other inputs	3	1	1	-	5	1	11
Much lower yield than expected	2	2	3	1	1	-	9
Pest resistance not adequate	2	1	-	1	1	5	10
Total	13	11	9	8	11	10	62

Table 5.7 (a): % Distribution of Households Reporting Problems with Improved Varieties of Pulses: NFSM Amravati District

Problem	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Total
Mung							
Not available at all	18.52	11.11	25.93	14.81	18.52	11.11	100.00
Available but not on time	21.43	10.71	14.29	32.14	14.29	7.14	100.00
Very Expensive	34.38	34.38	12.50	15.63	-	3.13	100.00
Need large doses of other inputs	32.26	25.81	6.45	9.68	29.03	-	100.00
Much lower yield than expected	6.25	25.00	31.25	6.25	18.75	12.50	100.00
Pest resistance not adequate	14.29	3.57	10.71	14.29	7.14	50.00	100.00
Total	19.66	19.66	16.85	15.17	14.61	14.04	100.00
Gram							
Not available at all	-	11.11	25.93	29.63	22.22	11.11	100.00
Available but not on time	14.29	21.43	7.14	28.57	17.86	10.71	100.00
Very Expensive	58.06	12.90	9.68	3.23	6.45	9.68	100.00
Need large doses of other inputs	10.00	26.67	23.33	20.00	6.67	13.33	100.00
Much lower yield than expected	25.81	19.35	9.68	-	32.26	12.90	100.00
Pest resistance not adequate	3.33	10.00	23.33	20.00	6.67	36.67	100.00
Total	19.21	16.95	16.38	16.38	15.25	15.82	100.00
Tur							
Not available at all	20.00	30.00	10.00	20.00	-	20.00	100.00
Available but not on time	-	-	30.00	40.00	30.00	-	100.00
Very Expensive	33.33	33.33	8.33	-	8.33	16.67	100.00
Need large doses of other inputs	27.27	9.09	9.09	-	45.45	9.09	100.00
Much lower yield than expected	22.22	22.22	33.33	11.11	11.11	-	100.00
Pest resistance not adequate	20.00	10.00	-	10.00	10.00	50.00	100.00
Total	20.97	17.74	14.52	12.90	17.74	16.13	100.00

The problem of expensive nature of improved varieties of gram crop was assigned 1st ranking by 58 per cent of the sampled households belonging to NFSM district of Amravati, 2nd ranking by 12 per cent households and 3rd ranking by 10 per cent households. Improved varieties of gram crop requiring large doses of other inputs was the fourth problem, which was assigned 1st ranking by 10 per cent households, 2nd ranking by 27 per cent households, 3rd ranking by 23 per cent households and 4th ranking by 20 per cent households. The fifth problem relating to lower yields from improved varieties of gram crop was assigned 1st ranking by 26 per cent households, 2nd ranking by 19 per cent households, and 5th ranking by 32 per cent households of NFSM district of Amravati. The sixth problem relating to inadequacy of pest resistance with respect to gram crop was assigned 1st ranking only by 3 per cent of sampled households, 2nd ranking by 10 per cent of households, 3rd ranking by 23 per cent households, 4th ranking by 20 per cent households, 5th ranking by 7 per cent households and 6th ranking by 37 per cent of sampled households of Amravati district.

In the case of improved varieties of tur crop cultivation on the farms of sampled households of NFSM district of Amravati, the non availability of improved variety was assigned 1st ranking by 20 per cent households, 2nd ranking by 30 per cent households, 4th ranking by 20 per cent households and 6th ranking by another 20 per cent households. The second problem relating to untimely availability of improved variety of tur crop was accorded 3rd ranking by 30 per cent households, 4th ranking by 40 per cent households, and 5th ranking by remaining 30 per cent households belonging to the NFSM district of Amravati. Very expensive nature of improved variety of tur crop was found to be another major problem and it was assigned 1st ranking by 33 per cent households, 2nd ranking by another 33 per cent households, and 6th ranking by 17 per cent households. Improved varieties requiring large doses of other inputs was the fourth major problem in the cultivation of tur crop on the farms of sampled households of NFSM district of Amravati and this problem was assigned 1st ranking by 27 per cent households and 5th ranking by 45 per cent households. Much lower yield than expected was the fifth problem in the cultivation of tur crop and it was assigned 1st ranking by 22 per cent households, 2nd ranking by another 22 per cent households, and 3rd ranking by 33 per cent households. The sixth problem relating to inadequacy of pest resistance with respect to tur crop was assigned 1st ranking by 20 per cent households and 6th ranking by 50 per cent sampled households belonging to the NFSM district of Amravati.

Insofar as non-NFSM district of Beed is concerned, the problem relating to non availability of improved varieties of mung crop was assigned much lower ranking as this problem was assigned 4th ranking by 27 per cent households, 5th ranking by another 27 per cent households, and 6th ranking by another 27 per cent households. The second problem relating to untimely availability of improved variety also received lower ranking as this problem was ranked 3rd by 27 per cent households and ranked 4th by 36 per cent households. Very expensive nature of improved varieties of mung crop was the third problem and it was assigned 2nd ranking by 18 per cent households, 3rd ranking by 27 per cent households and 5th ranking by another 27 per cent households. Improved varieties of mung crop requiring large doses of other inputs was identified as the major problem and it was assigned 1st ranking by 36 per cent households and 2nd ranking by 27 per cent households (Table 5.8 and Table 5.8 (a)). Lower availability of yield with respect to improved varieties of mung crop was identified as the fifth problem and it was assigned 2nd ranking 27 per cent households and 4th ranking by another 27 per cent households.

In the cultivation of improved varieties of gram crop on the farms belonging to the households of non-NFSM district of Beed, the problem relating to non availability of improved varieties was assigned 1st ranking by 14 per cent households, 2nd ranking by 24 per cent households, and 5th ranking by 33 per cent households. The second problem relating to untimely availability of improved variety was accorded 1st ranking by 29 per cent households and 3rd ranking by another 29 per cent households. Very expensive nature of improved variety was the 3rd problem that was assigned 1st ranking by 24 per cent households, 2nd ranking by 33 per cent households and 3rd ranking by 19 per cent households. The problem relating to improved variety of gram crop requiring large doses of other inputs received much lower ranking as it received 4th ranking by 52 per cent households and 5th ranking by 19 per cent households. The fifth problem relating to lower yield of improved variety was assigned 1st ranking by 29 per cent households, 3rd ranking by another 29 per cent households, and 5th ranking by another 29 per cent households.

As for the cultivation of improved varieties of tur crop on the farms belonging to the households of non-NFSM district of Beed, the problem relating non availability of improved varieties was assigned 1st ranking by 21 per cent households, 3rd ranking by 28 per cent households, and 4th ranking by 24 per cent households. The problem of untimely availability of improved variety was accorded 1st ranking by 24 per cent households, 2nd ranking by 21 per cent households and 5th ranking by another 21 per cent households.

Table 5.8: Households Reporting Problems with Improved Varieties of Pulses: Non-NFSM Beed District

Problem	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Total
Mung							
Not available at all	2	-	-	3	3	3	11
Available but not on time	1	2	3	4	1	1	11
Very Expensive	1	2	3	-	3	2	11
Need large doses of other inputs	4	3	2	1	2	-	11
Much lower yield than expected	2	3	1	3	1	1	11
Pest resistance not adequate	2	1	2	-	1	5	11
Total	11	11	11	11	11	11	66
Gram							
Not available at all	3	5	2	3	7	1	21
Available but not on time	6	3	6	2	3	1	21
Very Expensive	5	7	4	3	-	2	21
Need large doses of other inputs	-	3	2	11	4	1	21
Much lower yield than expected	6	1	6	1	6	1	21
Pest resistance not adequate	1	2	1	1	1	15	21
Total	21	21	21	21	21	21	126
Tur							
Not available at all	6	3	8	7	2	3	29
Available but not on time	7	6	5	4	6	1	29
Very Expensive	7	8	7	4	1	2	29
Need large doses of other inputs	5	1	4	8	9	2	29
Much lower yield than expected	2	9	2	4	9	3	29
Pest resistance not adequate	2	2	3	2	2	18	29
Total	29	29	29	29	29	29	174

Table 5.8 (a): % Distribution of Households Reporting Problems with Improved Varieties of Pulses: Non-NFSM Beed District

Problem	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Total
Mung							
Not available at all	18.18	-	-	27.27	27.27	27.27	100.00
Available but not on time	9.09	18.18	27.27	36.36	9.09	9.09	100.00
Very Expensive	9.09	18.18	27.27	-	27.27	18.18	100.00
Need large doses of other inputs	36.36	27.27	18.18	9.09	18.18	-	100.00
Much lower yield than expected	18.18	27.27	9.09	27.27	9.09	9.09	100.00
Pest resistance not adequate	18.18	9.09	18.18	-	9.09	45.45	100.00
Total	16.67	16.67	16.67	16.67	16.67	16.67	100.00
Gram							
Not available at all	14.29	23.81	9.52	14.29	33.33	4.76	100.00
Available but not on time	28.57	14.29	28.57	9.52	14.29	4.76	100.00
Very Expensive	23.81	33.33	19.05	14.29	-	9.52	100.00
Need large doses of other inputs	-	14.29	9.52	52.38	19.05	4.76	100.00
Much lower yield than expected	28.57	4.76	28.57	4.76	28.57	4.76	100.00
Pest resistance not adequate	4.76	9.52	4.76	4.76	4.76	71.43	100.00
Total	16.67	16.67	16.67	16.67	16.67	16.67	100.00
Tur							
Not available at all	20.69	10.34	27.59	24.14	6.90	10.34	100.00
Available but not on time	24.14	20.69	17.24	13.79	20.69	3.45	100.00
Very Expensive	24.14	27.59	24.14	13.79	3.45	6.90	100.00
Need large doses of other inputs	17.24	3.45	13.79	27.59	31.03	6.90	100.00
Much lower yield than expected	6.90	31.03	6.90	13.79	31.03	10.34	100.00
Pest resistance not adequate	6.90	6.90	10.34	6.90	6.90	62.07	100.00
Total	16.67	16.67	16.67	16.67	16.67	16.67	100.00

Very expensive nature of improved variety of tur crop was the third problem faced by the households belonging to non-NFSM district of Beed and this problem was assigned 1st ranking by 24 per cent households, 2nd ranking by 28 per cent households, and 3rd ranking by 24 per cent households. Much lower yield than expected was another problem in the cultivation of improved varieties of tur crop and this problem was assigned 2nd ranking by 31 per cent households and 5th ranking by another 31 per cent households. Inadequacy of pest resistance was the sixth problem but it received much lower ranking as it was assigned 6th ranking by 62 per cent households of Beed district.

Although ranking of problems with respect to improved varieties of pulses was different for the sampled farmers belonging to the NFSM district of Amravati and non-NFSM district of Beed, the expensive nature of cultivation of improved varieties of pulses and application of larger doses of other inputs in the cultivation of improved varieties could be identified as the major problems faced by the households belonging to the NFSM district of Amravati. However, in the case of non-NFSM district of Beed, the major problems with respect to improved varieties were non-availability of improved varieties, untimely availability, expensive nature of improved varieties and application of large doses of other inputs in the cultivation of improved varieties of pulses.

In the NFSM district of Amravati, the problem relating to expensive nature of improved varieties was assigned 1st ranking by 34 per cent of sampled households and 2nd ranking by another 34 per cent of sampled households in the case of mung crop, 1st ranking by 58 per cent of sampled households and 2nd ranking by 13 per cent of sampled households for gram crop cultivation, and 1st ranking by 33 per cent of sampled households and 2nd ranking by another 33 per cent of sampled households with respect to tur crop cultivation. The second major problem in the cultivation of improved variety of pulses was the application of larger doses of other inputs and this problem was assigned 1st ranking by 32 per cent of sampled households and 2nd ranking by another 26 per cent of sampled households in the case of mung crop, 1st ranking by 10 per cent of sampled households and 2nd ranking by 27 per cent of sampled households for gram crop cultivation, and 1st ranking by 27 per cent of sampled households and 2nd ranking by another 9 per cent of sampled households with respect to tur crop cultivation.

In the case of non-NFSM district of Beed, the problem relating to non availability of improved varieties was mainly seen in the cultivation of gram and tur crop since this problem was assigned 1st ranking by 14 per cent of sampled households, 2nd ranking by

24 per cent of sampled households and 5th ranking by 33 per cent of sampled households in the case of gram crop, and 1st ranking by 21 per cent of sampled households, 3rd ranking by 28 per cent households, and 4th ranking by 24 per cent of sampled households as for the tur crop cultivation. The problem of untimely availability of improved varieties was also seen in the case of gram and tur crop cultivation since this problem was assigned 1st ranking by 29 per cent of sampled households, 2nd ranking by 14 per cent of sampled households and 3rd ranking by 29 per cent of sampled households in the case of gram crop, and 1st ranking by 24 per cent of sampled households, 2nd ranking by 21 per cent of sampled households, and 3rd ranking by 17 per cent of sampled households as for the tur crop cultivation. The problem relating to very expensive nature of cultivation of improved varieties was also noticed in the case of gram and tur crop as majority of the sampled households of non-NFSM district of Beed assigned very high ranking to this problem. The problem relating to application of large doses of other inputs was seen in the case of cultivation of improved variety of mung crop and this problem was assigned 1st ranking 36 per cent of sampled households and 2nd ranking by 27 per cent of sampled households belonging to the non-NFSM district of Beed.

5.5 Suggested Solutions for Improved Varieties in NFSM and Non-NFSM Districts

There were some six major problems with respect to the cultivation of improved varieties of pulses in the NFSM district of Amravati and non-NFSM district of Beed and various categories of sampled households cultivating these improved varieties of pulses had aired their various views in terms of these problems that were recorded and analysed in the previous section. However, suggestions of these sampled households were also sought to overcome problems in the cultivation of improved varieties of pulses and these suggestions mainly revolved around: (a) cheaper availability of seeds, (b) timely availability of seeds, and (c) subsidy involved in the purchase of such seeds. The suggestions extended by various categories of sampled households belonging to the NFSM district of Amravati and non-NFSM district of Beed with respect to improved varieties of pulses were recorded and analysed and an analysis in this respect with all the various categories of sampled households put together for the NFSM district of Amravati and non-NFSM district of Beed are provided in Table 5.9 and Table 5.10. The household category-wise and crop-wise reported responses in terms of suggestions extended by sampled households of NFSM district of Amravati and non-NFSM district of Beed and their ranking in this respect are provided in Appendix from 9 to 14.

In the case of mung crop cultivated in the NFSM district of Amravati, while suggestion like cheaper availability of improved varieties of seeds acquired higher ranking and was assigned 1st ranking by 38 per cent of sampled households, 2nd ranking by 32 per cent of sampled households, and 3rd ranking by 29 per cent of sampled households, the ranking with respect to suggestion like timely availability of improved variety of seeds stood at lower and it was assigned 1st ranking by 27 per cent of sampled households, 2nd ranking by 33 per cent of sampled households, and 3rd ranking by 40 per cent of sampled households (Table 5.9 and Table 5.9 (a)). Among various suggestions with respect to improved varieties of pulses, involvement of subsidy in the purchase of seed was favoured most and this suggestion was assigned 1st ranking by 41 per cent of sampled households, 2nd ranking by 35 per cent of sampled households, and 3rd ranking by 24 per cent of sampled households.

As for gram crop cultivated in the NFSM district of Amravati, cheaper availability of improved varieties of seeds and their timely availability received lower ranking and involvement of subsidy in the purchase of improved varieties of seeds received higher ranking from the sampled households. For instance, cheaper availability of improved varieties of seeds was accorded 2nd ranking by 55 per cent of sampled households, whereas timely availability of improved varieties of seeds received 3rd ranking from 61 per cent of sampled households. The involvement of subsidy in the purchase of improved varieties of seeds was accorded 1st ranking by 53 per cent of sampled households.

Table 5.9: Suggested Solutions for Improved Varieties of Pulses: NFSM Amravati District

Problems	Rank 1	Rank 2	Rank 3	Rank 4	Total
Mung					
Cheaper availability of seeds	13	11	10	-	34
Timely availability of seeds	8	10	12	-	30
Subsidy	14	12	8	-	34
Any other (Specify)	-	-	-	-	-
Total	35	33	30	-	98
Gram					
Cheaper availability of seeds	9	17	6	-	32
Timely availability of seeds	6	6	19	-	31
Subsidy	18	6	10	-	34
Any other (Specify)	-	-	-	-	-
Total	33	29	35	-	97
Tur					
Cheaper availability of seeds	3	4	5	-	12
Timely availability of seeds	2	6	3	-	11
Subsidy	6	-	5	-	11
Any other (Specify)	-	-	-	-	-
Total	11	10	13	-	34

Table 5.9 (a): % Distribution of Suggested Solutions for Improved Varieties: NFSM Amravati District

Problems	Rank 1	Rank 2	Rank 3	Rank 4	Total
Mung					
Cheaper availability of seeds	38.24	32.35	29.41	-	100.00
Timely availability of seeds	26.67	33.33	40.00	-	100.00
Subsidy	41.18	35.29	23.53	-	100.00
Any other (Specify)	-	-	-	-	-
Total	35.71	33.67	30.61	-	100.00
Gram					
Cheaper availability of seeds	28.13	53.13	18.75	-	100.00
Timely availability of seeds	19.35	19.35	61.29	-	100.00
Subsidy	52.94	17.65	29.41	-	100.00
Any other (Specify)	-	-	-	-	-
Total	34.02	29.90	36.08	-	100.00
Tur					
Cheaper availability of seeds	25.00	33.33	41.67	-	100.00
Timely availability of seeds	18.18	54.55	27.27	-	100.00
Subsidy	54.55	-	45.45	-	100.00
Any other (Specify)	-	-	-	-	-
Total	32.35	29.41	38.24	-	100.00

In the case of tur crop cultivated on the farms belonging to sampled farmers of NFSM district of Amravati, suggestions like involvement of subsidy in the purchase of improved varieties of seeds was accorded high ranking by the sampled households and cheaper availability of improved varieties of seeds and their timely availability got lower ranking in this respect. About 55 per cent of sampled households of Amravati district gave 1st ranking to involvement of subsidy in the purchase of improved varieties of seeds, and 55 per cent of sampled households gave 2nd ranking to timely availability of improved varieties of seeds, whereas 3rd ranking was assigned to cheaper availability of seeds by 42 per cent of sampled households of Amravati district.

In the non-NFSM district of Beed, suggestions like timely availability of improved varieties of seeds in the case of mung crop, cheaper availability of improved varieties of seeds and involvement of subsidy in the purchase of improved varieties of seeds for gram crop and cheaper availability of improved varieties of seeds for tur crop were accorded high ranking by the sampled households. For instance, timely availability of improved varieties of mung crop seeds was favoured by 64 per cent of sampled households and they assigned this suggestion as 1st ranking. Cheaper availability of improved varieties of gram crop seed was favoured by 52 per cent households and they assigned this suggestion as 2nd ranking. Involvement of subsidy in the purchase of improved varieties of gram crop seeds was favoured by 48 per cent households and they assigned this suggestion as 1st ranking. In the case of tur crop cultivated on the farms

belonging to sampled households of non-NFSM district of Beed, the suggestion like cheaper availability of improved varieties of seeds ranked higher and 45 per cent of sampled households accorded 1st ranking to this suggestion (Table 5.10 and Table 5.10 (a)). Timely availability of improved varieties of tur crop seeds was favoured by 35 per cent of sampled households of Beed district and they assigned this suggestion as 1st ranking. Another 35 per cent of sampled households of non-NFSM district of Beed also favoured timely availability of improved varieties of tur crop seeds and they assigned this suggestion as 2nd ranking.

Table 5.10: Suggested Solutions for Improved Varieties of Pulses: Non-NFSM Beed District

Problems	Rank 1	Rank 2	Rank 3	Rank 4	Total
Mung					
Cheaper availability of seeds	2	4	5	-	11
Timely availability of seeds	7	2	2	-	11
Subsidy	2	5	4	-	11
Any other (Specify)	-	-	-	-	-
Total	11	11	11	-	33
Gram					
Cheaper availability of seeds	5	11	5	-	21
Timely availability of seeds	6	5	10	-	21
Subsidy	10	5	6	-	21
Any other (Specify)	-	-	-	-	-
Total	21	21	21	-	63
Tur					
Cheaper availability of seeds	13	7	9	-	29
Timely availability of seeds	10	10	9	-	29
Subsidy	6	12	11	-	29
Any other (Specify)	-	-	-	-	-
Total	29	29	29	-	87

Table 5.10 (a): % Distribution of Suggested Solutions for Improved Varieties: Non-NFSM Beed District

Problems	Rank 1	Rank 2	Rank 3	Rank 4	Total
Mung					
Cheaper availability of seeds	18.18	36.36	45.45	-	100.00
Timely availability of seeds	63.64	18.18	18.18	-	100.00
Subsidy	18.18	45.45	36.36	-	100.00
Any other (Specify)	-	-	-	-	-
Total	33.33	33.33	33.33	-	100.00
Gram					
Cheaper availability of seeds	23.81	52.38	23.81	-	100.00
Timely availability of seeds	28.57	23.81	47.62	-	100.00
Subsidy	47.62	23.81	28.57	-	100.00
Any other (Specify)	-	-	-	-	-
Total	33.33	33.33	33.33	-	100.00
Tur					
Cheaper availability of seeds	44.83	24.14	31.03	-	100.00
Timely availability of seeds	34.48	34.48	31.03	-	100.00
Subsidy	20.69	41.38	37.93	-	100.00
Any other (Specify)	-	-	-	-	-
Total	33.33	33.33	33.33	-	100.00

The households belonging to NFSM district of Amravati and non-NFSM district of Beed accorded different rankings to various suggestions with respect to the improved varieties of pulses crops seeds. While majority of the sampled households of NFSM district of Amravati favoured involvement of an element of subsidy in the purchase of improved varieties of mung, gram and tur crop seeds, the suggestions of sampled households of non-NFSM district was in favour of timely availability of improved varieties of seeds in the case of mung crop and cheaper availability of improved varieties of seeds with respect to tur crop. The ranking of suggestion like involvement of an element of subsidy in the purchase of improved varieties was high in the case of gram crop cultivated on the farms belonging sampled households of non-NFSM district of Beed. In the NFSM district of Amravati, the suggestion like involvement of an element of subsidy in the purchase of improved varieties of seeds was assigned 1st ranking by 55 per cent of tur crop cultivators, 53 per cent of gram crop cultivators and 41 per cent of mung crop cultivators. On the other hand, in the non-NFSM district of Beed, the first suggestion of cheaper availability of improved variety of seeds was assigned 1st ranking by 45 per cent of tur crop cultivators, 24 per cent of gram crop cultivators and 18 per cent of mung crop cultivators. The second suggestion of timely availability of improved varieties of seeds was assigned 1st ranking by 64 per cent of mung crop cultivators, 29 per cent of gram crop cultivators, and 34 per cent of tur crop cultivators. The third suggestion of involvement of subsidy in the purchase of improved varieties was assigned 1st ranking in the case of gram crop by 48 per cent of the sampled households belonging to the non-NFSM district of Beed. Thus, the ranking of suggestions with respect to improved varieties of pulses crops seeds differed across various sampled households drawn from the NFSM district of Amravati and non-NFSM district of Beed.

5.6 Marketing of Pulses Crops in NFSM and Non-NFSM Districts

It is widely believed that the marketing of pulses crops is not very complex process due to their less perishability. However, an efficient marketing system for pulses crops implies improving various marketing functions involved in the diversion of produce from the farmer to the ultimate consumer. Although there can be several channels through which pulses crops may move from producers to consumers, the farmers are generally seen to sell their pulses crops produce either in the village market itself or divert it through commission agents or sell it through regulated markets. Farmers are also seen to sell their pulses crops produce directly to the government agencies like

NAFED. In the NFSM district of Amravati and non-NFSM district of Beed, the sampled households were seen to sell their pulses crops produce through various channels.

The estimates relating to numerical strength of various categories of sampled households selling their pulses crops produce through various channels and proportion of households to total sampled households selling their produce through various channels for the NFSM district of Amravati and non-NFSM district of Beed encompassing the years 2007-08 and 2008-09 are brought out in Table 5.11 and Table 5.12.

In the NFSM district of Amravati, about 51 per cent of the total sampled households sold their mung crop produce through regulated market, 33 per cent through commission agents and 16 per cent through village markets during both 2007-08 and 2008-09 (Table 5.11 and Table 5.11 a)).

Table 5.11: No. of Households Marketing Pulses through Various Channels: NFSM Amravati District

Category	Village Market	Commission Agent	Regulated market	Govt. Agencies (NAFED)	Others	Total
2007-08						
Mung						
Marginal	2	-	7	-	-	9
Small	4	5	6	-	-	15
Medium	-	5	5	-	-	10
Large	-	3	2	-	-	5
All	6	13	20	-	-	39
Gram						
Marginal	2	-	9	-	-	11
Small	3	4	5	-	-	12
Medium	-	5	4	-	-	9
Large	-	3	2	-	-	5
All	5	12	20	-	-	37
Tur						
Marginal	1	1	1	-	-	3
Small	-	1	4	-	-	5
Medium	-	-	3	-	-	3
Large	-	1	2	-	-	3
All	1	3	10	-	-	14
2008-09						
Mung						
Marginal	3	1	7	-	-	11
Small	4	5	7	-	-	16
Medium	-	5	5	-	-	10
Large	-	3	3	-	-	6
All	7	14	22	-	-	43
Gram						
Marginal	2	1	7	-	-	10
Small	3	4	3	-	-	10
Medium	-	4	5	-	-	9
Large	-	3	3	-	-	6
All	5	12	18	-	-	35
Tur						
Marginal	1	-	1	-	-	2
Small	1	1	5	-	-	7
Medium	-	-	5	-	-	5
Large	-	1	1	-	-	2
All	2	2	12	-	-	16

Table 5.11 (a): % of Total Households in the Size Group Marketing Pulses through Various Channels: NFSM Amravati District

Category	Village Market	Commission Agent	Regulated market	Govt. Agencies (NAFED)	Others	Total
2007-08						
Mung						
Marginal	22.22	-	77.78	-	-	100.00
Small	26.67	33.33	40.00	-	-	100.00
Medium	-	50.00	50.00	-	-	100.00
Large	-	60.00	40.00	-	-	100.00
All	15.38	33.33	51.28	-	-	100.00
Gram						
Marginal	18.18	-	81.82	-	-	100.00
Small	25.00	33.33	41.67	-	-	100.00
Medium	-	55.56	44.44	-	-	100.00
Large	-	60.00	40.00	-	-	100.00
All	13.51	32.43	54.05	-	-	100.00
Tur						
Marginal	33.33	33.33	33.33	-	-	100.00
Small	-	20.00	80.00	-	-	100.00
Medium	-	-	100.00	-	-	100.00
Large	-	33.33	66.67	-	-	100.00
All	7.14	21.43	71.43	-	-	100.00
2008-09						
Mung						
Marginal	27.27	9.09	63.64	-	-	100.00
Small	25.00	31.25	43.75	-	-	100.00
Medium	-	50.00	50.00	-	-	100.00
Large	-	50.00	50.00	-	-	100.00
All	16.28	32.56	51.16	-	-	100.00
Gram						
Marginal	20.00	10.00	70.00	-	-	100.00
Small	30.00	40.00	30.00	-	-	100.00
Medium	-	44.44	55.56	-	-	100.00
Large	-	50.00	50.00	-	-	100.00
All	14.29	34.29	51.43	-	-	100.00
Tur						
Marginal	50.00	-	50.00	-	-	100.00
Small	14.29	14.29	71.43	-	-	100.00
Medium	-	-	100.00	-	-	100.00
Large	-	50.00	50.00	-	-	100.00
All	12.50	12.50	75.00	-	-	100.00

The major marketing of gram crop was also performed through regulated markets since about 54 per cent of the total sampled households of NFSM district of Amravati sold their gram crop produce through regulated market, 32 per cent through commission agents and 14 per cent through village markets during 2007-08 and 51 per cent through regulated markets, 32 per cent through commission agents and 16 per cent through village market during 2008-09. Similarly, in the NFSM district of Amravati, about 71 per cent of the total sampled households sold their tur crop produce through regulated market, 21 per cent through commission agents and 7 per cent through village markets during 2007-08 and 75 per cent through regulated markets, 13 per cent through commission agents and 12 per cent through village markets during 2008-09.

As for the non-NFSM district of Beed, nearly 92 per cent of the households sold their mung crop produce through regulated market and remaining 8 per cent through commission agents during 2007-08, and 94 per cent through regulated markets and 6 per cent through commission agents during 2008-09 (Table 5.12 and Table 5.12 a)). Similarly, in the case of gram crop, about 91 per cent of the households sold their produce through regulated market and 9 per cent through commission agents during 2007-08 and 95 per cent through regulated markets and 5 per cent through commission agents during 2008-09. In the case of tur crop, the produce was sold through regulated markets since 93 per cent of the households sold their tur crop produce through regulated market and 7 per cent through commission agents during 2007-08 and 86 per cent through regulated markets and 14 per cent through commission agents during 2008-09.

Table 5.12: No. of Households Marketing Pulses through Various Channels: Non-NFSM Beed District

Category	Village Market	Commission Agent	Regulated market	Govt. Agencies (NAFED)	Others	Total
2007-08						
Mung						
Marginal	-	-	2	-	-	2
Small	-	1	5	-	-	6
Medium	-	-	1	-	-	1
Large	-	-	3	-	-	3
All	-	1	11	-	-	12
Gram						
Marginal	-	1	5	-	-	6
Small	-	1	8	-	-	9
Medium	-	-	3	-	-	3
Large	-	-	5	-	-	5
All	-	2	21	-	-	23
Tur						
Marginal	-	2	3	-	-	5
Small	-	-	8	-	-	8
Medium	-	-	12	-	-	12
Large	-	-	3	-	-	3
All	-	2	26	-	-	28
2008-09						
Mung						
Marginal	-	-	2	-	-	2
Small	-	1	7	-	-	8
Medium	-	-	3	-	-	3
Large	-	-	3	-	-	3
All	-	1	15	-	-	16
Gram						
Marginal	-	-	5	-	-	5
Small	-	1	8	-	-	9
Medium	-	-	3	-	-	3
Large	-	-	5	-	-	5
All	-	1	21	-	-	22
Tur						
Marginal	-	3	8	-	-	11
Small	-	1	5	-	-	6
Medium	-	-	8	-	-	8
Large	-	-	4	-	-	4
All	-	4	25	-	-	29

Table 5.12 (a): % of Total Households in the Size Group Marketing Pulses through Various Channels: Beed District

Category	Village Market	Commission Agent	Regulated market	Govt. Agencies (NAFED)	Others	Total
2007-08						
Mung						
Marginal	-	-	100.00	-	-	100.00
Small	-	16.67	83.33	-	-	100.00
Medium	-	-	100.00	-	-	100.00
Large	-	-	100.00	-	-	100.00
All	-	8.33	91.67	-	-	100.00
Gram						
Marginal	-	16.67	83.33	-	-	100.00
Small	-	11.11	88.89	-	-	100.00
Medium	-	-	100.00	-	-	100.00
Large	-	-	100.00	-	-	100.00
All	-	8.70	91.30	-	-	100.00
Tur						
Marginal	-	40.00	60.00	-	-	100.00
Small	-	-	100.00	-	-	100.00
Medium	-	-	100.00	-	-	100.00
Large	-	-	100.00	-	-	100.00
All	-	7.14	92.86	-	-	100.00
2008-09						
Mung						
Marginal	-	-	100.00	-	-	100.00
Small	-	12.50	87.50	-	-	100.00
Medium	-	-	100.00	-	-	100.00
Large	-	-	100.00	-	-	100.00
All	-	6.25	93.75	-	-	100.00
Gram						
Marginal	-	-	100.00	-	-	100.00
Small	-	11.11	88.89	-	-	100.00
Medium	-	-	100.00	-	-	100.00
Large	-	-	100.00	-	-	100.00
All	-	4.55	95.45	-	-	100.00
Tur						
Marginal	-	27.27	72.73	-	-	100.00
Small	-	16.67	83.33	-	-	100.00
Medium	-	-	100.00	-	-	100.00
Large	-	-	100.00	-	-	100.00
All	-	13.79	86.21	-	-	100.00

Thus, the foregoing observations reveal that while the sampled households belonging to NFSM district of Amravati performed marketing of various pulses crops through regulated markets, commission agents and village markets, the marketing of pulses crops in the non-NFSM district was noticed mainly through regulated markets and at a very smaller scale through commission agents. In the NFSM district of Amravati, while about 51 per cent of the total sampled households sold their mung and gram crop produce through regulated markets, 34 per cent through commission agents and 15 per cent through village markets, these proportions for tur crop were worked out at 75 per cent, 12 per cent and 13 per cent, respectively. On the other hand, 95 per cent of sampled

households of non-NFSM district of Beed sold their mung and gram crop produce through regulated markets and remaining 5 per cent through commission agents. In the non-NFSM district of Beed, the proportion of households to total sampled households selling their tur crop produce through regulated market was 86 per cent with remaining 14 per cent selling their produce through commission agents.

5.7 Quantity of Pulses Marketed in NFSM and Non-NFSM Districts

The estimates relating to total quantum of marketed surplus of various pulses crops and the share of various channels in the marketed surplus coupled with average selling price of the produce for various categories of sampled households belonging to the NFSM district of Amravati and non-NFSM district of Beed for the reference years 2007-08 and 2008-09 are provided in Table 5.13 and 5.14.

During 2007-08, the total marketed surplus with all the sampled farmers of NFSM district of Amravati put together was estimated at 283 quintals for mung crop, 596 quintals for gram, and 69 quintals for tur crop. In the NFSM district of Amravati, the quantity of marketed surplus sold was found to be 47.43 per cent through regulated market, 41.59 per cent through commission agents, 10.97 per cent through village market in the case of mung crop, 48.15 per cent through regulated market, 44.46 per cent through commission agents, and 7.38 per cent through village market for gram crop, and 78.10 per cent through regulated market, 18.98 per cent through commission agents, and 2.92 per cent through village market in the case of tur crop (Table 5.13).

In the NFSM district of Amravati, during 2008-09, the total marketed surplus with all the sampled farmers put together was estimated at 333 quintals for mung crop, 739 quintals for gram, and 62 quintals for tur crop. Further, in the NFSM district of Amravati, the quantity of marketed surplus diverted was noticed to be 51.39 per cent through regulated market, 38.26 per cent through commission agents, 10.35 per cent through village market in the case of mung crop, 57.24 per cent through regulated market, 35.99 per cent through commission agents, and 6.77 per cent through village market for gram crop, and 84.55 per cent through regulated market, 9.76 per cent through commission agents, and 5.69 per cent through village market in the case of tur crop.

The major marketed surplus of pulses crops in the NFSM district of Amravati with all the sampled farmers put together was, therefore, sold through regulated market during both 2007-08 and 2008-09 with share of regulated market in marketed surplus of mung, gram and tur during 2008-09 being 51 per cent, 57 per cent and 85 per cent.

Table 5.13: Quantity of Pulses Sold through Various Channels: NFSM Amravati District
(Quantity Sold in Quintals; Price in Rs./ Quintal)

Category	Village Market		Comm. Agent		Regulated market		Govt. Agency		Others		Total	
	Qty Sold	Price	Qty Sold	Price	Qty Sold	Price	Qty Sold	Price	Qty Sold	Price	Qty Sold	Price
2007-08												
Mung												
Marginal	10.00	3150	-	-	22.50	3956	-	-	-	-	32.50	3742
Small	21.00	3152	24.50	3990	24.50	4006	-	-	-	-	70.00	3729
Medium	-	-	54.00	3741	41.00	3788	-	-	-	-	95.00	3771
Large	-	-	39.00	3797	46.00	3800	-	-	-	-	85.00	3802
All	31.00	3152	117.50	3841	134.00	3860	-	-	-	-	282.50	3766
Gram												
Marginal	18.00	2567	-	-	69.00	2114	-	-	-	-	87.00	2199
Small	26.00	2565	51.00	2184	65.00	2163	-	-	-	-	142.00	2241
Medium	-	-	130.00	2118	65.00	2369	-	-	-	-	195.00	2203
Large	-	-	84.00	2067	88.00	2445	-	-	-	-	172.00	2254
All	44.00	2566	265.00	2115	287.00	2285	-	-	-	-	596.00	2226
Tur												
Marginal	2.00	2500	4.00	2700	4.00	2800	-	-	-	-	10.00	2700
Small	-	-	4.00	2800	11.50	2967	-	-	-	-	15.50	2915
Medium	-	-	-	-	13.00	2785	-	-	-	-	13.00	2785
Large	-	-	5.00	2800	25.00	2780	-	-	-	-	30.00	2783
All	2.00	2500	13.00	2769	53.50	2828	-	-	-	-	68.50	2803
2008-09												
Mung												
Marginal	14.00	3693	4.00	3500	27.75	4073	-	-	-	-	45.75	3927
Small	20.50	4015	23.50	4121	36.50	4221	-	-	-	-	80.50	4139
Medium	-	-	46.00	4239	40.00	4183	-	-	-	-	86.00	4214
Large	-	-	54.00	4122	67.00	4300	-	-	-	-	121.00	4254
All	34.50	3884	127.50	4145	171.25	4219	-	-	-	-	333.25	4172
Gram												
Marginal	18.00	2500	9.00	2400	62.00	2342	-	-	-	-	89.00	2379
Small	32.00	2658	49.00	2390	81.00	2528	-	-	-	-	162.00	2512
Medium	-	-	80.00	2460	107.00	2556	-	-	-	-	187.00	2514
Large	-	-	128.00	2600	173.00	2584	-	-	-	-	301.00	2591
All	50.00	2601	266.00	2512	423.00	2531	-	-	-	-	739.00	2528
Tur												
Marginal	2.50	2800	-	-	2.50	2700	-	-	-	-	5.00	2750
Small	1.00	3200	2.00	3000	25.50	2983	-	-	-	-	28.50	3007
Medium	-	-	-	-	19.00	3145	-	-	-	-	19.00	3145
Large	-	-	4.00	3200	5.00	3200	-	-	-	-	9.00	3200
All	3.50	2914	6.00	3133	52.00	3053	-	-	-	-	61.50	3063

In the case of non-NFSM district of Beed, during 2007-08, the total marketed surplus with all the sampled farmers of non-NFSM district of Beed put together was estimated at 114 quintals for mung crop, 198 quintals for gram, and 192 quintals for tur crop. In the non-NFSM district of Beed, the quantity of marketed surplus sold was found to be 90.89 per cent through regulated market and 8.81 per cent through commission agents in the case of mung crop, 96.81 per cent through regulated market and 3.19 per

cent through commission agents for gram crop, and 97.66 per cent through regulated market and 2.34 per cent through commission agents in the case of tur crop (Table 5.14).

As against 2007-08, during 2008-09, in the non-NFSM district of Beed, the total marketed surplus with all the sampled farmers put together was estimated at 138 quintals for mung crop, 271 quintals for gram, and 166 quintals for tur crop. In the non-NFSM district of Beed, the quantity of marketed surplus diverted was noticed to be 92.75 per cent through regulated market and 7.25 per cent through commission agents in the case of mung crop, 95.93 per cent through regulated market and 4.07 per cent through commission agents for gram crop, and 93.36 per cent through regulated market and 6.64 per cent through commission agents in the case of tur crop.

Table 5.14: Quantity of Pulses Sold through Various Channels: Non-NFSM Beed District
(Quantity Sold in Quintals; Price in Rs./ Quintal)

Category	Village Market		Comm. Agent		Regulated market		Govt. Agency		Others		Total	
	Qty Sold	Price	Qty Sold	Price	Qty Sold	Price	Qty Sold	Price	Qty Sold	Price	Qty Sold	Price
2007-08												
Mung												
Marginal	-	-	-	-	4.00	3563	-	-	-	-	4.00	3742
Small	-	-	10.00	3700	24.50	3567	-	-	-	-	34.50	3606
Medium	-	-	-	-	8.00	3800	-	-	-	-	8.00	3771
Large	-	-	-	-	67.00	3701	-	-	-	-	67.00	3802
All	-	-	10.00	3700	103.00	3672	-	-	-	-	113.50	3674
Gram												
Marginal	-	-	6.50	2200	21.50	2065	-	-	-	-	28.00	2096
Small	-	-	3.00	2400	44.50	2040	-	-	-	-	47.50	2063
Medium	-	-	-	-	30.00	2110	-	-	-	-	30.00	2100
Large	-	-	-	-	192.00	2250	-	-	-	-	192.00	2250
All	-	-	9.50	2263	288.00	2189	-	-	-	-	297.50	2191
Tur												
Marginal	-	-	4.50	2589	2.75	2709	-	-	-	-	7.25	2635
Small	-	-	-	-	41.00	2710	-	-	-	-	41.00	2710
Medium	-	-	-	-	86.00	2780	-	-	-	-	86.00	2780
Large	-	-	-	-	58.00	2724	-	-	-	-	58.00	2724
All	-	-	4.50	2589	187.75	2746	-	-	-	-	192.25	2742
2008-09												
Mung												
Marginal	-	-	-	-	5.50	3791	-	-	-	-	5.50	3791
Small	-	-	10.00	3700	50.00	4005	-	-	-	-	60.00	3954
Medium	-	-	-	-	34.00	4154	-	-	-	-	34.00	4154
Large	-	-	-	-	38.50	4222	-	-	-	-	38.50	4222
All	-	-	10.00	3700	128.00	4101	-	-	-	-	138.00	4072
Gram												
Marginal	-	-	-	-	9.50	2363	-	-	-	-	9.50	2363
Small	-	-	11.00	2400	64.50	2395	-	-	-	-	75.50	2396
Medium	-	-	-	-	48.50	2389	-	-	-	-	48.50	2389
Large	-	-	-	-	137.00	2504	-	-	-	-	137.00	2504
All	-	-	11.00	2400	259.50	2450	-	-	-	-	270.50	2448
Tur												
Marginal	-	-	8.50	3000	17.75	2799	-	-	-	-	26.25	2864
Small	-	-	2.50	3300	32.50	3031	-	-	-	-	35.00	3050
Medium	-	-	-	-	46.50	3061	-	-	-	-	46.50	3061
Large	-	-	-	-	58.00	3155	-	-	-	-	58.00	3155
All	-	-	11.00	3068	154.75	3060	-	-	-	-	165.75	3061

It could be further noted from Table 5.15 and Table 5.16 that none of the sampled farmer belonging to NFSM district of Amravati and non-NFSM district of Beed sold any of their pulses crops to the government agency like NAFED, and therefore, government procurement in this respect remained nil in the NFSM district of Amravati and non-NFSM district of Beed.

Table 5.15: Government (NAFED) Procurement of Pulses from Farmers: NFSM Amravati District

Category	No. of Farmers from Whom Procured	Total No. of Farmers in the Size Group	% of Farmers from Whom Procured
Marginal	NIL	15	NIL
Small		19	
Medium		10	
Large		6	
All		50	

Table 5.16: Government (NAFED) Procurement of Pulses from Farmers: Non-NFSM Beed District

Category	No. of Farmers from Whom Procured	Total No. of Farmers in the Size Group	% of Farmers from Whom Procured
Marginal	NIL	14	NIL
Small		17	
Medium		13	
Large		6	
All		50	

A comparative analysis with respect to marketing of pulses crops revealed that the sampled farmers belonging to the non-NFSM district of Beed mostly depended on regulated markets for the marketing of their pulses crops since the share of regulated markets in total marketed surplus of mung, gram and tur crop in this district during 2008-09 stood at 93 per cent, 96 per cent and 93 per cent, respectively, with share of commission agents in total marketed surplus of mung, gram and tur being 7 per cent, 4 per cent and 7 per cent, respectively. Contrary to non-NFSM district of Beed, the sampled farmers of NFSM district of Amravati also sold their marketed surplus of pulses crops through village markets, apart from selling their marketed surplus through regulated markets and commission agents. However, the major marketed surplus of pulses crops in the NFSM district of Amravati with all the sampled farmers put together was diverted through regulated markets only with share of regulated markets in marketed surplus of mung, gram and tur during 2008-09 being 51 per cent, 57 per cent and 85 per cent, respectively, and the share of commission agents in this respect being 38 per cent, 36 per cent and 10 per cent, respectively, with village markets showing very little share.

CHAPTER – VI

FARMERS' PERCEPTIONS

This chapter is chiefly focused on recording and analysing the opinion of the sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed with respect to the major pest problems faced by them in the cultivation of various pulses crops, reasons for their cultivation of various pulses crops, criteria used by them for allocation of area under pulses crops cultivation, problems confronted by them in terms of cultivation of pulses on inferior quality of land, reasons for not growing pulses on irrigated land, reasons for shifting area from other crops to pulses or vis-a-versa, their willingness to grow pulses under assured market conditions, their opinion regarding problems in the cultivation of pulses, and their suggested solutions with respect to cultivation of various pulses crops. This chapter, therefore, mainly analyses producer farmers' response with respect to the cultivation of various pulses crops, reasons for their cultivation, problems in their cultivation and suggested remedial measures with respect to their cultivation. Analysis of responses of farmers with respect to various queries raised in terms of the cultivation of pulses crops is essential to judge the impact of NFSM programme on farming community with a view to augment pulses production to meet ever-growing demand for these crops from both urban and rural population of India.

6.1 Major Pest Problems in NFSM and Non-NFSM Districts

The sampled farmers belonging to the NFSM district of Amravati and non-NFSM district of Beed faced some pest problems in the cultivation of various pulses crops. Although there could be many pests like pod borer, pod fly, wilt, root rot, nematodes, etc., the sampled farmers were seen to be mainly affected by pod borer, pod fly and wilt. The perceptions of the sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed with respect to the type of pests affecting their pulses crops and the extent of loss of the pulses crops are brought out in Table 6.1 and 6.2.

In the NFSM district of Amravati, the proportions of sampled farmers affected by various pests was found to be 80 per cent by pod borer, 93 per cent by pod fly and 13 per cent by wilt for marginal category, 79 per cent by pod borer, 84 per cent by pod fly and 47 per cent by wilt for small category, 60 per cent by pod borer, 80 per cent by pod fly and 50 per cent by wilt for medium category and 50 per cent by pod borer, 100 per cent

by pod fly and 50 per cent by wilt for large category with an average of 72 per cent by pod borer, 88 per cent by pod fly and 32 per cent by wilt for the average category of farmers (Table 6.1). The pests like pod borer, pod fly and wilt were found to affect all the pulses crops cultivated by the sampled farmers of NFSM district of Amravati.

Table 6.1: Major Pest Problems faced in Pulses: NFSM Amravati District

Type of Pest	No. of Households Reporting Problem	Total No. of Households	% to Total Households	Crops Affected	Estimated Yield Loss Per Acre (in per cent)
Marginal					
Pod borer	12	15	80.00	Mung, Tur, Gram	11.58
Pod fly	14	15	93.33	Mung, Tur, Gram	9.79
Wilt	2	15	13.33	Gram	4.50
Root rot	-	-	-	-	-
Nematodes	-	-	-	-	-
Any other (specify)	-	-	-	-	-
Small					
Pod borer	15	19	78.95	Mung, Tur, Gram	10.87
Pod fly	16	19	84.21	Mung, Tur, Gram	9.75
Wilt	9	19	47.37	Mung, Tur, Gram	11.11
Root rot	-	-	-	-	-
Nematodes	-	-	-	-	-
Any other (specify)	-	-	-	-	-
Medium					
Pod borer	6	10	60.00	Mung, Tur, Gram	12.50
Pod fly	8	10	80.00	Mung, Tur, Gram	11.88
Wilt	5	10	50.00	Gram	11.00
Root rot	-	-	-	-	-
Nematodes	-	-	-	-	-
Any other (specify)	-	-	-	-	-
Large					
Pod borer	3	6	50.00	Gram	10.00
Pod fly	6	6	100.00	Mung, Tur	12.50
Wilt	3	6	50.00	Gram	9.33
Root rot	-	-	-	-	-
Nematodes	-	-	-	-	-
Any other (specify)	-	-	-	-	-
All					
Pod borer	36	50	72.00	Mung, Tur, Gram	11.31
Pod fly	44	50	88.00	Mung, Tur, Gram	10.52
Wilt	16	50	32.00	Mung, Tur, Gram	10.11
Root rot	-	-	-	-	-
Nematodes	-	-	-	-	-
Any other (specify)	-	-	-	-	-

The extent of per acre loss caused by various pests with respect to pulses crops was estimated at 11.58 per cent by pod borer, 9.79 per cent by pod fly and 4.50 per cent by wilt for marginal category, 10.87 per cent by pod borer, 9.75 per cent by pod fly and 11.11 per cent by wilt for small category, 12.50 per cent by pod borer, 11.88 per cent by pod fly and 11.00 per cent by wilt for medium category and 10.00 per cent by pod borer,

12.50 per cent by pod fly and 9.33 per cent by wilt for large category with an average of 11.31 per cent by pod borer, 10.52 per cent by pod fly and 10.11 per cent by wilt for the average category of farmers (Table 6.1)

As for the non-NFSM district of Beed, the proportions of sampled farmers affected by various pests was estimated at 64 per cent by pod borer, 43 per cent by pod fly and 14 per cent by wilt for marginal category, 88 per cent by pod borer, 71 per cent by pod fly and 47 per cent by wilt for small category, 77 per cent by pod borer, 77 per cent by pod fly and 38 per cent by wilt for medium category and 83 per cent by pod borer, 100 per cent by pod fly and 67 per cent by wilt for large category with an average of 78 per cent by pod borer, 68 per cent by pod fly and 38 per cent by wilt for the average category of farmers (Table 6.2).

Table 6.2: Major Pest Problems faced in Pulses: Non-NFSM Beed District

Type of Pest	No. of Households Reporting Problem	Total No. of Households	% to Total Households	Crops Affected	Estimated Yield Loss Per Acre (in per cent)
Marginal					
Pod borer	9	14	64.29	Tur, Gram	15.22
Pod fly	6	14	42.86	Mung, Tur, Gram	11.17
Wilt	2	14	14.29	Gram	7.50
Root rot	-	-	-	-	-
Nematodes	-	-	-	-	-
Any other (specify)	-	-	-	-	-
Small					
Pod borer	15	17	88.24	Mung, Tur, Gram	13.47
Pod fly	12	17	70.59	Mung, Tur, Gram	11.03
Wilt	8	17	47.06	Gram	13.88
Root rot	-	-	-	-	-
Nematodes	-	-	-	-	-
Any other (specify)	-	-	-	-	-
Medium					
Pod borer	10	13	76.92	Mung, Tur, Gram	13.20
Pod fly	10	13	76.92	Tur, Gram	12.00
Wilt	5	13	38.46	Mung, Tur, Gram	14.40
Root rot	-	-	-	-	-
Nematodes	-	-	-	-	-
Any other (specify)	-	-	-	-	-
Large					
Pod borer	5	6	83.33	Mung, Tur	11.60
Pod fly	6	6	100.00	Mung, Gram	11.17
Wilt	4	6	66.67	Tur, Gram	10.50
Root rot	-	-	-	-	-
Nematodes	-	-	-	-	-
Any other (specify)	-	-	-	-	-
All					
Pod borer	39	50	78.00	Mung, Tur, Gram	13.56
Pod fly	34	50	68.00	Mung, Tur, Gram	11.36
Wilt	19	50	38.00	Mung, Tur, Gram	12.63
Root rot	-	-	-	-	-
Nematodes	-	-	-	-	-
Any other (specify)	-	-	-	-	-

The pests like pod borer, pod fly and wilt caused considerable damage to all the pulses crops cultivated by the sampled farmers of non-NFSM district of Beed with proportion of farmers affected by pests being higher in large category.

In the non-NFSM district of Beed, the extent of per acre loss caused by various pests with respect to pulses crops was estimated at 15.22 per cent by pod borer, 11.17 per cent by pod fly and 7.50 per cent by wilt for marginal category, 13.47 per cent by pod borer, 11.03 per cent by pod fly and 13.88 per cent by wilt for small category, 13.20 per cent by pod borer, 12.00 per cent by pod fly and 14.00 per cent by wilt for medium category and 11.60 per cent by pod borer, 11.17 per cent by pod fly and 10.50 per cent by wilt for large category with an average of 13.56 per cent by pod borer, 11.36 per cent by pod fly and 12.63 per cent by wilt for the average category of farmers (Table 6.2).

A comparative analysis between NFSM district of Amravati and non-NFSM district of Beed revealed that the extent of per acre loss caused by various pests with respect to pulses crops was higher in the non-NFSM district of Beed as against NFSM district of Amravati since per acre losses caused by various pests with respect to pulses crops for the average category of farmers was estimated at 11.31 per cent by pod borer, 10.52 per cent by pod fly and 10.11 per cent by wilt in the NFSM district of Amravati and 13.56 per cent by pod borer, 11.36 per cent by pod fly and 12.63 per cent by wilt in the non-NFSM district of Beed. Both NFSM district of Amravati and non-NFSM district of Beed showed mung, tur and gram as the pulses crops being affected by various pests.

6.2 Reasons for Growing Pulses Crops in NFSM and Non-NFSM Districts

At the time of survey, the sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed were asked to indicate the reasons that weighed in favour of cultivation various pulses crops. The perceptions with respect to reasons for growing various pulses crops were recorded and analysed, and these perceptions for the sampled farmers of NFSM district of Amravati and non-NFSM district of Beed are presented in Table 6.3 and Table 6.4.

Profitability was found to be the major reason for the cultivation of pulses by various categories of sampled households drawn from the NFSM district of Amravati since 74 per cent of the total sampled households of this district aired their view in favour of this reason, whereas 12 of the sampled households aired their view in favour of home consumption, 2 per cent in favour of inferior quality of land and 12 per cent in favour of lack of irrigation facilities (Table 6.3 and Table 6.3 (a)).

Table 6.3: Reasons for Growing Pulses: NFSM Amravati District

Reasons	(No. of Households)	
	Total No. of Households	% of Total Households
Home Consumption	6	12.00
Animal Feed	-	-
Inferior Quality of Land	1	2.00
Lack of Irrigation	6	12.00
Profitability	37	74.00
Any Other	-	-
Total	50	100.00

Table 6.3 (a): Reasons for Growing Pulses: Size-group-wise: NFSM Amravati District

Household Category	(No. of Households)						
	Home Consumption	Animal Feed	Inferior Quality of Land	Lack of Irrigation	Profitability	Any Other	Total
Marginal	1	-	-	2	12	-	15
Small	2	-	-	3	14	-	19
Medium	2	-	-	1	7	-	10
Large	1	-	1	-	4	-	6
All	6	-	1	6	37	-	50
Percentage to Total Farmers in the Size-group							
Marginal	6.67	-	-	13.33	80.00	-	100.00
Small	10.53	-	-	15.79	73.68	-	100.00
Medium	20.00	-	-	10.00	70.00	-	100.00
Large	16.67	-	16.67	-	66.67	-	100.00
All	12.00	-	2.00	12.00	74.00	-	100.00

Interestingly, the proportions of sampled households showing profitability as the major reason for the cultivation of various pulses crops declined with the increase in land holding size of sampled households of NFSM district of Amravati, whereas proportions of households showing home consumption as the major reason for the cultivation of various pulses crops increased with the increase in land holding size of sampled households of this district.

Contrary to the NFSM district of Amravati, the sampled households belonging to non-NFSM district of Beed showed profitability as well home consumption as the major reasons for the cultivation of pulses crops on their farms since 48 per cent of the total sampled farmers of Beed district favoured profitability as the major cause for cultivation of pulses crops and another 46 per cent aired their view in favour of cultivation of pulses for home consumption (Table 6.4 and Table 6.4 (a)). About 4 per cent of sampled households of Beed district cultivated various pulses crops due to inferior quality of land and 2 per cent due to lack of irrigation facilities. Interestingly, none of the sampled households belonging to NFSM district of Amravati and non-NFSM district of Beed showed animal feed as the reason for the cultivation of pulses crops on their farms.

Table 6.4: Reasons for Growing Pulses: Non-NFSM Beed District

(No. of Households)

Reasons	Total No. of Households	% of Total Households
Home Consumption	23	46.00
Animal Feed	-	-
Inferior Quality of Land	2	4.00
Lack of Irrigation	1	2.00
Profitability	24	48.00
Any Other	-	-
Total	50	100.00

Table 6.4 (a): Reasons for Growing Pulses: Size-group-wise: Non-NFSM Beed District

(No. of Households)

Household Category	Reasons						Total
	Home Consumption	Animal Feed	Inferior Quality of Land	Lack of Irrigation	Profitability	Any Other	
Marginal	10	-	-	1	3	-	14
Small	6	-	2	-	9	-	17
Medium	5	-	-	-	8	-	13
Large	2	-	-	-	4	-	6
All	23	-	2	1	24	-	50
	Percentage to Total Farmers in the Size-group						
Marginal	71.43	-	-	7.14	21.43	-	100.00
Small	35.29	-	11.76	-	52.94	-	100.00
Medium	38.46	-	-	-	61.54	-	100.00
Large	33.33	-	-	-	66.67	-	100.00
All	46.00	-	4.00	2.00	48.00	-	100.00

As against the NFSM district of Amravati, the proportions of sampled households showing profitability as the major reason for the cultivation of various pulses crops increased with the increase in land holding size of sampled households of non-NFSM district of Beed, and proportions of households showing home consumption as the major reason for the cultivation of various pulses crops declined with the increase in land holding size of sampled households of Beed district.

Thus, while the sampled households of NFSM district of Amravati showed profitability as the major cause for growing pulses crops on their farms with 72 per cent of sampled households airing their view in its favour, the reason for the cultivation of various pulses crops in the non-NFSM district of Beed was found to be both home consumption and profitability since 48 per cent of the total sampled households of Beed district favoured profitability as the cause of cultivation of pulses crops and 46 per cent of households of this district aired their view in favour of home consumption. Among various categories of households, while the proportions of sampled households showing profitability as the major reason for the cultivation of various pulses crops declined with the increase in land holding size of households in Amravati district, a reverse trend was

noticed in the non-NFSM district of Beed. Similarly, while the proportion of sampled households showing home consumption as the major cause for growing pulses crops declined with the increase in land holding size of sampled households in non-NFSM district of Beed, a reverse trend was noticed in the case of NFSM district of Amravati.

6.3 Criteria for Pulses Cultivation in NFSM and Non-NFSM Districts

There could be several criteria for the cultivation of pulses crops and important among them are extent of rainfall, soil suitability, requirements for home consumption, inferior quality of land, lack of irrigation facilities, etc. These criteria are generally used while deciding area allocation under pulses crops. The responses of the sampled households belonging to NFSM district of Amravati and non-NFSM district of Beed were also sought with respect to the criteria used for the cultivation of pulses crops and these responses are brought out in Table 6.5 and Table 6.6.

The sampled households drawn from the NFSM district of Amravati used rainfall followed by soil suitability as the major criteria while allocating area under various pulses crops cultivation since 68 per cent of the sampled households of this district favoured rainfall as the criteria in deciding area under pulses crops and 20 per cent sampled households aired their view in favour of soil suitability as the criteria in this respect (Table 6.5 and Table 6.5 (a)). However, 6 per cent of total sampled households of Amravati district aired their view in favour of home consumption, 2 per cent in favour of inferior quality of land and 4 per cent favoured lack of irrigation as the criteria in deciding area allocation under pulses crops.

Table 6.5: Criteria Used While Opting to Grow Pulses: NFSM Amravati District

Reasons	Total No. of Farmers	% of Farmers
Rainfall	34	68.00
Soil suitability	10	20.00
Home requirement	3	6.00
Inferior quality of land	1	2.00
Extent of irrigation	2	4.00
Any Other	-	-
Total	50	100.00

Among various categories of households, the proportions of households of NFSM district of Amravati showing rainfall as the main criteria in deciding area allocation under pulses crops was cent per cent in the case of large category, 60 per cent for marginal category, 68 per cent for small category and 60 for medium category. The proportion of sampled households showing soil suitability as the criteria in deciding area allocation

under pulses crops was 33 per cent for marginal category, 11 per cent for small and 30 per cent for medium category with an average of 20 per cent for the average category of farmers belonging to NFSM district of Amravati.

Table 6.5 (a): Criteria Used While Opting to Grow Pulses: NFSM Amravati District
(No. of Households)

Household Category	Criteria						Total
	Rainfall	Soil suitability	Home requirement	Inferior quality of land	Extent of irrigation	Any Other	
Marginal	9	5	-	1	-	-	15
Small	13	2	2	-	2	-	19
Medium	6	3	1	-	-	-	10
Large	6	-	-	-	-	-	6
All	34	10	3	1	2	-	50
Percentage to Total Farmers in the Size-group							
Marginal	60.00	33.33	-	6.67	0.00	-	100.00
Small	68.42	10.53	10.53	-	10.53	-	100.00
Medium	60.00	30.00	10.00	-	-	-	100.00
Large	100.00	-	-	-	-	-	100.00
All	68.00	20.00	6.00	2.00	4.00	-	100.00

The sampled households belonging to the non-NFSM district of Beed also used rainfall followed by soil suitability as the major criteria in deciding area allocation under various pulses crops cultivation since 58 per cent of the sampled households of this district favoured rainfall as the criteria for allocating area under pulses crops and 26 per cent sampled households aired their view in favour of soil suitability as the criteria in this respect (Table 6.6 and Table 6.6 (a)). Nevertheless, 10 per cent of total sampled households of Beed district aired their view in favour of home consumption, 4 per cent in favour of inferior quality of land and 2 per cent favoured lack of irrigation as the criteria while deciding area allocation under pulses crops.

Table 6.6: Criteria Used While Opting to Grow Pulses: Non-NFSM Beed District

Reasons	Total No. of Farmers	% of Farmers
Rainfall	29	58.00
Soil suitability	13	26.00
Home requirement	5	10.00
Inferior quality of land	2	4.00
Extent of irrigation	1	2.00
Any Other	-	-
Total	50	100.00

Among various categories of households drawn from the non-NFSM district of Beed, the proportions of households showing rainfall as the main criteria in deciding area allocation under pulses crops was 57 per cent in the case of marginal category, 76 per cent for small category, 31 per cent for medium category and 67 for large category. The

proportion of sampled households showing soil suitability as the criteria in deciding area allocation under pulses crops was 29 per cent for marginal category, 12 per cent for small, 46 per cent for medium and 17 per cent for medium category with an average of 26 per cent for the average category of farmers belonging to the non-NFSM district of Beed.

Table 6.6 (a): Criteria Used While Opting to Grow Pulses: Non-NFSM Beed District

Household Category	Criteria						Total
	Rainfall	Soil suitability	Home requirement	Inferior quality of land	Extent of irrigation	Any Other	
Marginal	8	4	2	-	-	-	14
Small	13	2	1	1	-	-	17
Medium	4	6	2	-	1	-	13
Large	4	1	-	1	-	-	6
All	29	13	5	2	1	-	50
Percentage to Total Farmers in the Size-group							
Marginal	57.14	28.57	14.29	-	-	-	100.00
Small	76.47	11.76	5.88	5.88	-	-	100.00
Medium	30.77	46.15	15.38	-	7.69	-	100.00
Large	66.67	16.67	-	16.67	-	-	100.00
All	58.00	26.00	10.00	4.00	2.00	-	100.00

Thus, the sampled households drawn from the NFSM district of Amravati and non-NFSM district of Beed used rainfall followed by soil suitability as the major criteria in deciding area allocation under pulses crops with weightage to rainfall being higher in the NFSM district as against non-NFSM district since 68 per cent of the sampled households of NFSM district of Amravati favoured rainfall as the criteria for allocation of area under pulses crops as against 58 per cent of the sampled households of non-NFSM district of Beed who aired their view in favour of rainfall as the criteria in this respect. However, 20 per cent of the sampled households of NFSM district of Amravati and 26 per cent of the sampled households of non-NFSM district of Beed aired their view in favour of soil suitability as the criteria in deciding area allocation under pulses crop.

6.4 Reasons for Low Area under Pulses in NFSM and Non-NFSM Districts

The sampled households drawn from the NFSM district of Amravati and non-NFSM district of Beed showed varied reasons for low area allocation under pulses crops, and these reasons mainly included (a) low profitability, (b) low yield, (c) instability in terms of price and yield, (d) marketing related problems, and (e) pest related problems. The sampled households aired different opinions about these problems. The responses of the sampled households belonging to the NFSM district of Amravati and non-NFSM district of Beed with respect to reasons for low area allocation under pulses crops are presented in Table 6.7 and Table 6.8.

In the NFSM district of Amravati, the reported responses of sampled households were more or less equitably distributed across various reasons for low area allocation under pulses crops since 28 per cent of sampled households showed yield and price instability as the major reason for low area under pulses crops cultivation, whereas low profitability was sighted as the major reason for low area under pulses crops by 22 per cent of sampled households, pest related problems in this respect by 20 per cent of sampled households, marketing related problems by 16 per cent of sampled households, and low yield by 14 per cent of sampled households (Table 6.7 and Table 6.7 (a)).

Table 6.7: Reasons for Low Area under Pulses: NFSM Amravati District

Reasons	Total No. of Farmers	% of Farmers
Low Profitability	11	22.00
Low Yield	7	14.00
Instability (Yield or Price or Both)	14	28.00
Marketing Problem	8	16.00
Pest Problem	10	20.00
Any Other	-	-
Total	50	100.00

Table 6.7 (a): Reasons for Low Area under Pulses: Size-group-wise: NFSM Amravati District
(No. of Households)

Household Category	Reasons						Total
	Low Profitability	Low Yield	Instability (Yield or Price or Both)	Marketing Problem	Pest Problem	Any Other	
Marginal	3	1	6	2	3	-	15
Small	6	-	5	4	4	-	19
Medium	1	3	1	2	3	-	10
Large	1	3	2	-	-	-	6
All	11	7	14	8	10	-	50
	Percentage to Total Farmers in the Size-group						
Marginal	20.00	6.67	40.00	13.33	20.00	-	100.00
Small	31.58	-	26.32	21.05	21.05	-	100.00
Medium	10.00	30.00	10.00	20.00	30.00	-	100.00
Large	16.67	50.00	33.33	-	-	-	100.00
All	22.00	14.00	28.00	16.00	20.00	-	100.00

Among various categories of sampled households of NFSM district of Amravati, low profitability was shown as the major reason for low area under pulses crops by 20 per cent households in marginal category, 32 per cent households in small category, 10 per cent households in medium category and 17 per cent households in large category. The proportions of households showing low yield as the major reason for low area under pulses crops was 7 per cent in marginal category, 30 per cent in medium and 50 per cent in large category. The proportions of households reporting yield and price instability as the major reason for low area allocation under pulses crops was 40 per cent in marginal

category, 26 per cent in small, 10 per cent in medium and 33 per cent in large category. As regards low area allocation under pulses crops due to marketing related problems, 13 per cent of sampled households in marginal category, 21 per cent in small category and 20 per cent in medium category aired their view in favour of this problem. Similarly, as for low area allocation under pulses crops due to pest related problems, 20 per cent of sampled households in marginal category, 21 per cent in small category and 30 per cent in medium category aired their view in favour of this problem.

As regards the non-NFSM district of Beed, the reported responses of sampled households were not equitably distributed across various reasons with respect to low area allocation under pulses crops since 46 per cent of sampled households showed low profitability as the major reason for low area under pulses crops cultivation, 32 per cent of households showed low yield as the major reason for low area under pulses crops and 14 per cent households showed yield and price instability as the major cause for low area allocation under pulses crops in this district (Table 6.8 and Table 6.8 (a)). Market and pest related problems were reported as the reasons for low area allocation under pulses crops by only 2 per cent and 6 per cent, respectively, of the sampled households belonging to the non-NFSM district of Beed.

Table 6.8: Reasons for Low Area under Pulses: Non-NFSM Beed District

Reasons	Total No. of Farmers	% of Farmers
Low Profitability	23	46.00
Low Yield	16	32.00
Instability (Yield or Price or Both)	7	14.00
Marketing Problem	1	2.00
Pest Problem	3	6.00
Any Other	-	-
Total	50	100.00

Table 6.8 (a): Reasons for Low Area under Pulses: Size-group-wise: Non-NFSM Beed District
(No. of Households)

Household Category	Reasons						Total
	Low Profitability	Low Yield	Instability (Yield or Price or Both)	Marketing Problem	Pest Problem	Any Other	
Marginal	5	7	2	-	-	-	14
Small	8	7	-	-	2	-	17
Medium	8	1	2	1	1	-	13
Large	2	1	3	-	-	-	6
All	23	16	7	1	3	-	50
	Percentage to Total Farmers in the Size-group						
Marginal	35.71	50.00	14.29	-	-	-	100.00
Small	47.06	41.18	-	-	11.76	-	100.00
Medium	61.54	7.69	15.38	7.69	7.69	-	100.00
Large	33.33	16.67	50.00	-	-	-	100.00
All	46.00	32.00	14.00	2.00	6.00	-	100.00

Among various categories of sampled households belonging to the non-FSM district of Beed, low profitability was shown as the major reason for low area under pulses crops by 36 per cent households in marginal category, 47 per cent households in small category, 62 per cent households in medium category and 33 per cent households in large category. The proportions of households showing low yield as the major reason for low area under pulses crops was 50 per cent in marginal category, 41 per cent in small, 8 per cent in medium and 17 per cent in large category. The proportions of households reporting yield and price instability as the major reason for low area allocation under pulses crops was 14 per cent in marginal category, 15 per cent in medium and 50 per cent in large category. As for low area allocation under pulses crops due to marketing related problems, only 8 per cent of sampled households in medium category aired their view in favour of this problem. Similarly, as for low area allocation under pulses crops due to pest related problems, only 12 per cent of sampled households in small category and 8 per cent in medium category aired their view in favour of this problem.

The analysis with respect to reported reasons for low area allocation under pulses crops revealed that about 28 per cent of the sampled households of NFSM district of Amravati district opted for low area allocation under pulses crops due to yield and price instability, 22 per cent due to low profitability, 20 per cent due to pest related problems, 16 per cent due to marketing related problems, and 14 per cent due to low yield related problem. In the case of non-NFSM district of Beed, about 46 per cent of the total sampled households opted for low area allocation under pulses crops due to low profitability, 32 per cent due to low levels of yields, 14 per cent due to yield and price instabilities, 2 per cent due to marketing related problems, and 6 per cent due to pest related problems.

6.5 Crops Grown on Inferior Quality of Lands in NFSM and Non-NFSM Districts

Generally, farmers allocate inferior quality of land in the cultivation of those crops that do not require much investment but still yield reasonable returns, as they want to optimize returns from their land resources. These crops could be those that mainly depend on cultivation under rainfed conditions like vegetable crops, medicinal plants, aromatic plants, fruits, flowers and sometimes, coarse cereals, superior cereals, pulses and oilseeds. However, the sampled farmers belonging to the NFSM district of Amravati and non-NFSM district of Beed were found to cultivate superior cereals, course cereals, pulses, oilseeds and vegetable crops on their inferior quality of land. The reported responses of the sampled households of NFSM district of Amravati and non-NFSM

district of Beed with respect to the type of crops grown by them on inferior quality of land are brought out in Table 6.9 and Table 6.10.

In the NFSM district of Amravati, the inferior quality of land was used mainly for the cultivation of pulses, oilseeds and vegetables since 38 per cent of the sampled households used inferior quality of land for the cultivation of pulses, 28 per cent used it for the cultivation of oilseeds and another 28 per cent used this land for the cultivation of vegetables (Table 6.9 and Table 6.9 (a)). However, about 6 per cent of sampled households also used inferior quality of land for the cultivation of course cereals.

Table 6.9: Crops Grown on Inferior Quality Lands: Size-group-wise: NFSM Amravati District

Reasons	Total No. of Farmers	% of Farmers
Superior Cereals	-	-
Course Cereals	3	6.0
Pulses	19	38.00
Oilseeds	14	28.00
Vegetables	14	28.00
Any Other	-	-
Total	50	100.00

**Table 6.9 (a): Crops Grown on Inferior Quality Lands: Size-group-wise: NFSM Amravati District
(No. of Households)**

Household Category	Crops Grown						Total
	Superior Cereals	Course Cereals	Pulses	Oilseeds	Vegetables	Any Other	
Marginal	-	2	5	2	6	-	15
Small	-	1	7	5	6	-	19
Medium	-	-	4	5	1	-	10
Large	-	-	3	2	1	-	6
All	-	3	19	14	14	-	50
Percentage to Total Farmers in the Size-group							
Marginal	-	13.33	33.33	13.33	40.00	-	100.00
Small	-	5.26	36.84	26.32	31.58	-	100.00
Medium	-	-	40.00	50.00	10.00	-	100.00
Large	-	-	50.00	33.33	16.67	-	100.00
All	-	6.00	38.00	28.00	28.00	-	100.00

Among various categories, the proportion of households using inferior quality of land for the cultivation of pulses increased with the increase in land holding size of the households in the NFSM district of Amravati. Similarly, the proportion of households using inferior quality of land for the cultivation of oilseeds also increased with the increase in land holding size of the households in the NFSM district of Amravati with the exception of large category where the proportion stood lower as compared to medium category. On the other hand, the proportion of households using inferior quality of land for the cultivation of vegetables decreased with the increase in land holding size of the households in the NFSM district of Amravati with the exception of large category where the proportion stood higher as compared to medium category.

In the non-NFSM district of Beed, the inferior quality of land was not only used for the cultivation of pulses, oilseeds and vegetables but also course cereals and superior cereals since 40 per cent of the sampled households of this district used inferior quality of land for the cultivation of pulses, 26 per cent used it for the cultivation of course cereals, 16 per cent used it for the cultivation of vegetables, 10 per cent used it for the cultivation of superior cereals and only 8 per cent of the sampled households used this land for the cultivation of oilseeds (Table 6.10 and Table 6.10 (a)).

Table 6.10: Crops Grown on Inferior Quality Lands: Size-group-wise: Non-NFSM Beed District

Reasons	Total No. of Farmers	% of Farmers
Superior Cereals	5	10.00
Course Cereals	13	26.00
Pulses	20	40.00
Oilseeds	4	8.00
Vegetables	8	16.00
Any Other	-	-
Total	50	100.00

**Table 6.10 (a): Crops Grown on Inferior Quality Lands: Size-group-wise: Non-NFSM Beed District
(No. of Households)**

Household Category	Crops Grown						Total
	Superior Cereals	Course Cereals	Pulses	Oilseeds	Vegetables	Any Other	
Marginal	1	4	7	1	1	-	14
Small	1	2	7	2	5	-	17
Medium	2	5	4	-	2	-	13
Large	1	2	2	1	-	-	6
All	5	13	20	4	8	-	50
Percentage to Total Farmers in the Size-group							
Marginal	7.14	28.57	50.00	7.14	7.14	-	100.00
Small	5.88	11.76	41.18	11.76	29.41	-	100.00
Medium	15.38	38.46	30.77	-	15.38	-	100.00
Large	16.67	33.33	33.33	16.67	-	-	100.00
All	10.00	26.00	40.00	8.00	16.00	-	100.00

In the non-NFSM district of Beed, the proportion of households using inferior quality of land for the cultivation of pulses by and large declined with the increase in land holding size of households, whereas this proportion with respect to superior cereals increased with the increase in land holding size of households. Further, in the non-NFSM district of Beed, the proportion of households using inferior quality of land for the cultivation of course cereals was the highest for medium category and lowest for small category, and for vegetables this proportion was the highest for small category and lowest for marginal category. The proportion of households using inferior quality of land for the cultivation of oilseeds increased with the increase in land holding size of sampled households of non-NFSM district of Beed.

Thus, the sampled households belonging to NFSM district of Amravati mainly used inferior quality of land for the cultivation of pulses, oilseeds and vegetable crops since 38 per cent of the sampled households used this land for the cultivation of pulses, 28 per cent used it for the cultivation of oilseeds and another 28 per cent used this land for the cultivation of vegetables. On the other hand, the inferior quality of land in non-NFSM district of Beed was chiefly used for the cultivation of pulses, coarse cereals, vegetables, oilseeds and also superior cereals since 40 per cent of the sampled households of Beed district used inferior quality of land for the cultivation of pulses, 26 per cent used it for the cultivation of coarse cereals, 16 per cent used it for the cultivation of vegetables, 10 per cent used it for the cultivation of superior cereals and 8 per cent used it for the cultivation of oilseeds.

6.6 Problems with Pulses on Inferior Quality of Lands in NFSM and Non-NFSM Districts

The cultivation of pulses crops on inferior quality of land generally results in either low yield or poor quality of grain or both low yield and poor quality of grain. The reported responses of the sampled households drawn from the NFSM district of Amravati and non-NFSM district of Beed with respect to problems faced by them in the cultivation of pulses crops on inferior quality of land are presented in Table 6.11 and Table 6.12.

Majority of the sampled households belonging to the NFSM district of Amravati had reported low yield and both poor quality of grain and low yield as the major problems faced by them in the cultivation of pulses crops on inferior quality of land. The proportion of sampled households to the total sampled households of Amravati district reporting low yield as the major problem in the cultivation of pulses crops on inferior quality of land was 47 per cent, whereas 34 per cent of the sampled households of this district showed both poor grain quality and low yield as the major problem faced by them in the cultivation of pulses crops on inferior quality of land (Table 6.11 and Table 6.11 (a)). About 18 per cent of the sampled households of NFSM district of Amravati aired their view in favour of poor quality of grain as the major problem in the cultivation of pulses crops on inferior quality of land.

Table 6.11: Problems of Growing Pulses on Inferior Quality Land : NFSM Amravati District

Reasons	Total No. of Farmers	% of Farmers
Yield is Low	18	47.37
Grain Quality is Poor	7	18.42
Both 1 and 2	13	34.21
Total	38	100.00

Table 6.11 (a): Problems of Growing Pulses on Inferior Quality Land: Size-group-wise: NFSM Amravati District

(Only Farmers' Reported Responses)

Household Category	Problems			
	Yield is Low	Grain Quality is Poor	Both 1 and 2	Total
Marginal	3	1	4	8
Small	10	3	3	16
Medium	3	1	4	8
Large	2	2	2	6
All	18	7	13	38
	Percentage to Total Farmers in the Size-group			
Marginal	37.50	12.50	50.00	100.00
Small	62.50	18.75	18.75	100.00
Medium	37.50	12.50	50.00	100.00
Large	33.33	33.33	33.33	100.00
All	47.37	18.42	34.21	100.00

In the NFSM district of Amravati, the proportion of households reporting low yield as the major problem in the cultivation of pulses crops on poor quality of land was the highest for small category (63 per cent) and lowest for large category (33 per cent), whereas the proportion of households reporting both poor quality of grain and low yield as the major problem in the cultivation of pulses crops on poor quality of land stood at the highest for marginal and medium categories (50 per cent) and lowest for the small category (19 per cent).

In the non-NFSM district of Beed, low yield was reported as the major problem in the cultivation of pulses crops on the inferior quality of land since 58 per cent of the sampled households of this district favoured their opinion in this respect (Table 6.12 and Table 6.12 (a)). However, 28 per cent of the sampled households of the non-NFSM district of Beed had reported poor quality of grain as the problem in the cultivation of pulses crops on the inferior quality of land. In this respect, about 15 per cent of the sampled households of the non-NFSM district of Beed had reported both poor quality of grain and low yield as the problems in the cultivation of pulses crops on the inferior quality of land.

Table 6.12: Problems of Growing Pulses on Inferior Quality Land: Non-NFSM Beed District

Reasons	Total No. of Farmers	% of Farmers
Yield is Low	23	57.50
Grain Quality is Poor	11	27.50
Both 1 and 2	6	15.00
Total	40	100.00

Table 6.12 (a): Problems of Growing Pulses on Inferior Quality Land: Size-group-wise: Non-NFSM Beed District

(Only Farmers' Reported Responses)

Household Category	Problems			
	Yield is Low	Grain Quality is Poor	Both 1 and 2	Total
Marginal	6	2	-	8
Small	10	5	-	15
Medium	4	2	5	11
Large	3	2	1	6
All	23	11	6	40
	Percentage to Total Farmers in the Size-group			
Marginal	75.00	25.00	0.00	100.00
Small	66.67	33.33	0.00	100.00
Medium	36.36	18.18	45.45	100.00
Large	50.00	33.33	16.67	100.00
All	57.50	27.50	15.00	100.00

As for various categories of households belonging to the non-NFSM district of Beed, the proportions of households reporting low yield and poor quality of grain, and also both poor quality of grain and low yield as the major problems in the cultivation of pulses crops on the inferior quality of land declined in general with the increase in land holding size of households showing major concern in this respect being raised by the smaller categories of farmers, though the proportion in this respect stood at higher for medium category with respect to low yield and poor quality of grain.

The sampled households belonging to the NFSM district of Amravati and non-NFSM district of Beed showed some variations in terms of problems faced by them in terms of cultivation of pulses crops on inferior quality of land since 47 per cent of the sampled households of NFSM district had reported low yield and 34 per cent showed both poor quality of grain and low yield as the major problems faced by them in the cultivation of pulses crops on inferior quality of land. The proportion of households in the non-NFSM district of Beed reporting low yield as the major problem in the cultivation of pulses crops on inferior quality of land was as high as 58 per cent, whereas 28 per cent of the sampled households of this district reported poor quality of grain as the major problem faced by them in the cultivation of pulses crops on the inferior quality of land.

6.7 Reasons for Shifting from Pulses to Other Crops in NFSM and Non-NFSM Districts

There are several reasons for shifting from pulses to other crops cultivation and important among these reasons encompass: (a) low level of yield, low realization of prices, (c) lack of assured market, uncertainty in the yield of improved varieties, and (d) application of large doses of other inputs. The reported responses for the reasons for

shifting from pulses to other crops cultivation were recorded from the sampled households belonging to the NFSM district of Amravati and non-NFSM district of Beed, and these reported responses are brought out in Table 6.13 and Table 6.14.

The sampled households drawn from the NFSM district of Amravati had cited lack of assured market, uncertainty in the yield of improved varieties and application of large doses of other inputs as the major reasons for shifting from pulses to other crops cultivation since about 43 per cent of the reported responses from the sampled households of NFSM district of Amravati accorded the reason for shifting from pulses to other crops cultivation to lack of assured market, 26 per cent to uncertainty in yield of improved varieties of seeds and 22 per cent to application of large doses of other inputs (Table 6.13 and Table 6.13 (a)). About 9 per cent of the sampled households of NFSM district of Amravati cited low price realization as the reason for shifting from pulses to other crops cultivation.

Table 6.13: Reasons for Shifting from Pulses o Other Crops: NFSM Amravati District
(Only Farmers' Reported Responses)

Reasons	Total No. of Farmers	% of Farmers
Yield is Low	-	-
Price Realization is Low	2	8.70
No Assured Market	10	43.48
Yield of Improved Varieties is Uncertain	6	26.09
Large Doses of Other Inputs Required	5	21.74
Any Other	-	-
Total	23	100.00

Table 6.13 (a): Reasons for Shifting from Pulses o Other Crops: Size-group-wise: NFSM Amravati District
(Only Farmers' Reported Responses)

Household Category	Crops Grown						Total
	Yield is Low	Price Realization is Low	No Assured Market	Yield of Improved Varieties is Uncertain	Large Doses of Other Inputs Required	Any Other	
Marginal	-	-	2	1	3	-	6
Small	-	-	3	3	1	-	7
Medium	-	1	2	1	-	-	4
Large	-	1	3	1	1	-	6
All	-	2	10	6	5	-	23
	Percentage to Total Farmers in the Size-group						
Marginal	-	-	33.33	16.67	50.00	-	100.00
Small	-	-	42.86	42.86	14.29	-	100.00
Medium	-	25.00	50.00	25.00	-	-	100.00
Large	-	16.67	50.00	16.67	16.67	-	100.00
All	-	8.70	43.48	26.09	21.74	-	100.00

Among various categories, the proportions of sampled households of NFSM district of Amravati citing lack of assured market as the major reasons for shifting from pulses to other crops cultivation increased with the increase in land holding size of

households, whereas the proportion of households citing uncertainty in yield of improved variety as the reasons for shifting from pulses to other crops cultivation was the highest for small category (43 per cent) and lowest for marginal and large categories (17 per cent). The proportion of households citing application of large doses of other inputs as the reasons for shifting from pulses to other crops cultivation was the highest for marginal category (50 per cent) and lowest for small category (14 per cent).

In the case of non-NFSM district of Beed, the sampled households had cited application of large doses of other inputs, uncertainty in the yield of improved varieties of seeds, lack of assured market, low price realization, and low yield as the reasons for shifting from pulses to other crops cultivation since about 36 per cent of the reported responses from the sampled households of non-NFSM district of Beed accorded the reason for shifting from pulses to other crops to application of large doses of other inputs, 18 per cent to uncertainty in yield of improved varieties of seeds, 15 per cent to lack of assured market, 15 per cent to low price realization and another 15 per cent to low yield (Table 6.14 and Table 6.14 (a)).

Table 6.14: Reasons for Shifting from Pulses to Other Crops: Non-NFSM Beed District
(Only Farmers' Reported Responses)

Reasons	Total No. of Farmers	% of Farmers
Yield is Low	5	15.15
Price Realization is Low	5	15.15
No Assured Market	5	15.15
Yield of Improved Varieties is Uncertain	6	18.18
Large Doses of Other Inputs Required	12	36.36
Any Other	-	-
Total	33	100.00

Table 6.14 (a): Reasons for Shifting from Pulses to Other Crops: Size-group-wise: Non-NFSM Beed District
(Only Farmers' Reported Responses)

Household Category	Crops Grown						Total
	Yield is Low	Price Realization is Low	No Assured Market	Yield of Improved Varieties is Uncertain	Large Doses of Other Inputs Required	Any Other	
Marginal	2	1	2	2	2	-	9
Small	2	1	-	2	5	-	10
Medium	1	1	2	1	5	-	10
Large	-	2	1	1	-	-	4
All	5	5	5	6	12	-	33
	Percentage to Total Farmers in the Size-group						
Marginal	22.22	11.11	22.22	22.22	22.22	-	100.00
Small	20.00	10.00	-	20.00	50.00	-	100.00
Medium	10.00	10.00	20.00	10.00	50.00	-	100.00
Large	0.00	50.00	25.00	25.00	-	-	100.00
All	15.15	15.15	15.15	18.18	36.36	-	100.00

Among various categories, the proportions of sampled households of non-NFSM district of Beed citing application of large doses of other inputs as the major reasons for shifting from pulses to other crops cultivation increased with the increase in land holding size of households, whereas the proportion of households citing low yield as the reason for shifting from pulses to other crops cultivation declined with the increase in land holding size of sampled households. The proportion of households citing uncertainty in yield of improved varieties of seeds as the reason for shifting from pulses to other crops cultivation was the highest for large category (25 per cent) and lowest for medium category (10 per cent). The proportion of households citing low price realization as the reason for shifting from pulses to other crops cultivation was the highest for large category (50 per cent) and lowest for small and medium category (10 per cent). Similarly, the proportion of households citing lack of assured market as the reason for shifting from pulses to other crops cultivation was the highest for large category (25 per cent) and lowest for medium category (20 per cent).

The foregoing observations revealed that while the reported responses of the sampled households belonging to the NFSM district of Amravati with respect to reasons for shifting from pulses to other crops were mainly confined to lack of assured market, uncertainty in the yield of improved varieties of seeds and application of large doses of other inputs, the sampled households of non-NFSM district of Beed had reported application of large doses of other inputs, uncertainty in the yield of improved varieties of seeds, lack of assured market, low price realization, and low yield as the reasons for shifting from pulses to other crops cultivation. However, a couple of sampled households of NFSM district of Amravati had also cited low price realization as the reason for shifting from pulses to other crops cultivation.

6.8 Farmers Willingness to Grow Pulses in NFSM and Non-NFSM Districts

The perceptions of the sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed were also ascertained with respect to their willingness to grow pulses if assured market is provided, and these reported responses have been presented in Table 6.15 and 6.16.

In the NFSM district of Amravati, the proportion of sampled households willing to grow pulses under assured market conditions was found to be 93 per cent for marginal category, 95 per cent for small, 100 per cent for medium and 100 per cent for large category with an average of 96 per cent for the average category of farmers (Table 6.15).

Table 6.15: Farmers Willing to Grow Pulses if Assured Market is Provided: NFSM Amravati District

Household Category	No. of Farmers Willing	Total No. of Farmers in the Size-group	% of Farmers Willing
Marginal	14	15	93.33
Small	18	19	94.74
Medium	10	10	100.00
Large	6	6	100.00
All	48	50	96.00

Table 6.16: Farmers Willing to Grow Pulses if Assured Market is Provided: Non-NFSM Beed District

Household Category	No. of Farmers Willing	Total No. of Farmers in the Size-group	% of Farmers Willing
Marginal	13	14	92.86
Small	17	17	100.00
Medium	11	13	84.62
Large	6	6	100.00
All	47	50	94.00

As for the non-NFSM district of Beed, the proportion of sampled households willing to grow pulses under assured market conditions was estimated at 93 per cent for marginal category, 100 per cent for small, 85 per cent for medium and 100 per cent for large category with an average of 94 per cent for the average category, showing cent per cent proportion in this respect for small and large categories (Table 6.16).

A comparative analysis between the sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed revealed that while all the medium and large categories of sampled farmers of NFSM district of Amravati were willing to grow pulses under assured market conditions, this willingness was cent per cent in the case of small and large categories of sampled farmers in the case of non-NFSM district of Beed. In general, about 96 per cent of the sampled farmers of the NFSM district of Amravati were willing to grow pulses under assured market condition, whereas this proportion for non-NFSM district of Beed stood at 94 per cent.

6.9 Major Problems in Cultivating Pulses in NFSM and Non-NFSM Districts

The sampled farmers were noticed to face several problems in the cultivation of pulse crops and these problems mainly encompassed: (a) lack of irrigation facilities, (b) lack of improved varieties, (c) lower yields, (d) incidence of high pests, (e) low market price, (f) lack of assured market, and (g) provision of extension services. Perceptions of the sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed were, therefore, sought with respect to the problems faced by them in the cultivation of pulse crops, and these perceptions were ranked from 1 to 7. The reported

perceptions with respect to major problems faced by the sampled farmers in the cultivation various pulses crops and their ranking in this respect are brought out in Table 6.17 and Table 6.18 with all the categories of sampled farmers put together. The household category-wise and reported perceptions in terms of problems faced by the sampled farmers of NFSM district of Amravati and non-NFSM district of Beed and their ranking in this respect are provided in Appendix 15 and 16.

In the NFSM district of Amravati, the problem relating to lack of irrigation facilities was assigned 1st ranking by 48 per cent of sampled households, 2nd ranking by 19 per cent of sampled households, and 3rd ranking by 21 per cent of sampled households. Lack of improved varieties of seeds was another problem in the cultivation of pulse crops, which was assigned 1st ranking by 12 per cent of sampled households, 2nd ranking by 15 per cent of sampled households, 3rd ranking by 24 per cent of sampled households, 4th ranking by 26 per cent of sampled households, and 5th ranking by 15 per cent of sampled households (Table 6.17 and Table 6.17 (a)). The problem relating to low yield was assigned 1st ranking by 16 per cent of sampled households, 2nd ranking by 34 per cent of sampled households, 3rd ranking by 16 per cent of sampled households, and 4th ranking by 18 per cent of sampled households. Another major problem in the cultivation of pulses was low market prices, which was assigned 1st ranking by 27 per cent of sampled households, 2nd ranking by 16 per cent of sampled households, 3rd ranking by 19 per cent of sampled households, and 5th ranking by 22 per cent of sampled households of NFSM district of Amravati.

Table 6.17: Major Problems in Cultivating Pulses: NFSM Amravati District

Problem	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Rank 7	Total
Lack of irrigation facilities	23	9	10	4	1	1	-	48
Lack of improved varieties	4	5	8	9	5	3	-	34
Lower yield	6	13	6	7	4	2	-	38
High pest incidence	5	11	9	8	12	2	-	47
Low market price	10	6	7	2	8	4	-	37
No assured market/procurement	1	5	7	6	4	19	-	42
Any other (Extension service)	-	-	-	-	-	-	2	2
Total	49	49	47	36	34	31	2	248

Table 6.17 (a): % Distribution of Major Problems in Cultivating Pulses: NFSM Amravati District

Problem	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Rank 7	Total
Lack of irrigation facilities	47.92	18.75	20.83	8.33	2.08	2.08	-	100.00
Lack of improved varieties	11.76	14.71	23.53	26.47	14.71	8.82	-	100.00
Lower yield	15.79	34.21	15.79	18.42	10.53	5.26	-	100.00
High pest incidence	10.64	23.40	19.15	17.02	25.53	4.26	-	100.00
Low market price	27.03	16.22	18.92	5.41	21.62	10.81	-	100.00
No assured market/procurement	2.38	11.90	16.67	14.29	9.52	45.24	-	100.00
Any other (Extension service)	-	-	-	-	-	-	100.00	100.00
Total	19.76	19.76	18.95	14.52	13.71	12.50	0.81	100.00

As for the non-NFSM district of Beed, the major problem in the cultivation of pulse crops was lack of irrigation facilities, which was assigned 1st ranking by 22 per cent of sampled households, 2nd ranking by 42 per cent of sampled households, and 4th ranking by 14 per cent of sampled households. Lack of improved varieties of seeds was another problem in the cultivation of pulse crops, which was assigned 1st ranking by 22 per cent of sampled households, 3rd ranking by 30 per cent of sampled households, and 4th ranking by 26 per cent of sampled households (Table 6.18 and Table 6.18 (a)). Lower level of yield was identified as the third problem in the cultivation of pulse crops in non-NFSM district of Beed, which was assigned 1st ranking by 18 per cent of sampled households, 2nd ranking by another 18 per cent of sampled households, 3rd ranking by 24 per cent of sampled households, and 4th ranking by another 24 per cent of sampled households. Low market price was cited as another problem in the cultivation of pulse crops, which got 1st ranking by 28 per cent of sampled households and 5th ranking by 32 per cent of sampled households.

Table 6.18: Major Problems in Cultivating Pulses: Non-NFSM Beed District

Problem	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Rank 7	Total
Lack of irrigation facilities	11	21	5	7	6	-	-	50
Lack of improved varieties	11	6	15	13	4	1	-	50
Lower yield	9	9	12	12	7	1	-	50
High pest incidence	6	5	10	15	12	2	-	50
Low market price	14	4	7	3	16	6	-	50
No assured market/procurement	1	5	1	-	3	40	-	50
Any other (Extension service)	-	-	-	-	-	-	-	-
Total	50	50	50	50	50	50	-	300

Table 6.18 (a): % Distribution of Major Problems in Cultivating Pulses: Non-NFSM Beed District

Problem	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Rank 7	Total
Lack of irrigation facilities	22.00	42.00	10.00	14.00	12.00	-	-	100.00
Lack of improved varieties	22.00	12.00	30.00	26.00	8.00	2.00	-	100.00
Lower yield	18.00	18.00	24.00	24.00	14.00	2.00	-	100.00
High pest incidence	12.00	10.00	20.00	30.00	24.00	4.00	-	100.00
Low market price	28.00	8.00	14.00	6.00	32.00	12.00	-	100.00
No assured market/procurement	2.00	10.00	2.00	-	6.00	80.00	-	100.00
Any other (Extension service)	-	-	-	-	-	-	-	-
Total	16.67	16.67	16.67	16.67	16.67	16.67	-	100.00

A comparative analysis between NFSM district of Amravati and non-NFSM district of Beed with respect to the problems faced by the households in the cultivation of pulse crops revealed that lack of irrigation facilities, lower yield and lower market prices were the major problems faced by the sampled households belonging to the NFSM district of Amravati, whereas sampled farmers of non-NFSM district of Beed showed

lack of irrigation, lack of improved varieties of seeds, lower yields and low market prices as the major problems faced by them in the cultivation of pulse crops on their farms. High incidence of pest was another major problem faced by the sampled households belonging to the non-NFSM district of Beed.

6.10 Important Suggestion for Cultivating Pulses in NFSM and Non-NFSM Districts

In order to augment pulse production, the sampled farmers belonging to NFSM district of Amravati and non-NFSM district of Beed aired their own suggestion, which included:(a) improvement in irrigation facilities, (b) availability of high yielding varieties of seeds, (c) availability of pest resistance varieties of seeds, (d) assured procurement with MSP, (e) higher market price and (f) provision of extension services. Perceptions of the sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed with respect to the suggestions extended by them for the cultivation of pulse crops along with ranking of various suggestions are brought out in Table 6.19 and Table 6.20 with all the categories of sampled farmers put together. The household category-wise and reported perceptions in terms of suggestions extended by the sampled households of NFSM district of Amravati and non-NFSM district of Beed and their ranking in this respect are provided in Appendix 17 and 18.

In the NFSM district of Amravati, the major suggestion was with respect to improvement in irrigation facilities since this suggestion received 1st ranking from 51 per cent of sampled households, 2nd ranking from 12 per cent of sampled households, and 3rd ranking from 29 per cent of sampled households (Table 6.19 and Table 6.19 (a)). Availability of high yielding varieties of seeds was another suggestion put forward by the sampled farmers of NFSM district of Amravati and this suggestion received 1st ranking from 20 per cent of sampled households, 2nd ranking from 55 per cent of sampled households and 3rd ranking from 11 per cent of sampled households. Further, availability of pest resistant varieties of seeds was also a suggestion put forward by the sampled households and this suggestion received 2nd ranking from 21 per cent of sampled households, 3rd ranking from 28 per cent of sampled households and 4th ranking from another 28 per cent of sampled households. Interestingly, higher market price for pulse crops was supported by 25 per cent of the sampled households who assigned 1st ranking to this suggestion. Similarly, provision of better extension services was supported by 50 per cent of the sampled households of NFSM district of Amravati who assigned 1st ranking to this suggestion.

Table 6.19: Important Suggestions from the Farmers for Cultivating Pulses: NFSM Amravati District

Suggestions	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Total
Improving irrigation facilities	25	6	14	2	2	-	49
Availability of high yielding varieties	9	24	5	6	-	-	44
Availability of pest resistant varieties	2	9	12	12	8	-	43
Assured procurement with MSP	1	4	8	15	15	-	43
Higher market price	12	7	9	7	12	1	48
Any other (Providing extension service)	1	-	-	-	-	1	2
Total	50	50	48	42	37	2	229

Table 6.19 (a): % Distribution of Important Suggestions from the Farmers for Cultivating Pulses: NFSM Amravati District

Suggestions	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Total
Improving irrigation facilities	51.02	12.24	28.57	4.08	4.08	-	100.00
Availability of high yielding varieties	20.45	54.55	11.36	13.64	0.00	-	100.00
Availability of pest resistant varieties	4.65	20.93	27.91	27.91	18.60	-	100.00
Assured procurement with MSP	2.33	9.30	18.60	34.88	34.88	-	100.00
Higher market price	25.00	14.58	18.75	14.58	25.00	2.08	100.00
Any other (Providing extension service)	50.00	-	-	-	-	50.00	100.00
Total	21.83	21.83	20.96	18.34	16.16	0.87	100.00

As for the non-NFSM district of Beed, the major suggestion was again in terms of improvement in irrigation facilities since this suggestion received 1st ranking from 40 per cent of the sampled households, 2nd ranking from 28 per cent of the sampled households, and 3rd ranking from 18 per cent of sampled households (Table 6.20 and Table 6.20 (a)). Availability of high yielding varieties of seeds was yet another suggestion put forward by the sampled farmers of non-NFSM district of Beed and this suggestion received 1st ranking from 16 per cent of the sampled households, 2nd ranking from 26 per cent of the sampled households, 3rd ranking from 24 per cent of the sampled households and 4th ranking from 26 per cent of the sampled households. The sampled households of non-NFSM district of Beed also favoured availability of pest resistant varieties of seeds and this suggestion received 2nd ranking from 30 per cent of the sampled households, 3rd ranking from 32 per cent of sampled households and 4th ranking from another 20 per cent of the sampled households. Availability of higher market price for pulse crops was favoured by 38 per cent of the sampled households of non-NFSM district of Beed who assigned 1st ranking to this suggestion.

Table 6.20: Important Suggestions from the Farmers for Cultivating Pulses: Non-NFSM Beed District

Suggestions	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Total
Improving irrigation facilities	20	14	9	5	2	-	50
Availability of high yielding varieties	8	13	12	13	4	-	50
Availability of pest resistant varieties	3	15	16	10	6	-	50
Assured procurement with MSP	-	7	7	16	20	-	50
Higher market price	19	1	6	6	18	-	50
Any other (Providing extension service)	-	-	-	-	-	-	-
Total	50	50	50	50	50	-	250

**Table 6.20 (a): % Distribution of Important Suggestions from the Farmers for Cultivating Pulses:
Non-NFSM Beed District**

Suggestions	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Total
Improving irrigation facilities	40.00	28.00	18.00	10.00	4.00	-	100.00
Availability of high yielding varieties	16.00	26.00	24.00	26.00	8.00	-	100.00
Availability of pest resistant varieties	6.00	30.00	32.00	20.00	12.00	-	100.00
Assured procurement with MSP	-	14.00	14.00	32.00	40.00	-	100.00
Higher market price	38.00	2.00	12.00	12.00	36.00	-	100.00
Any other (Providing extension service)	-	-	-	-	-	-	-
Total	20.00	20.00	20.00	20.00	20.00	-	100.00

The major suggestion of the sampled households belonging to the NFSM district of Amravati and non-NFSM district of Beed with respect to pulse crops cultivation mainly revolved around improvement in the existing irrigation facilities, availability of high yielding varieties of seeds, availability of pest resistant varieties of seeds and provision of higher market prices for various pulse crops since all these suggestions were assigned 1st, 2nd or 3rd ranking by majority of the sampled households belonging to both NFSM district of Amravati and non-NFSM district of Beed. Interestingly, 50 per cent of the sampled households drawn from the NFSM district of Amravati aired their view in favour of availability of better extension services as these households assigned 1st ranking to this suggestion, though another 50 per cent of the sampled households of this district assigned 6th ranking to this suggestion.

CHAPTER – VII

IMPACT OF NFSM-PULSES ON PULSE PRODUCTION

This chapter mainly evaluates the impact of National Food Security Mission (NFSM) on pulse crop production in the NFSM district of Amravati of Maharashtra. In order to evaluate the impact of NFSM programme on pulse crop production, responses of the sampled households belonging to the NFSM district of Amravati have been assessed with respect to their awareness of NFSM for pulses, assistance received and the type of assistance, usefulness of the assistance, area allocation under pulse crops before and after NFSM programme, production of pulses crops before and after NFSM programme, increase in area under pulses after NFSM programme, extent of increase in area under pulse crops, and their major suggestions for improving NFSM-Pulses programme.

7.1 Farmers' Awareness of NFSM-Pulses

The responses of various categories of sampled farmers drawn from the NFSM district of Amravati in terms of their awareness about the NFSM programme for pulse crops are brought out in Table 7.1.

Table 7.1: Farmers' Awareness of NFSM – Pulses: NFSM Amravati District

Household Category	No. of Households Aware	Total No. of Households in the Size-group	% of Household Aware
Marginal	10	15	66.67
Small	16	19	84.21
Medium	7	10	70.00
Large	5	6	83.33
All	38	50	76.00

Although NFSM programme has been initiated in India a few years ago, the sampled farmers belonging to the NFSM district of Amravati were quite aware of this programme since 76 per cent of the total sampled farmers of this district aired their view in favour of their awareness of the programme and this proportion among various categories stood at 67 per cent in marginal category, 84 per cent in small, 70 per cent in medium and 83 per cent in large category with an average of 76 per cent for the average category of farmers of the NFSM district of Amravati. Thus, large and small categories of sampled farmers showed higher proportion as against marginal and medium category in terms of their awareness of the programme.

7.2 Assistance Received under NFSM-Pulses

At the time of survey, various categories of sampled households belonging to the NFSM district of Amravati were asked to indicate as to whether they received any assistance under NFSM-pulses programme, and the responses in this respect received from the sampled farmers are shown in Table 7.2.

Table 7.2: Received any Assistance Under NFSM – Pulses: NFSM Amravati District

Household Category	No. of Households Received Assistance	Total No. of Households in the Size-group	% of Household Assisted
Marginal	10	15	66.67
Small	16	19	84.21
Medium	7	10	70.00
Large	5	6	83.33
All	38	50	76.00

The response with respect to assistance under NFSM-pulses programme was quite positive since 76 per cent of the total sampled farmers belonging to the NFSM district of Amravati aired their view in favour of receiving assistance under the programme and this proportion among various categories stood at 67 per cent in marginal category, 84 per cent in small, 70 per cent in medium and 83 per cent in large category with an average of 76 per cent for the average category of farmers of the NFSM district of Amravati, showing higher proportion of small and large categories of farmers in terms of receiving assistance under NFSM-pulses programme.

7.3 Type of Assistance received under NFSM-Pulses

Under NFSM-pulses, the farmers are provided various types of assistance and these mainly include: (a) breeder/foundation/certified seeds, (b) assistance on Integrated Nutrient Management (INM) – micronutrients/line/gypsum, etc., (c) assistance on Integrated Pest Management (IPM) - micronutrients/line/gypsum IPM, (d) equipment like seed drills, pumpsets, sprinklers, conoweeder, Knapp-sack sprayers, (e) demonstration of new ICRISAT technologies or Bluebull menace, (f) training under Farmers' Training component, etc. The responses of the sampled households drawn from the NFSM district of Amravati were recorded in terms of types of assistance received by them and these responses for various categories of households are brought out in Table 7.3.

About 52 per cent of the total sampled households belonging to the NFSM district of Amravati were found to air their view in favour of receiving improved varieties of seeds of pulses crops under NFSM programme, 21 per cent received assistance on INM, 6 per cent received assistance on IPM, 17 per cent received various equipments, and

about 5 per cent received training under the programme. Among various categories, the proportion of sampled households showing receipt of improved varieties of seeds of pulse crops was 50 per cent in marginal category, 48 per cent in small, 55 per cent in medium and 67 per cent in large category.

Table 7.3: Distribution of Households by Type of Assistance: NFSM Amravati District

Household Category	No. of Households Assisted							Total
	Seeds	Integrated Nutrient Management (INM)	Integrated Pest Management (IPM)	Equipment like Seed Drills, etc,	Demonstration	Training	Other	
Marginal	10	4	2	3	-	1	-	20
Small	14	5	2	6	-	2	-	29
Medium	6	3	-	2	-	-	-	11
Large	4	2	-	-	-	-	-	6
All	34	14	4	11	-	3	-	66
	% Farmers Assisted to Total Farmers in Size Group							
Marginal	50.00	20.00	10.00	15.00	-	5.00	-	100.00
Small	48.28	17.24	6.90	20.69	-	6.90	-	100.00
Medium	54.55	27.27	-	18.18	-	-	-	100.00
Large	66.67	33.33	-	-	-	-	-	100.00
All	51.52	21.21	6.06	16.67	-	4.55	-	100.00

Note: There is overlapping of households as same household has received no. of assistance and, therefore, the total is exceeding the actual sample size of households

The proportion of sampled households of NFSM district of Amravati airing their view in terms of receiving assistance on INM was 20 per cent in marginal category, 17 per cent in small, 27 per cent in medium and 33 per cent in large category, showing a rise in this proportion with the increase in land holding size of households. Similarly, the proportion of sampled households airing their view in favour of receiving various equipments under NFSM programme was 15 per cent in marginal category, 21 per cent in small and 18 per cent in medium category. Thus, majority of the sampled households belonging to the NFSM district of Amravati received some kind of assistance under NFSM-pulses programme with higher perception in this respect being aired in favour of receiving improved varieties of seeds of pulses crop.

7.4 Usefulness of NFSM-Pulses

The responses of the sampled households drawn from the NFSM district of Amravati were also sought in terms of usefulness of NFSM-pulses programme and these responses for various categories of sampled households are presented in Table 7.4.

Majority of the sampled households belonging to the NFSM district of Amravati found NFSM programme for pulses very useful since 66 per cent of the total sampled households belonging to the NFSM district of Amravati aired their view in favour of the

programme. Among various categories, the proportion of households finding NFSM programme for pulses crops quite useful was 67 per cent in marginal category, 63 per cent in small, 70 per cent in medium and 67 per cent in large category (Table 7.4).

Table 7.4: Usefulness of NFSM – Pulses: NFSM Amravati District

Household Category	No. of Households Who Found Useful	Total No. of Households in the Size-group	% of Household
Marginal	10	15	66.67
Small	12	19	63.16
Medium	7	10	70.00
Large	4	6	66.67
All	33	50	66.00

Thus, by and large, all the categories of sampled households belonging to the NFSM district of Amravati favoured the NFSM programme for pulses crops due to various facilities extended to them under the programme that helped the farmers to raise the productivity of their pulse crops cultivated under rainfed conditions.

7.5 Type of Usefulness of NFSM-Pulses

The major reasons that weighed in favour of the NFSM programme for pulses crops were in terms of rise in yield levels of pulses crops, reduction in pest attacks, reduction in drudgery, and increase in knowledge about better varieties and practices. The responses of the sampled households belonging to the NFSM district of Amravati with respect to various reasons for usefulness of the programme were also sought and these responses for various categories of households are brought out in Table 7.5.

In the NFSM district of Amravati, about 34 per cent of the total sampled households favoured the NFSM programme for pulses due to rise in yield levels of pulses crops, 22 per cent due to reduction in pest attacks, 16 per cent due to reduction in drudgery, and 28 per cent owing to their increased knowledge about better varieties and practices (Table 7.5).

Table 7.5: Distribution by Type of Uses– Pulses: NFSM Amravati District

Household Category	No. of Households by Type of Use					Total
	Higher Yield	Reduced Pest Attacks	Reduced Drudgery	Increased Knowledge about Better Varieties and Practices	Any Other	
Marginal	10	7	5	7	-	29
Small	12	9	6	10	-	37
Medium	7	2	4	6	-	19
Large	4	3	1	4	-	12
All	33	21	16	27	-	97
	% Households to Total Households in Size Group					
Marginal	34.48	24.14	17.24	24.14	-	100.00
Small	32.43	24.32	16.22	27.03	-	100.00
Medium	36.84	10.53	21.05	31.58	-	100.00
Large	33.33	25.00	8.33	33.33	-	100.00
All	34.02	21.65	16.49	27.84	-	100.00

Among various categories, marginal, small and large categories of households, in particular, favoured the NFSM programme for pulses due to reduction in pest attacks, whereas medium, small and marginal category of households favoured the programme due to reduction in drudgery. However, all the categories of sampled households also favoured the programme owing to the fact that it resulted in rise in yield levels of pulses crops cultivated by them. Incidentally, the proportion of sampled households belonging to NFSM district of Amravati airing their view in favour of acquiring increased knowledge about better varieties and practices increased with the increase in land holding size of households.

7.6 Area under Pulse Crops Before and After NFSM

The estimates relating to the average area allocation under various pulses crops during 2006-07 and 2007-08, and the area allocation under pulses crops for the reference year 2008-09 for various categories of sampled households drawn from the NFSM district of Amravati are brought out in Table 7.6.

The average area allocation under mung crop during 2006-07 and 2008-09 with all the sampled households belonging to the NFSM district of Amravati put together was estimated at 147.44 acres, which increased to 155.66 acres in 2008-09. Similarly, the average area allocation under gram crop during 2006-07 and 2008-09 with all the sampled households belonging to the NFSM district of Amravati put together was estimated at 144.08 acres, which increased to 160.91 acres in 2008-09. However, in the case tur crop, the area allocation declined to 13.45 acres in 2008-09 from 18.60 acres noticed during 2006-07 and 2007-08.

Table 7.6: Area under Pulse Crops Before and After NFSM: NFSM Amravati District
(As Calculated from Schedule: Area in Acres)

Household Category	Mung		Tur		Gram	
	Average of 2006-07 and 2007-08	200809	Average of 2006-07 and 2007-08	200809	Average of 2006-07 and 2007-08	200809
Marginal	18.35	21.05	1.88	1.00	21.98	20.05
Small	40.74	36.86	4.85	5.95	40.60	37.86
Medium	46.25	39.75	5.88	4.50	44.25	41.00
Large	42.10	58.00	6.00	2.00	37.25	62.00
All	147.44	155.66	18.60	13.45	144.08	160.91

Table 7.6 (a): Area under Pulse Crops Before and After NFSM: NFSM Amravati District
(As Calculated from Schedule: Area in Acres)

Household Category	Total Pulses		
	Average of 2006-07 and 2007-08	2008-09	% Increase
Marginal	42.21	42.1	-0.26
Small	86.19	80.67	-6.40
Medium	96.38	85.25	-11.55
Large	85.35	122	42.94
All	310.12	330.02	6.42

Thus, the sampled households drawn from the NFSM district of Amravati showed a rise in area allocation under various pulses crops in 2008-09 as against average area allocation under pulses crops during 2006-07 and 2007-08 with the exception of tur crop, which showed a decline in area allocation in 2008-09 as against during 2006-07 and 2008-09. As a result, the total area under pulses crops with all the sampled households belonging to NFSM district of Amravati increased to 330.02 acres, which was estimated at 310.12 acres during 2006-07 and 2008-09, showing 6.42 per cent rise in area under pulse crops in 2008-09 over that of 2006-07 and 2007-08 average estimate. This clearly shows a positive impact of NFSM programme for pulses crops as the area allocation under pulses crops after the initiation of programme has increased on the sampled farms.

7.7 Production of Pulse Crops Before and After NFSM

The estimates relating to the average production of various pulses crops during 2006-07 and 2007-08, and the production of pulses crops for the reference year 2008-09 for various categories of sampled households belonging to the NFSM district of Amravati are presented in Table 7.7.

The average production of mung crop during 2006-07 and 2008-09 with all the sampled households drawn from the NFSM district of Amravati put together was estimated at 302.50 quintals, which rose to 365.00 quintals in 2008-09, showing 21 per cent rise in the same in 2008-09 over that of the average production figures of the same during 2006-07 and 2007-08. Similarly, the average production of gram crop during 2006-07 and 2008-09 with all the sampled households belonging to the NFSM district of Amravati put together was estimated at 561.50 quintals, which increased to 791.00 quintals in 2008-09, showing 41 per cent rise in the same in 2008-09 over that of the average production figures of the same during 2006-07 and 2007-08. Nevertheless, the production of tur crop in 2008-09 was estimated at 65.50 quintals for all the sampled farmers of NFSM district of Amravati put together, which actually stood at lower than 72.75 quintals estimated for the average production figures of tur crop for the years 2006-07 and 2007-08 (Table 7.7).

Table 7.7: Production of Pulse Crops Before and After NFSM: NFSM Amravati District
(As Calculated from Schedule: Production in Quintals)

Household Category	Mung		Tur		Gram	
	Average of 2006-07 and 2007-08	200809	Average of 2006-07 and 2007-08	200809	Average of 2006-07 and 2007-08	200809
Marginal	36.00	49.00	7.50	5.00	84.50	96.00
Small	84.50	89.00	19.75	28.50	155.00	174.00
Medium	95.50	95.00	21.50	22.00	173.00	204.00
Large	86.50	132.00	24.00	10.00	149.00	317.00
All	302.50	365.00	72.75	65.50	561.50	791.00

Table 7.7 (a): Production of Pulse Crops Before and After NFSM: NFSM Amravati District
(As Calculated from Schedule: Production in Quintals)

Household Category	Total Pulses		
	Average of 2006-07 and 2007-08	2008-09	% Increase
Marginal	128.00	150.00	17.19
Small	259.25	291.50	12.44
Medium	290.00	321.00	10.69
Large	259.50	459.00	76.88
All	936.75	1221.50	30.40

The foregoing observations clearly revealed that the sampled households drawn from the NFSM district of Amravati showed a substantial increase in production of pulses crops in 2008-09 as compared to the average production figures for the years 2006-07 and 2007-08 with the only exception of tur crop, which actually showed a decline in production in 2008-09 as against the average production during 2006-07 and 2008-09. As a consequence, the production of total pulses crops with all the sampled households belonging to NFSM district of Amravati put together increased to 1221.50 quintals in 2008-09, which was estimated at 936.75 quintals during 2006-07 and 2008-09, showing 30.40 per cent rise in production of total pulse crops in 2008-09 over that of average production of pulses crops during 2006-07 and 2007-08. This once again clearly shows a positive impact of NFSM programme on pulses crops as production of pulses crops after the initiation of programme has increased on the sampled farms. Since rise in production of pulses crops on the farms belonging to the sampled farmers of NFSM district stood at much faster than area expansion in 2008-09 over that of the average of 2006-07 and 2007-08, this is a clear cut indication of rise in productivity level of pulse crops cultivated on the sampled farm in 2008-09 over that of the average of 2006-07 and 2007-08, showing positive impact of NFSM programme on productivity levels of pulses crops grown in the state of Maharashtra.

7.8 Increase in Area under Pulse Crops after NFSM

The responses of the sampled farmers drawn from the NFSM district of Amravati were recorded with respect to rise in area under pulses after the initiation of NFSM programme and these responses for various categories are brought out in Table 7.8.

Table 7.8: Increase in Area under Pulses after NFSM: Farmers' Perception (Amravati District)

Household Category	No. of Farmers Who Reported Increase	Total No. of Farmers in the Size-group	% of Farmers
Marginal	8	15	53.33
Small	9	19	47.37
Medium	4	10	40.00
Large	4	6	66.67
All	25	50	50.00

When the sampled farmers drawn from the NFSM district of Amravati were asked to indicate as to whether the area allocation under pulses crops increased after the initiation of NFSM programme for pulses crops, about 50 per cent of the total sampled farmers aired positive response in this respect and among various categories this proportion stood at 53 per cent in marginal category, 47 per cent in small, 40 per cent in medium and 67 per cent in large category.

7.9 Extent of Increase in Area under Pulse Crops after NFSM

The estimates relating to extent of rise in area allocation under pulses on the farms belonging to various categories of sampled farmers of NFSM district of Amravati are presented in Table 7.9.

Table 7.9: Distribution by Extent of Increase: Farmers' Perception (Amravati District)

Household Category	No. of Households by Type of Use				Total
	1% - 2%	2% - 5%	5% - 10%	> 10%	
Marginal	-	-	-	8	8
Small	-	-	1	8	9
Medium	-	-	1	3	4
Large	-	1	-	3	4
All	-	1	2	22	25
% of Households to Total Households in Size Group					
Marginal	-	-	-	100.00	100.00
Small	-	-	11.11	88.89	100.00
Medium	-	-	25.00	75.00	100.00
Large	-	25.00	-	75.00	100.00
All	-	4.00	8.00	88.00	100.00

The estimates presented in Table 7.9 revealed that only 25 out of 50 sampled households belonging to the NFSM district of Amravati aired their view in terms of rise in area under pulses crops after initiation of NFSM programme for pulses crops and about 88 per cent of them showed more than 10 per cent rise in area under pulses crops on their farms, 8 per cent showed 5-10 per cent rise in this respect, and 4 per cent showed 2-5 per cent rise in area under pulses crops on their farms after initiation of NFSM programme for pulses crops. The proportion of sampled farmers showing more than 10 per cent rise in area under pulses crops declined with the increase in land holding size of farmers.

7.10 Suggestions for Improving NFSM – Pulses

The responses/perceptions of the sampled farmers drawn from the NFSM district of Amravati were also sought with respect to their own suggestion extended in favour of improving NFSM programme for pulses crops, especially with a view to make this programme more useful and meaningful, and these suggestions obtained from various categories of sampled farmers are presented in Table 7.10.

Table 7.10: Suggestions for Improving NFSM – Pulses: Farmers' Perception (Amravati District)

Sr. No.	Household Category	Suggestions
	Marginal	
1		Subsidy on fertilizer be provided.
2		Fertilizer should be provided on low price
3		Provide Irrigation
4		Provide Irrigation through Canal
5		Provide Improved Seeds and Implements
6		Provide Irrigation; Provide subsidy on Agri- Implements & subsidy on Pesticides
7		Provide Irrigation and give subsidy on Agri- Implements & subsidy on Fertilizers & Seeds.
8		Organize Camps for knowledge about the programme (NFSM)
9		Provide Irrigation and give subsidy on Agri- Implements & Seeds.
10		Provide Irrigation & Agri- Implements & give subsidy on Pesticides
11		Provide Irrigation and give subsidy on Agri- Implements, Fertilizers
12		Provide Irrigation and give subsidy on seeds and fertilizers; Good Market and price is required
13		Make available high yielding varieties of seeds; fertilizers on subsidized rate and on time
	Small	
1		Seeds and Fertilizers should be made available on low prices and on time.
2		Subsidy on Seed Prices; Fertilizers should be made available on low price.
3		Provide Irrigation
4		Provide Sprinkler set; Reduce intermediates or broker; give subsidy on newly arrived seeds
5		Provide a automatic pump set on subsidized price for tur for spraying
6		Provide subsidy on Agri implements & improved seeds; Give plant protection on subsidized rate.
7		Provide subsidy on seeds, Sprinkler Pump set and Pesticide; Provide farm pond on farm
8		Provide subsidy on seeds, Agri-Implements, and Fertilizers; Improve irrigation facilities.
9		Provide irrigation facilities
10		Make aware of NFSM programme to the people by arranging meetings with farmers; Provide infrastructure, seeds, fertilizers and pest control on time with subsidy
11		Provide Agri implements, High yielding variety seeds; Fertilizers on subsidy; Give minimum support price
12		Provide High yield variety seeds, fertilizers on subsidy; give minimum support price
13		Provide Credit on time with less Interest rate; Provide Irrigation, fertilizers, seeds; Govt should buy pulses
14		Arrange meeting with farmers every month to provide information about the usefulness of the programme; Provide micro finance at minimum rate; Give minimum support price.
	Medium	
1		Market prices be kept constant; Fertilizers prices should be less; Provide seeds on subsidy
2		Provide Irrigation facilities under the programme
3		Prices be kept constant
4		Provide plant Protection measures and Improved Implements on Subsidy
5		Provide seeds on subsidized rates
6		Provide seeds & fertilizers and provide Irrigation facilities
7		Provide seeds & fertilizers on subsidized rates; Provide irrigation facilities; Give remunerative price
8		Provide high yielding varieties of seeds & fertilizers: Give surety of minimum support price
	Large	
1		Seeds and fertilizers should be provided on subsidized rates at door steps
2		Seed prices should be less; Required active assistant who can spread information about the Govt. policies.
3		Seeds should be provide on subsidized rates; Market price should be constant
4		Provide seeds, fertilizers and pest control measures on subsidy
5		Provide seeds, fertilizers and pest control measures on subsidy; provide Irrigation facilities; Increase market prices for pulses

Although various categories of sampled farmers drawn from the NFSM district of Amravati had aired several suggestions to improve the existing NFSM programme for pulses crops with a view to make the programme more useful to them, there was

considerable overlapping in these suggestions across various categories of sampled farmers. The marginal category of sampled farmers aired their view in favour of receiving subsidy on fertilizer, provision of fertilizer on low prices, provision of irrigation facilities, provision of improved varieties of seeds and implements, provision of subsidy on seeds, fertilizers, pesticides, implements, etc., organizing camps for the dissemination of knowledge about NFSM, timely availability of seeds, fertilizers, pesticides and other inputs, better marketing conditions, remunerative prices, etc.

In order to make NFSM programme for pulses more useful, the suggestions of medium category of farmers were in favour of timely availability of various inputs, subsidised prices of seeds, fertilizers, and other inputs, provision of irrigation facilities, provision of sprinkler sets, subsidy on newly arrived improved seeds, provision of automatic pump sets on subsidised rates for the purpose of spraying on tur crop, provision of subsidy on agricultural implements, extension of plant protection measures on subsidised rates, provision of pest control measures on subsidised rates, making aware of NFSM programme through meetings with farmers, provision of credit facilities on low rates of interests, timely availability of credit, etc.

The suggestions of medium category of farmers mainly encompassed those facilities that included provision of seeds, fertilizers, pesticides, implements, pesticides, plant protection measures, etc. on subsidised rates, extension of irrigation facilities, etc. The suggestions of large category of farmers also by and large turned out to be same as extended by small and medium categories and these suggestions included provision of subsidy on seeds, fertilizers, pesticides, implements, pesticides, plant protection measures, etc., provision of irrigation facilities, etc.

Thus, in order to improve NFSM programme for pulses and make it more useful, the suggestions of the sampled farmers mainly revolved around extension of irrigation facilities, provision of improved varieties of seeds on subsidised rates, an element of subsidy with respect to other inputs like fertilizer, pesticides, implements and machinery, pest control measures, plant protection measures, etc, assured and remunerative market prices for various pulse crops, organizing meetings with the farmers to make them aware about the programme, timely availability of seeds, fertilizers, and other inputs, provision of automatic pump sets on subsidised rates for spraying in the cultivation of tur crop, provision of farm pond, sprinkler sets, etc.

CHAPTER – VIII

SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

8.1 Backdrop

Food security of India is one of the major issues raised in the 11th Plan Approach paper. Very slow growth in agriculture sector of India has raised doubts about bridging demand supply gaps in foodgrain production, which has remained erratic over the last few years. This is despite the fact that there has still been large existing untapped potential of foodgrains available in eastern and central parts of India. The National Development Council (NDC), therefore, in its 53rd meeting held on 29th May, 2007 resolved to launch a Food Security Mission for rice, wheat and pulses with a view to raise foodgrain production by at least 20 million tonnes by the end of Eleventh Plan, which included 2 million tonnes rise in pulses production. In view of achieving the targets set forth for the end of Eleventh Plan and operationalising the resolution taken by NDC, the 'National Food Security Mission (NFSM)' was launched in 2007-08 as a Centrally Sponsored Scheme in mission-mode approach. The major thrust of this programme is on increasing seed replacement and the replacement of older varieties by newer ones. One of the major features of this is that it offers much more than what earlier programmes offered, especially with respect to capacity building, monitoring and planning. The execution of the programme remains within the district planning framework.

Although NFSM has been launched for rice, wheat and pulses, the largest numbers of districts fall under NFSM-Pulses mainly owing to the fact that the production of pulses has remained stagnant in the country for past decades in spite of India being the largest producer and consumer of pulses. Due to sluggish and erratic growth, the net per capita per day availability of pulses in India declined from 60 grams in 1951 to 31 grams in 2008. This is despite the fact that several policy initiatives, projects and programmes with respect to pulses were undertaken in the past viz. All India Coordinated Pulses Improvement Project (AICPIP), National Pulses Development Programme (NPDP), Technology Mission on Pulses (TMOP), Centrally Sponsored Integrated Scheme of Oilseeds, Pulses, Oil palm and Maize (ISOPOM), etc. These policies and programmes hardly led to any improvement in pulses production of India. In order to raise pulses production by 2 million tonnes by the end of 2011-12, the existing pulses related programmes were replaced by NFSM-pulses.

The major areas of concern in pulse cultivation are the low yield levels, marginal lands devoted to pulse cultivation, stagnation in production technology, severe abiotic (climate-related) and biotic (insect, pest) stresses, volatility of prices and lack of effective procurement. The present study, therefore, attempts to unravel the degree of importance of these constraints and outline the prospects for pulses production in the state of Maharashtra. The study also intends to assess the effectiveness of NFSM-Pulses, if any, on the pulse production in Maharashtra.

8.2 Objectives of the Study

The study has been undertaken with the following specific objectives:

1. To analyze returns from cultivation of pulses vis-à-vis competing crops
2. To analyze the other major problems and prospects for pulse cultivation, and
3. To assess the impact, if any, of NFSM-Pulses

8.3 Methodology

The study is carried in two districts of Maharashtra – one covered under the umbrella of NFSM and the other not falling under the preview of NFSM. At present, there are 33 pulse growing districts in Maharashtra and 18 among them fall under the preview of NFSM. In order to select the study districts, the NFSM and non-NFSM districts were arranged in descending order based on area allocation under pulses crops in 2008-09. Amravati under the umbrella of NFSM districts of Maharashtra showed the highest area allocation under pulses crops in 2008-09, accounting for 7.28 per cent share in total area allocation under pulses crops in the State, and it was selected for the present investigation and considered as sampled NFSM district of Maharashtra. Similarly, Beed under the umbrella of non-NFSM districts of Maharashtra showed the highest area allocation under pulses crops in 2008-09, accounting for 3.47 per cent share in total area allocation under pulses crops in the State, and it was selected for the present investigation and treated as sampled non-NFSM district of Maharashtra. It was decided to select one Taluka from each of the selected sampled districts based similar criteria as followed in the case of selection of districts in the State. The Talukas of Daryapur in Amravati district and Majalgaon in Beed district showed significantly high area under pulses crops, and these two Talukas were, therefore, further selected for the present investigation. The study is confined to the selection of only one village from the NFSM district of Amravati and non-NFSM district of Beed, and, therefore, the village of Ramagad from Amravati district and Majalgaon from Beed district were further selected randomly for the present

investigation subject to the condition that they should be having sufficient area allocation under pulses crops and that farmers belonging to the selected villages should be having cultivation of some other competing field and other crops with a view to evaluate the actual impact of NFSM on pulses vis-à-vis other crops.

In this study, it was decided to select 50 sampled farmers from the NFSM district of Amravati and 50 from non-NFSM district of Beed. Therefore, a complete enumeration of the two selected villages was done with view to further categorization of farmers into marginal (less than 1 hectare), small (1 to 2 hectares), medium (2-4 hectares) and large (above 4 hectares). The probability proportion to sample size technique was used for further selection of farmers under each of the land holding size category from the selected sampled villages. The number of sampled farmers in the selected Ramagad village encompassed 15 in marginal category, 19 in small, 10 in medium and 6 in large category with a sum of 50 farmers drawn from the district of Amravati. Similarly, the number of sampled farmers in the selected Majalgaon village encompassed 14 in marginal category, 17 in small, 13 in medium and 6 in large category with a sum of 50 farmers.

Primary data from the sampled farmers belonging to NFSM district of Amravati and non-NFSM district of Beed were collected through the well structured schedule by personal interview method. In-depth information related to socio economic characteristics of sampled farmers, cropping pattern, production and disposal of crops, cost and return structure for various crops cultivated on the sampled farms, farmers' perceptions regarding various facilities extended under NFSM programme, farmers' awareness of NFSM for pulses, assistance received and the type of assistance, usefulness of the assistance, area allocation under pulse crops before and after NFSM programme, production of pulses crops before and after NFSM programme, increase in area under pulses after NFSM programme, etc. was collected from each of the sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed.

The reference period for the primary data survey was the period from 2006-07 to 2008-09. The comparative economics of pulse crops cultivation vis-à-vis other competing crops cultivation was analyzed for the above period. The increase in area under pulses for 2008-09 was also assessed in the present investigation to evaluate impact of NFSM.

8.4 Major Findings

The major findings mainly revolve around status of pulses sector in various districts of Maharashtra, insights into profitability of various crops cultivated on the

farms belonging to the sampled farmers of NFSM district of Amravati and non-NFSM district of Beed, extent of technology adoption, pest problems, marketing aspects, opinion survey, major problems and important suggestions, the effect of NFSM-Pulses, on area and production of pulses, and the problems and suggestions for the improvement of NFSM-Pulses programme.

8.4.1 Status of Pulses Sector in Maharashtra

Status of pulses sector in Maharashtra is evaluated in terms of to area, production and productivity of various important crops cultivated in the state of Maharashtra encompassing the period between 1996-97 and 2007-8, growth estimates for various pulses crops, and trends with respect to broad quantitative parameters of agricultural sector of the State.

8.4.1.1 Area under Important Crops

The average Gross Cropped Area (GCA) in Maharashtra during the last five years encompassing the period between 2003-04 and 2007-08 was estimated at 22.47 million hectares, which included 40.81 per cent area under cereals and 16.15 per cent area under pulses with a sum of 56.96 per cent area under foodgrains. The share of other important crops in GCA of Maharashtra during the same period was estimated at 2.86 per cent for sugarcane, 13.16 per cent for cotton, 15.52 per cent for oilseeds, and 11.51 per cent for other crops, which chiefly included horticultural crops. Among various pulses crops, kharif pulses like *mung*, *tur* and *udid* accounted for 10.04 per cent share in GCA of Maharashtra during the given period of time, whereas rabi pulses like gram showed a share of 4.72 per cent in the same during the given period. Some other kharif and rabi pulses accounted for the remaining 1.39 per cent share in GCA of Maharashtra.

8.4.1.2 Trend in Share of Important Crops in GCA

An important feature of the last one decade is the falling share of cereals and rising share of oilseeds in GCA of Maharashtra. The share of cereal crops in GCA of the State has fallen from 48 per cent in 1996-97 to about 40 per cent in 2007-08. On the other hand, the share of pulses in GCA of the State has remained by and large same, and hovered at around 16-17 per cent during the past one decade or so. As a result, the share of foodgrains in GCA of the State has dropped from 63 per cent in 1996-97 to about 58 per cent in 2007-08. The oilseed crops have shown rise in their share in GCA of the State, which increased from 12 per cent in 1996-97 to nearly 17 per cent in 2007-08. The share of cotton in GCA of the State has remained at around 13-14 per cent between 1996-97

and 2007-08. Similarly, share of sugarcane in GCA of the State has remained by and large constant, and hovered at around 3-4 per cent during the past one decade.

8.4.1.3 Growth Trends in Important Crops

Despite decline in area, majority of foodgrain crops in Maharashtra have registered a reasonable growth in their production due to rise in their yield levels. For instance, between 1996-97 and 2007-08, the production of various foodgrains grew at the rate of 0.56 per cent per annum, which was mainly due to 1.04 per cent annual growth in their yield levels as the area under these crops declined at the rate of 0.47 per cent per annum. This is also concomitant from the fact that in spite of 0.94 per cent annual decline in area under cereal crops, their production grew at the rate of 0.13 per cent per annum mainly due to 1.08 per cent annual growth in their yield levels during the last one decade. In the case of pulses, much of the production expansion was due to yield growth rather than area growth. The production of various pulses in Maharashtra grew at the rate of 2.9 per cent between 1996-97 and 2007-08, which was due to 2.11 per cent annual growth in their yield levels as the area growth under pulses stood at only 0.79 per cent per annum during this period. Although the general trend in Maharashtra shows a positive production growth in cereals, pulses, sugarcane, cotton and oilseed crops during the last one decade or so, which could be attributed to their higher yield growth, the negative feature of agriculture sector of Maharashtra is the negative growth in area, production and yield of *bajra* and *jowar* among cereals and *udid* among pulses.

8.4.1.4 Growth in GCA, NSA and Fertilizer Consumption

The NSA in Maharashtra has marginally declined from 17.85 million hectares in 1996-97 to 17.47 million hectares in 2007-08 with an annual decline in the same at 0.21 per cent during this period. On the other hand, the GCA of the State has increased from 21.84 million hectares in 1996-97 to 22.66 million hectares in 2007-08 with an annual growth in the same at 0.49 per cent. As against NSA and GCA, the NIA in Maharashtra has fluctuated considerably over the past one decade. The NIA in Maharashtra though increased from 3.09 million hectares in 1996-97 to 3.31 million hectares in 2007-08. However, due to significant fluctuation in NIA over time, there was hardly any overall annual growth in the same during the period from 1996-97 to 2007-08. The GIA in Maharashtra increased from 3.77 million hectares in 1996-97 to 4.04 million hectares in 2007-08 with an annual growth in the same at 0.30 per cent during this period. The estimates also show that the state of Maharashtra has shown significant progress not only

in terms of rise in GCA but also with respect to GIA and consumption of fertilizer over time since GCA, GIA and extent of fertilizer application in crop cultivation have improved significantly over the past decade or so, leaving aside growth in NSA and share of GIA in GCA.

8.4.1.5 Area under Pulses in Maharashtra

The annual average area under pulse crops in Maharashtra during the period between 2003-04 and 2007-08 was estimated at 36.28 lakh hectares, which encompassed 11.00 lakh hectares area under *tur*, 10.61 lakh hectares area under gram, 6.25 lakh hectares area under *mung*, 5.31 lakh hectares area under *udid*, and 3.10 lakh hectares area under other pulse crops. Thus, kharif pulses like mung, tur and udid accounted for the major share in total acreage under pulse crops in Maharashtra as their combined share was 62 per cent in total area under pulses crops of the State. During the period between 2003-04 and 2007-08, the highest share in total area under pulse crops in Maharashtra was seen to be accounted for by kharif tur (30.33 per cent), followed by rabi gram (29.26 per cent), mung (17.22 per cent), and udid (14.63 per cent).

8.4.1.6 Area, Production and Yield of Pulses Crops

Although various pulses crops cultivated in Maharashtra have shown varying performances in terms expansion in area, production and yield, the general trend shows an expansion in these parameters for total pulse crop in the State. The area under total pulse crop in Maharashtra has grown from 33.63 lakh hectares in 1996-97 to 40.57 lakh hectares in 2007-08. The rise in production with respect to total pulse crop cultivated in Maharashtra is noticed to be faster than area expansion and it has increased from 20.32 lakh MT in 1996-97 to 30.24 lakh MT in 2007-08. The yield level of total pulse crop or all the pulse crops put together has improved from as low as 353 kg/ha in 1997-98 to as much as 745 kg/ha in 2007-08. However, the irrigated area under total pulse crop in Maharashtra has come down from 2.70 lakh hectares in 1996-97 to 2.27 lakh hectares in 2001-02. Even the share of area under irrigation vis-à-vis total area under pulse crops has come down from 8.03 per cent in 1996-97 to 6.46 per cent in 2001-02.

8.4.1.7 Share of Districts in Area and Production of Pulses

Pulse crop cultivation in Maharashtra was confined mainly to five divisions of Maharashtra viz. Amravati, Latur, Aurangabad, Nashik and Nagpur. The districts belonging to these five divisions showed as much as 85 per cent share in total area and 87 per cent share in total production of total pulse crops of Maharashtra. During the period

between 1996-97 and 2007-08, out of the total annual average area of 35.66 lakh hectares under total pulse crops, 28 per cent area belonged to Amravati division, 24 per cent to Latur, 10 per cent to Aurangabad, 12 per cent to Nashik and 10 per cent to Nagpur division of Maharashtra. Similarly, during the same period, out of the total annual production of 20.32 lakh MT of total pulse crop, 33 per cent production belonged to Amravati division, 22 per cent to Latur, 9 per cent to Aurangabad, 13 per cent to Nashik, and 10 per cent to Nagpur division of Maharashtra. This clearly shows predominance of Amravati and Latur divisions not only in terms of area but also production of pulse crop in Maharashtra. The combined share of Amravati and Latur divisions in terms of both area and production of pulse crops is more than 50 per cent in Maharashtra with rest area and production being accounted for by other divisions.

8.4.1.8 District-wise Growth in A, P, Y of Pulses

The analysis drawn from growth trends with respect to area, production and yield of various pulses crops cultivated in Maharashtra clearly show that the pulse sector of Maharashtra has performed very well during the past one decade as major pulse crops like kharif tur and rabi gram cultivated in the State showed positive and significantly high area, production and yield growth during this period. However, negative growth rates associated with mung and udid with respect to their area, production and yield could be considered as a matter of concern, though these declining trends in area production and yield of mung and udid crops have not affected overall rise in area, production and yield of total pulse crops cultivated in Maharashtra during the period between 1996-97 and 2007-08. However, the pulse sector of Maharashtra has to still do lot of catching especially when some of the pulse crops like mung and udid are showing negative growth in their area, production and yield. Since the demand for these two pulses has always exceeded supply, there is need to bring more area under mung and udid crop cultivation in order to augment their production in the state of Maharashtra. Equally important is the improvement in yield levels of mung and udid crop as they have been showing negative yield growth in Maharashtra over the past one decade.

8.4.2 Socio-economic Characteristics and Resource Endowments of Farmers

The socio-economic characteristics and resource endowments of sampled farmers of study districts are assessed with respect to their family size and composition, education status, caste composition, land use pattern, cropping pattern, irrigated area, sources of irrigation, etc.

8.4.2.1 Family Size Composition of Farmers

The average size of family consisted of 5 persons with 4 adults and 1 child in the case of sampled farmers drawn from the NFSM district of Amravati since 50 sampled farmers consisted of 249 family members encompassing 197 persons belonging to adult males and females and 52 children. In the case of sampled farmers belonging to non-NFSM district of Beed, the average family size consisted of nearly 6 members with 5 adult males and females and one child. This was mainly due to the fact that the 50 sampled farmers of this district had 277 members encompassing 206 persons belonging to adult males and females and 71 children.

8.4.2.2 Educational Status of Farmers

The sampled farmers belonging to NFSM Amravati district were relatively more educated as compared to their counterpart in non-NFSM Beed district. While about 82 per cent head of the sampled households of Amravati district received education up to secondary and higher level, this proportion for Beed district stood at only 68 per cent. Even the adult members of sampled households showed higher educational status in Amravati district as 77 per cent adult members of sampled households of Amravati district attained education up to secondary and higher level, whereas this proportion for Beed district was only 66 per cent. The illiteracy among heads of households was found to be more in the district of Beed as against Amravati district. Similarly, the illiteracy among adult members was more pronounced in the case of Beed district as compared to Amravati district.

8.4.2.3 Caste Composition of Farmers

Two differing scenarios emerged in terms of caste composition of sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed. While majority of the sampled farmers in Amravati district belonged to the category of OBC, the district of Beed was found to show a significant proportion of total sampled farmers belonging to general category since 74 per cent of total sampled farmers in Amravati district belonged to OBC category and 82 per cent of sampled farmers of Beed district belonged to general category.

8.4.2.4 Irrigated Area in NFSM and Non-NFSM Districts

The irrigation status was found to be entirely different in the NFSM district of Amravati and non-NFSM district of Beed. While the entire area of sampled farmers in Amravati district was under unirrigated or rainfed conditions, the sampled farmers of

non-NFSM district of Beed showed 32 per cent of their total operational holding under irrigation and 68 per cent under rainfed conditions. In the non-NFSM district of Beed, open well and river lift were the main sources of irrigation. The irrigated area under open well and river lift accounted for as much as 28 per cent share in total operational holding of the average category of sampled farmers of Beed district. The area under tubewell irrigation was only 4 per cent for the average category of sampled farmers of Beed district. The marginal category of sampled farmers of Beed district showed their entire area under rainfed conditions.

8.4.2.5 Cropping Pattern of Farmers

The cropping pattern of sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed differed significantly. While pulses crops predominated the cropping pattern of sampled farmers of Amravati district during both kharif and rabi seasons, the area predominance with respect to pulses crops was less for the sampled farmers drawn from the district of Beed. This is concomitant from the fact that the average category of farmer belonging to Amravati district showed 73 per cent of the net sown area under pulses crops in kharif season and 95 per cent in rabi season, whereas these proportions in the district of Beed were worked out at 36 per cent and 45 per cent. The average category of sampled farmers belonging to the district of Beed had about 45 per cent of net sown area under cotton crop in kharif season and 35 per cent of the net sown area under sugarcane in rabi season. In the case of non-NFSM district of Beed, some other rabi crops like jowar, banana, wheat, onion, etc. accounted for significant share in net sown area for the average category of sampled farmers.

8.4.2.6 Area under Pulses for NFSM and Non-NFSM Farmers

The sampled farmers of NFSM district of Amravati showed much higher area under pulses crops as against the sampled farmers of non-NFSM district of Beed. The area under pulses crops with all the sampled farmers put together was estimated at 167.06 acres in kharif and 149.69 acres in rabi season for the district of Amravati and 87.07 acres in kharif and 85.63 acres in rabi season for the district of Beed. During kharif season, while sampled farmers of Amravati district showed very high share (90 per cent) of mung crop in net sown area under pulse crops, this share was found to be high for tur crop (54 per cent) in case of the sampled farmers of Beed district. However, all the sampled farmers of Amravati and Beed district showed the entire pulse crop area of rabi season under gram crop, though the area under this crop was much higher in Amravati District.

8.4.2.7 Share of Size-Groups in Pulse Farming

The sampled farmers of NFSM district of Amravati and non-NFSM district of Beed showed a rise in their share in total area under pulses crops cultivated during kharif and rabi seasons with the rise in their land holding size. In the NFSM district of Amravati, the share of marginal, small, medium and large category in total area under pulses crops was estimated at 12.47 per cent, 26.73 per cent, 29.63 per cent and 31.17 per cent, respectively, in kharif season and, 14.25 per cent, 26.51 per cent, 28.84 per cent, and 30.40 per cent, respectively, in rabi season. As for the non-NFSM district of Beed, the share of marginal, small, medium and large category in total area under pulses crops was estimated at 9.21 per cent, 29.17 per cent, 29.08 per cent and 32.54 per cent, respectively, in kharif season and, 9.77 per cent, 21.45 per cent, 13.51 per cent, and 55.27 per cent, respectively, in rabi season.

8.4.2.8 Irrigated Area under Pulses

While the sampled farmers belonging to the NFSM district cultivated various pulses crops under rainfed conditions, the cultivation of these crops by the sampled farmers of non-NFSM district of Beed was under both irrigated and unirrigated conditions. However, the extent of area under irrigation with respect to pulses crops was very low in Beed district, and, in general, the proportion of irrigated area to net sown area for pulses crops with all the sampled farmers put together stood at 18.76 per cent in kharif season and 14.40 per cent in rabi season. It was only in the case of mung that about 61 per cent of net sown area was under irrigation in the case of large category of sampled farmers belonging to the non-NFSM district of Beed.

It could be further noted that though all the crops cultivated by the sampled farmers of NFSM district of Amravati were under rainfed conditions, and, therefore, GIA in this district stood nil, the sampled farmers of non-NFSM district Beed, however, showed some irrigated area under various crops during both kharif and rabi seasons, and, the GIA in this district was estimated at 152.83 acres for the all the sampled farmers put together, which encompassed 10.25 per cent area under soybean, 0.22 per cent under jowar, 13.41 per cent under cotton, 0.44 per cent under bajra, 7.64 per cent under mung, 3.06 per cent under tur, 8.07 per cent under gram, 43.40 per cent under sugarcane, and 13.52 per cent under other rabi crops like jowar, wheat, onion, banana, etc. The area under pulses crops was not much under irrigated conditions in the district of Beed as the share of kharif pulses in GIA for all the sampled farmers put together stood at 10.69 per

cent, and this share with respect to rabi pulses like gram was estimated at only 8.07 per cent. In fact, other crops cornered major share in GIA for various categories of farmers of Beed district since the share of other kharif crops in GIA was 35 per cent and other rabi crops accounted for as much as 65 per cent share in GIA.

8.4.3 Economics of Pulses and Other Crops Cultivation

The extent of profit involved in the cultivation of pulses crops vis-à-vis other crops in both NFSM district of Amravati and non-NFSM district of Beed is evaluated for three reference years viz. 2006-07, 2007-08 and 2008-09, where reference years 2006-07 and 2007-08 represent the scenario obtaining in terms of profitability of crops before initiation of NFSM for pulses crops and the reference year 2008-09 shows the scenario obtaining in this respect after the initiation of NFSM for pulses crops, i.e. the impact of the NFSM programme.

8.4.3.1 Economics of Pulses Crops in NFSM District

In terms of profitability, total pulses crops encompassing kharif mung and tur and rabi gram cultivated by various categories of sampled farmers showed a rising trend from 2006-07 to 2007-08, and from 2007-08 to 2008-09. Even per quintal net returns from total pulses crops farming followed a rising trend throughout the period between 2006-07 and 2008-09. The total pulse crop also showed an increase in per hectare net returns and per quintal net returns with the increase in land holding size of sampled farmers belonging to NFSM district of Amravati. The per hectare net returns from total pulses crops for the average category of farmer of Amravati district was estimated at Rs.8,897 in 2006-07, which increased to Rs.11,861 in 2007-08, and further to Rs.17,076 in 2008-09. Similarly, the per quintal net returns from total pulses crops for the average category of farmer belonging to NFSM district of Amravati was estimated at Rs.1,268 in 2006-07, which increased to Rs.1,470 in 2007-08, and further to Rs.1,845 in 2008-09.

Thus, in the total pulses farming, the average category of sampled farmer of Amravati district generated 33.31 per cent higher per hectare net returns in 2007-08 over 2006-07, 43.97 per cent in 2008-09 over 2007-08, and 91.93 per cent higher net returns in 2008-09 over 2006-07. Similarly, in the total pulses farming, the average category of sampled farmer of Amravati district generated 15.98 per cent higher per quintal net return in 2007-08 over that of 2006-07, 25.52 per cent in 2008-09 over that of 2007-08, and 45.58 per cent higher net returns in 2008-09 over that of 2006-07. The rise in yield level and higher prices on offer for pulses crops in Amravati district could be the reasons for

higher amount of net profit generated from pulses crop farming since both net returns per hectare and per quintal from total pulses crops increased substantially in 2008-09 over that of 2006-07, which also show positive impact of NFSM programme on pulses farming in the NFSM district of Amravati of Maharashtra.

8.4.3.2 Economics of Other Major Crops in NFSM District

Although sampled farmers belonging to the NFSM district of Amravati cultivated a number of other crops viz. soybean, kharif jowar, cotton, bajra, kharif and rabi sunflower, etc., the amount of per hectare as well as per quintal net returns varied significantly across these crops, and due to significantly high element of profit involved in the cultivation of soybean, cotton, kharif and rabi sunflower, the per hectare net returns from all the other crops put together was reasonable, though lower than element of profit emanating from total pulses crops cultivation. The average category of sampled farmers belonging to the NFSM district of Amravati derived Rs.11,018 per hectare net returns from the cultivation of all other crops put together in 2006-07, which though marginally declined to Rs.10,170 in 2007-08 but again increased to Rs.14,022 in 2008-09, showing about 27 per cent rise in per hectare net returns from all other crops in 2008-09 over that of 2006-07, and 38 per cent rise in the same in 2008-09 over that of 2007-08. Similarly, the per quintal net returns from all the other crops put together with respect to the average category of sampled farmers of Amravati district though declined to Rs.910 in 2007-08 from Rs.922 in 2006-07 but increased again to Rs.1,152 in 2008-09, indicating 25 per cent rise in per quintal net returns from all other crops in 2008-09 over that of 2006-07, and 27 per cent rise in the same in 2008-09 over that of 2007-08.

Thus, the average category of sampled farmers belonging to the NFSM district of Amravati derived much higher per hectare net returns from the cultivation of pulses crops as compared to other crops since the per hectare net returns for total pulses crops turned out to be Rs.8,897 in 2006-07, Rs.11,861 in 2007-08, and Rs.17,076 in 2008-09 as against per hectare net returns from all other crops estimated at Rs.11,012 in 2006-07, Rs.10,170 in 2007-08, and Rs.14,022 in 2008-09. Even per quintal net return was substantially high in the case of pulses crop farming vis-à-vis all other crop farming since the average category of sampled farmer of Amravati district showed a net per quintal return in total pulses crop farming to the tune of Rs.1,238 in 2006-07, Rs.1,470 in 2007-08, and Rs.1,845 in 2008-09 as against per quintal net returns from all other crops estimated at Rs.922 in 2006-07, Rs.910 in 2007-08, and at Rs.1,152 in 2008-09. These estimates

clearly show positive impact of NFSM programme on pulses crop farming as the net returns from pulses crops are much as against other crops cultivated by the sampled farmers of Amravati district, especially in 2008-09.

8.4.3.3 Economics of Pulses Crops in Non-NFSM District

Although pulses crop farming was lucrative proposition in both NFSM district of Amravati and non-NFSM district of Beed, the amount of net profit involved in the cultivation of pulses crops stood at much higher in the NFSM district of Amravati as against the non-NFSM district of Beed. In the case of total pulses crops, the element of per hectare net return from pulses crops in Amravati district, on an average, was estimated at Rs.8,897 in 2006-07, Rs.11,861 in 2007-08, and Rs.17,076 in 2008-09 as against similar figures estimated for the non-NFSM district of Beed at Rs.9,750 in 2006-07, Rs.11,487 in 2007-08, and Rs.13,829 in 2008-09. Further, as for the average category of sampled farmers belonging to non-NFSM district of Beed, the total pulses crops yielded a per quintal net returns to the tune of Rs.1,243 in 2006-07, Rs.1,364 in 2007-08, and Rs.1,603 in 2008-09. On the other hand, the average category of sampled farmer of Amravati district showed a net per quintal return in total pulses crop farming to the tune of Rs.1,238 in 2006-07, Rs.1,470 in 2007-08, and Rs.1,845 in 2008-09. These estimates clearly bring us closer to the fact that not only various pulses crops cultivated in NFSM district of Amravati yielded higher net returns as against pulses crops cultivated in non-NFSM district of Beed but the rise in the element of profit in pulses crop cultivation in 2008-09 vis-à-vis 2007-08 and 2006-07 was quite substantial in NFSM district of Amravati as against its counterpart in non-NFSM district of Beed, which clearly show a positive impact of NFSM programme in the NFSM district of Amravati.

8.4.3.4 Economics of Other Major Crops in Non-NFSM District

Since the sampled farmers belonging to the non-NFSM district of Beed cultivated a large number of diversified crops with significantly large area allocation towards highly profitable crops like sugarcane, cotton, soybean, onion and banana, the cost and return structure with respect to other crops put together was influenced by these crops. The element of profit involved in the cultivation of all other crops put together was much higher in the non-NFSM district of Beed as against the NFSM district of Amravati. This is concomitant from the fact that the average category of farmers drawn from non-NFSM district of Beed generated per hectare net returns from all other crops put together to the tune of Rs.18,392 in 2006-07, Rs.20,979 in 2007-08, and Rs.19,991 in 2008-09 as against

corresponding figures for all other crops in NFSM district of Amravati estimated at Rs.11,017 in 2006-07, Rs.10,170 in 2007-08, and Rs.14,022 in 2008-09. In dismal contrast to this, the element of profit involved in the cultivation of all pulses crops put together was much higher in the NFSM district of Amravati as against the non-NFSM district of Beed since the average category of sampled farmers belonging to NFSM district of Amravati derived per hectare net returns from all pulses crops put together of the order of Rs.8,897 in 2006-07, Rs.11,861 in 2007-08, and Rs.17,076 in 2008-09 as against corresponding figures for all pulses crops in non-NFSM district of Beed estimated at Rs.9,750 in 2006-07, Rs.11,487 in 2007-08, and Rs.13,829 in 2008-09.

The comparative analysis drawn from the NFSM district of Amravati and non-NFSM district of Beed clearly shows positive impact of NFSM programme in raising various pulses crops since the net returns from these crops are not only higher in NFSM district of Amravati as against non-NFSM district of Beed but net returns from pulses have grown very sharply in 2008-09 over that of 2007-08, especially in NFSM district of Amravati. In fact, the farmers belonging to NFSM district of Amravati derived 44 per cent higher net returns from pulses crop cultivation in 2008-09 over that of 2007-08 as against only 20 per cent higher net returns being generated from pulses crop cultivation in non-NFSM district of Beed in 2008-09 over that of 2007-08. However, the scenario with respect to all other crops was entirely different and sampled farmers of non-NFSM district derived much higher returns from these crops as compared to their counterpart in NFSM district of Amravati.

8.4.4 Technology Adoption and Marketing

In this study, the responses of sampled farmers with respect to knowledge about improved varieties of pulses, sources of knowledge, area under improved varieties of pulses, recommended practices followed by them in the cultivation of pulses in terms of sowing practices, seed practices, and other practices, problems with improved varieties of pulses, suggested solutions for improved varieties of pulses, channels of marketing of pulses crops, quantity of pulses crops sold, extent of government procurement of pulses crops, etc. have been assessed.

8.4.4.1 Area Under Improved Varieties of Pulses

In the NFSM district of Amravati, the proportion of households to total sampled households reporting area under improved varieties was 78 per cent in the case of mung crop, 74 per cent for gram and 30 per cent for tur crop. On the other hand, in the non-

NFSM district of Beed, the proportion of households to total sampled households reporting area under improved varieties was 30 per cent in the case of mung crop, 60 per cent for gram and 66 per cent for tur crop. Further, in NFSM district of Amravati, the proportion of area under improved varieties to net sown area was worked out at 94 per cent for mung, 96 per cent for gram, and 76 per cent for tur. Contrary to this, in the non-NFSM district of Beed, the proportion of area under improved varieties to net sown area was worked out at 87 per cent for mung, 100 per cent for gram, and 81 per cent for tur.

8.4.4.2 Knowledge of Improved Varieties of Pulses

About 84 per cent of the total number of sampled farmers of NFSM district of Amravati and 78 per cent of the non-NFSM district of Beed had acquired knowledge about improved varieties of pulses. Extension agents and neighbours were the major sources of knowledge about improved varieties of pulses in the case of both NFSM district of Amravati and non-NFSM district of Beed. In the case of NFSM district of Amravati, 50 per cent of the sampled farmers received knowledge about improved varieties of pulses from extension agents, 43 per cent from neighbours, and remaining 7 per cent from other sources like friend, relatives, media, etc. As for non-NFSM district of Beed, 56 per cent of the total sampled farmers acquired knowledge about improved varieties of pulses from extension agents and 44 per cent from neighbours, showing higher proportion in this respect from extension agents.

8.4.4.3 Recommended Practices in NFSM and Non-NFSM Districts

In terms of technology adoption with respect to pulses crops, while majority of the sampled farmers belonging to the NFSM district of Amravati followed recommended sowing, seed and other practices in the cultivation of mung and gram crop, this was not the case in the cultivation of tur crop by them as most of the sampled farmers of the NFSM district of Amravati neither followed any of the recommended sowing practices nor recommended seed and other practices like application of organic manure and chemical fertilizer, etc. It was only in the case of large farmers that recommended practices in terms of use of chemical fertilizer for tur was followed on reasonably higher scale. On the other hand, in the case of non-NFSM district of Beed, though majority of the sampled farmers did not follow any recommended practices in the case of mung crop cultivation, the cultivation of other pulses crops like gram and tur was followed as per the recommended practices since 60 per cent of the sampled households of non-NFSM district of Beed favoured their view in terms of following recommended practices in the

cultivation of gram crop and 64 per cent in the cultivation of tur crop, though this proportion stood at 32 per cent for mung crop.

8.4.4.4 Problems with Improved Varieties of Pulses

The expensive nature of cultivation of improved varieties of pulses and application of larger doses of other inputs in the cultivation of improved varieties were identified as the major problems faced by the households belonging to the NFSM district of Amravati. However, in the case of non-NFSM district of Beed, the major problems with respect to improved varieties were non-availability of improved varieties of seeds, untimely availability, expensive nature of improved varieties of seeds and application of large doses of other inputs in the cultivation of improved varieties of pulses.

8.4.4.5 Suggested Solution for Improved Varieties of Pulses

The households belonging to NFSM district of Amravati and non-NFSM district of Beed accorded different rankings to various suggestions with respect to the improved varieties of pulses crops seeds. While majority of the sampled households of NFSM district of Amravati favoured involvement of an element of subsidy in the purchase of improved varieties of mung, gram and tur crop seeds, the suggestions of sampled households of non-NFSM district was in favour of timely availability of improved varieties of seeds in the case of mung crop and cheaper availability of improved varieties of seeds with respect to tur crop.

8.4.4.6 Marketing of Pulses Crops

While the sampled households of NFSM district of Amravati performed marketing of various pulses crops through regulated markets, commission agents and village markets, the marketing of pulses crops in the non-NFSM district of Beed was noticed mainly through regulated markets and at a very small scale through commission agents. In the NFSM district of Amravati, while about 51 per cent of the total sampled households sold their mung and gram crop produce through regulated markets, 34 per cent through commission agents and 15 per cent through village markets, these proportions for tur crop were worked out at 75 per cent, 12 per cent and 13 per cent, respectively. On the other hand, 95 per cent of sampled households of non-NFSM district of Beed sold their mung and gram crop produce through regulated markets and remaining 5 per cent through commission agents. In Need district, the proportion of households to total sampled households selling their tur crop produce through regulated market was 86 per cent with remaining 14 per cent selling their produce through commission agents.

8.4.4.7 Quantity of Pulses Marketed

A comparative analysis with respect to marketing of pulses crops revealed that the sampled farmers belonging to the non-NFSM district of Beed mostly depended on regulated markets for the marketing of their pulses crops since the share of regulated markets in total marketed surplus of mung, gram and tur crop in this district during 2008-09 stood at 93 per cent, 96 per cent and 93 per cent, respectively, with share of commission agents in total marketed surplus of mung, gram and tur being 7 per cent, 4 per cent and 7 per cent, respectively. Contrary to non-NFSM district of Beed, the sampled farmers of NFSM district of Amravati also sold their marketed surplus of pulses crops through village markets, apart from selling their marketed surplus through regulated markets and commission agents. However, the major marketed surplus of pulses crops in the NFSM district of Amravati with all the sampled farmers put together was diverted through regulated markets only with share of regulated markets in marketed surplus of mung, gram and tur during 2008-09 being 51 per cent, 57 per cent and 85 per cent, respectively, and the share of commission agents in this respect being 38 per cent, 36 per cent and 10 per cent, respectively, with village markets showing very little share.

8.4.5 Farmers' Perceptions for Cultivation of Pulses

In this study, farmers' perceptions have been recorded and analysed with respect to the cultivation of various pulses crops, reasons for their cultivation, problems in their cultivation and suggested remedial measures with respect to their cultivation.

8.4.5.1 Major Pest Problems in Pulses Cultivation

A comparative analysis between NFSM district of Amravati and non-NFSM district of Beed revealed that the extent of per acre loss caused by various pests with respect to pulses crops was higher in the non-NFSM district of Beed as against NFSM district of Amravati since per acre losses caused by various pests with respect to pulses crops for the average category of farmers was estimated at 11.31 per cent by pod borer, 10.52 per cent by pod fly and 10.11 per cent by wilt in the NFSM district of Amravati and 13.56 per cent by pod borer, 11.36 per cent by pod fly and 12.63 per cent by wilt in the non-NFSM district of Beed. Both NFSM district of Amravati and non-NFSM district of Beed showed mung, tur and gram as the pulses crops being affected by various pests.

8.4.5.2 Reasons for Growing Pulses Crops

While the sampled households of NFSM district of Amravati showed profitability as the major cause for growing pulses crops on their farms with 72 per cent of sampled

households airing their view in its favour, the reason for the cultivation of various pulses crops in the non-NFSM district of Beed was found to be both home consumption and profitability since 48 per cent of the total sampled households of Beed district favoured profitability as the cause of cultivation of pulses crops and 46 per cent of households of this district aired their view in favour of home consumption.

8.4.5.3 Criteria for Pulses Cultivation

The sampled households drawn from the NFSM district of Amravati and non-NFSM district of Beed used rainfall followed by soil suitability as the major criteria in deciding area allocation under pulses crops with weightage to rainfall being higher in the NFSM district as against non-NFSM district since 68 per cent of the sampled households of NFSM district of Amravati favoured rainfall as the criteria for allocation of area under pulses crops as against 58 per cent of the sampled households of non-NFSM district of Beed who aired their view in favour of rainfall as the criteria in this respect. However, 20 per cent of the sampled households of NFSM district of Amravati and 26 per cent of the sampled households of non-NFSM district of Beed aired their view in favour of soil suitability as the criteria in deciding area allocation under pulses crop.

8.4.5.4 Reasons for Low Area under Pulses

The analysis with respect to reported reasons for low area allocation under pulses crops revealed that about 28 per cent of the sampled households of NFSM district of Amravati district opted for low area allocation under pulses crops due to yield and price instability, 22 per cent due to low profitability, 20 per cent due to pest related problems, 16 per cent due to marketing related problems, and 14 per cent due to low yield related problem. In the case of non-NFSM district of Beed, about 46 per cent of the total sampled households opted for low area allocation under pulses crops due to low profitability, 32 per cent due to low levels of yields, 14 per cent due to yield and price instabilities, 2 per cent due to marketing related problems, and 6 per cent due to pest related problems.

8.4.5.5 Crops Grown on Inferior Quality of Land

The sampled households belonging to NFSM district of Amravati mainly used inferior quality of land for the cultivation of pulses, oilseeds and vegetable crops since 38 per cent of the sampled households used this land for the cultivation of pulses, 28 per cent used it for the cultivation of oilseeds and another 28 per cent used this land for the cultivation of vegetables. On the other hand, the inferior quality of land in non-NFSM district of Beed was chiefly used for the cultivation of pulses, coarse cereals, vegetables,

oilseeds and also superior cereals since 40 per cent of the sampled households of Beed district used inferior quality of land for the cultivation of pulses, 26 per cent used it for the cultivation of coarse cereals, 16 per cent used it for the cultivation of vegetables, 10 per cent used it for the cultivation of superior cereals and 8 per cent used it for the cultivation of oilseeds.

8.4.5.6 Problems with Pulses on Inferior Quality of Land

The sampled households belonging to the NFSM district of Amravati and non-NFSM district of Beed showed some variations in terms of problems faced by them in terms of cultivation of pulses crops on inferior quality of land since 47 per cent of the sampled households of NFSM district had reported low yield and 34 per cent showed both poor quality of grain and low yield as the major problems faced by them in the cultivation of pulses crops on inferior quality of land. The proportion of households in the non-NFSM district of Beed reporting low yield as the major problem in the cultivation of pulses crops on inferior quality of land was as high as 58 per cent, whereas 28 per cent of the sampled households of this district reported poor quality of grain as the major problem faced by them in the cultivation of pulses crops on the inferior quality of land.

8.4.5.7 Reasons for Shifting from Pulses to Other Crops

While the reported responses of the sampled households belonging to the NFSM district of Amravati with respect to reasons for shifting from pulses to other crops were mainly confined to lack of assured market, uncertainty in the yield of improved varieties of seeds and application of large doses of other inputs, the sampled households of non-NFSM district of Beed had reported application of large doses of other inputs, uncertainty in the yield of improved varieties of seeds, lack of assured market, low price realization, and low yield as the reasons for shifting from pulses to other crops cultivation. However, a couple of sampled households of NFSM district of Amravati had also cited low price realization as the reason for shifting from pulses to other crops cultivation.

8.4.5.8 Farmers Willingness to Grow Pulses

A comparative analysis between the sampled farmers drawn from the NFSM district of Amravati and non-NFSM district of Beed revealed that while all the medium and large categories of sampled farmers of NFSM district of Amravati were willing to grow pulses under assured market conditions, this willingness was cent per cent in the case of small and large categories of sampled farmers in the case of non-NFSM district of Beed. In general, about 96 per cent of the sampled farmers of the NFSM district of

Amravati were willing to grow pulses under assured market condition, whereas this proportion for non-NFSM district of Beed stood at 94 per cent.

8.4.5.9 Major Problems in Cultivating Pulses

A comparative analysis between NFSM district of Amravati and non-NFSM district of Beed with respect to the problems faced by the households in the cultivation of pulse crops revealed that lack of irrigation facilities, lower yield and lower market prices were the major problems faced by the sampled households belonging to the NFSM district of Amravati, whereas sampled farmers of non-NFSM district of Beed showed lack of irrigation, lack of improved varieties of seeds, lower yields and low market prices as the major problems faced by them in the cultivation of pulse crops on their farms. High incidence of pest was another major problem faced by the sampled households belonging to the non-NFSM district of Beed.

8.4.5.10 Important Suggestion for Cultivating Pulses

The major suggestion of the sampled households belonging to the NFSM district of Amravati and non-NFSM district of Beed with respect to pulse crops cultivation mainly revolved around improvement in the existing irrigation facilities, availability of high yielding varieties of seeds, availability of pest resistant varieties of seeds and provision of higher market prices for various pulse crops since all these suggestions were assigned 1st, 2nd or 3rd ranking by majority of the sampled households belonging to both NFSM district of Amravati and non-NFSM district of Beed.

8.4.6 Impact of NFSM-Pulses

In order to evaluate impact of NFSM-pulses, responses of the sampled households of NFSM district of Amravati have been assessed with respect to their awareness of NFSM for pulses, assistance received and the type of assistance, usefulness of the assistance, area allocation under pulse crops before and after NFSM programme, production of pulses crops before and after NFSM programme, etc.

8.4.6.1 Farmers' Awareness of NFSM-Pulses

The sampled farmers belonging to the NFSM district of Amravati were quite aware of the NFSM-pulses programme since 76 per cent of the total sampled farmers of this district aired their view in favour of their awareness of the programme and this proportion among various categories stood at 67 per cent in marginal category, 84 per cent in small, 70 per cent in medium and 83 per cent in large category with an average of 76 per cent for the average category of farmers of the NFSM district of Amravati.

8.4.6.2 Assistance Received under NFSM-Pulses

The response with respect to assistance under NFSM-pulses programme was quite positive since 76 per cent of the total sampled farmers belonging to the NFSM district of Amravati aired their view in favour of receiving assistance under the programme and this proportion among various categories stood at 67 per cent in marginal category, 84 per cent in small, 70 per cent in medium and 83 per cent in large category.

8.4.6.3 Type of Assistance received under NFSM-Pulses

About 52 per cent of the sampled households of NFSM district of Amravati were found to air their view in favour of receiving improved varieties of seeds of pulses crops under NFSM programme, 21 per cent received assistance on INM, 6 per cent received assistance on IPM, 17 per cent received various equipments, and about 5 per cent received training under the programme. The proportion of sampled households showing receipt of improved varieties of seeds of pulse crops was 50 per cent in marginal category, 48 per cent in small, 55 per cent in medium and 67 per cent in large category.

8.4.6.4 Usefulness of NFSM-Pulses

Majority of the sampled households belonging to the NFSM district of Amravati found NFSM programme for pulses very useful since 66 per cent of the total sampled households belonging to the NFSM district of Amravati aired their view in favour of the programme. Among various categories, the proportion of households finding NFSM programme for pulses crops quite useful was 67 per cent in marginal category, 63 per cent in small, 70 per cent in medium and 67 per cent in large category.

8.4.6.5 Type of Usefulness of NFSM-Pulses

In the NFSM district of Amravati, about 34 per cent of the sampled households favoured the NFSM programme for pulses due to rise in yield levels of pulses crops, 22 per cent due to reduction in pest attacks, 16 per cent due to reduction in drudgery, and 28 per cent owing to their increased knowledge about better varieties and practices.

8.4.6.6 Area under Pulse Crops Before and After NFSM

The sampled households of NFSM district of Amravati showed a rise in area allocation under various pulses crops in 2008-09 as against average area allocation under pulses crops during 2006-07 and 2007-08 with the exception of tur crop, which showed a decline in area allocation in 2008-09 as against during 2006-07 and 2008-09. As a result, the total area under pulses crops increased to 330.02 acres, which was estimated at 310.12 acres during 2006-07 and 2008-09, showing 6.42 per cent rise in area under pulse

crops in 2008-09 over that of 2006-07 and 2007-08 average estimate. This clearly shows a positive impact of NFSM programme for pulses crops as the area allocation under pulses crops after the initiation of programme has increased on the sampled farms.

8.4.6.7 Production of Pulse Crops Before and After NFSM

The production of total pulses crops with all the sampled households belonging to NFSM district of Amravati put together increased to 1221.50 quintals in 2008-09, which was estimated at 936.75 quintals during 2006-07 and 2008-09, showing 30.40 per cent rise in production of total pulse crops in 2008-09 over that of average production of pulses crops during 2006-07 and 2007-08. Since rise in production of pulses crops on the farms of sampled farmers of NFSM district stood at much faster than area expansion in 2008-09 over that of the average of 2006-07 and 2007-08, this is a clear cut indication of rise in productivity level of pulse crops cultivated on the sampled farm in 2008-09 over that of the average of 2006-07 and 2007-08, showing positive impact of NFSM programme on productivity levels of pulses crops grown in the state of Maharashtra.

8.4.6.8 Increase in Area under Pulses after NFSM

About 50 per cent of the total sampled households of NFSM district of Amravati aired positive response in terms of rise in area under pulses crops after initiation of NFSM programme for pulses, and among various categories this proportion stood at 53 per cent in marginal category, 47 per cent in small, 40 per cent in medium and 67 per cent in large category.

8.4.6.9 Extent of Increase in Area under Pulses after NFSM

Only 25 out of 50 sampled households of NFSM district of Amravati aired their view in terms of rise in area under pulses crops after initiation of NFSM programme for pulses crops and about 88 per cent of them showed more than 10 per cent rise in area under pulses crops on their farms, 8 per cent showed 5-10 per cent rise in this respect, and 4 per cent showed 2-5 per cent rise in area under pulses crops on their farms after initiation of NFSM programme for pulses crops.

8.4.6.10 Suggestions for Improving NFSM-Pulses

In order to improve NFSM programme for pulses and make it more useful, the suggestions of the sampled farmers mainly revolved around extension of irrigation facilities, provision of improved varieties of seeds on subsidised rates, an element of subsidy with respect to other inputs like fertilizer, pesticides, implements and machinery, pest control measures, plant protection measures, etc, assured and remunerative market

prices for various pulse crops, organizing meetings with the farmers to make them aware about the programme, timely availability of seeds, fertilizers, and other inputs, provision of automatic pump sets on subsidised rates for spraying in the cultivation of tur crop, provision of farm pond, sprinkler sets, etc.

8.5 Conclusions and Policy Implications

The study showed positive impact of NFSM programme on pulses crops cultivation in the state of Maharashtra since the element of profit involved in the cultivation of pulses crops turned out to be much higher in the NFSM district as against the non-NFSM district. The element of profit involved in the cultivation of pulses crops in NFSM district was even higher than all other crops cultivated in the district. Not only this, the net profit margins in the cultivation of pulses crops in NFSM district were substantially high in 2008-09 as against 2006-07 and 2007-08. The plausible reasons for rise in profit margins in the cultivation of pulses crops could be traced in rise in yield levels, higher prices on offer for pulses, adoption of improved varieties of seeds in pulses crops cultivation, area under improved varieties, higher adoption of recommended practices such as sowing, seed and other practices, including application of organic manure, chemical fertilizers, etc., assistance received under NFSM-pulses programme viz. improved varieties of seeds like breeder/foundation/certified seeds, assistance on Integrated Nutrient Management (INM) – micronutrients/line/gypsum, etc., assistance on Integrated Pest Management (IPM) - micronutrients/line/gypsum IPM, provision of equipment like seed drills, pumpsets, sprinklers, conoweeder, Knapp-sack sprayers, participation of farmers in various training programmes, reasonably assured market for the pulses produce, etc.

The farmers generated substantial profit from pulses crops despite the fact that all these crops in NFSM district were cultivated under rainfed conditions. The farmers in NFSM district showed 6 per cent rise in area and 30 per cent rise in production of pulse crops in 2008-09 over that of 2006-07 and 2007-08 average, showing sharp rise in productivity level of pulses crops in the study area. However, the farmers were found to face some major problems in the cultivation of improved varieties of pulses, which mainly encompassed pest and marketing related problems, lack of availability of improved varieties, untimely availability, expensive nature of improved varieties of seeds, application of large doses of other inputs in the cultivation of improved varieties of pulses, etc. Therefore, in order to improve NFSM programme for pulses and make it

more useful, farmers aired their own suggestions and these suggestions included extension of irrigation facilities, provision of improved varieties of seeds on subsidised rates, an element of subsidy with respect to other inputs like fertilizer, pesticides, implements and machinery, pest control measures, plant protection measures, etc, assured and remunerative market prices for various pulse crops, organizing meetings with the farmers to make them aware about the programme, timely availability of seeds, fertilizers, and other inputs, provision of automatic pump sets on subsidised rates for spraying in the cultivation of tur crop, provision of farm pond, sprinkler sets, etc.

It is to be noted that earlier Sidhu and Sidhu (1991) had put forward a number of suggestions, which encompassed development of draught-disease-and pest resistant high yielding varieties of pulses for different agro-climatic regions, diversification of agriculture through introduction of pulses crops in wheat-paddy monoculture, etc. Similarly, Kadrekar (1991) had suggested a number of strategies to increase pulses production, especially, in the state of Maharashtra with major emphasis on protective irrigation, soil fertility management, improved crop production technique, plant protection measures, and diversification of cropping pattern. However, these strategies and schemes could not yield the desired results so far as pulses production in the country is concerned. The low level of technology adoption in pulses was the major reason for poor performance of pulses crops in the country. However, the initiation of NFSM-pulses would certainly pay rich dividend since the major thrust of this programme is on increasing seed replacement and the replacement of older varieties by newer ones. One of the major features of this is that it offers much more than what earlier programmes offered, especially with respect to capacity building, monitoring and planning. The execution of the programme remains within the district planning framework.

Although NFSM-pulses was implemented in 18 districts of Maharashtra from rabi season of 2007-08, the positive impact of the programme has led the State to include all 33 districts from 2010-11. However, it is too early to evaluate the impact of any programme based on one year performance after the initiation of the programme. Such impact assessment would be more meaningful if 3-5 years period is considered after the initiation of the programme. This is concomitant from the fact that though study shows reasonably higher returns from pulses crop cultivation in 2008-09 but the rainfall was also favourable during this year in the state of Maharashtra, which might have also favoured the farmers to cultivate pulses crops vis-à-vis other competing crops.

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APPENDIX

Appendix 1: Cropping Pattern – Over All Seasons: NFSM Amravati District

(Area in Acres)

Category	Area Sown													
	Kharif Season										Rabi Season			
	Other Crops					Pulses					Pulse		Other	
	Soybean	Jowar	Cotton	Bajra	Others	Total	Mung	Tur	Total	G. Total	Gram	Sunflower	Total	G. Total
2006-07														
Marginal	5.75	-	1.00	-	-	6.75	19.20	1.25	20.45	27.20	22.20	2.25	24.45	51.65
Small	5.00	6.96	0.95	1.30	-	14.21	45.78	5.70	51.48	65.69	43.58	-	43.58	109.27
Medium	2.00	9.00	6.00	-	-	17.00	43.00	8.00	51.00	68.00	39.00	-	39.00	107.00
Large	6.00	-	14.00	-	-	20.00	41.20	4.50	45.70	65.70	31.50	3.00	34.50	100.20
Total	18.75	15.96	21.95	1.30	-	57.96	149.18	19.45	168.63	226.59	136.28	5.25	141.53	368.12
2007-08														
Marginal	1.00	3.00	-	-	-	4.00	17.50	2.50	20.00	24.00	21.75	3.00	24.75	48.75
Small	1.75	4.00	8.75	1.30	4.06	19.86	35.70	4.00	39.70	59.56	37.62	2.00	39.62	99.18
Medium	3.00	2.75	8.00	-	2.00	15.75	49.50	3.75	53.25	69.00	49.50	-	49.50	118.50
Large	-	15.00	1.50	-	1.00	17.50	43.00	7.50	50.50	68.00	43.00	4.00	47.00	115.00
Total	5.75	24.75	18.25	1.30	7.06	57.11	145.70	17.75	163.45	220.56	151.87	9.00	160.87	381.43
2008-09														
Marginal	1.50	1.00	2.00	-	2.00	6.50	21.05	1.00	22.05	28.55	20.05	2.00	22.05	50.60
Small	3.80	2.50	6.00	-	8.65	20.95	36.86	5.95	42.81	63.76	37.86	3.38	41.24	105.00
Medium	5.50	4.00	7.00	-	7.00	23.50	39.75	4.50	44.25	67.75	41.00	6.00	47.00	114.75
Large	7.00	4.50	4.50	-	-	16.00	58.00	2.00	60.00	76.00	62.00	-	62.00	138.00
Total	17.80	12.00	19.50	-	17.65	66.95	155.66	13.45	169.11	236.06	160.91	11.38	172.29	408.35
Average														
Marginal	2.75	1.33	1.00	-	0.67	5.75	19.25	1.58	20.83	26.58	21.33	2.42	23.75	50.33
Small	3.52	4.49	5.23	0.87	4.24	18.34	39.45	5.22	44.66	63.00	39.69	1.79	41.48	104.48
Medium	3.50	5.25	7.00	-	3.00	18.75	44.08	5.42	49.50	68.25	43.17	2.00	45.17	113.42
Large	4.33	6.50	6.67	-	0.33	17.83	47.40	4.67	52.07	69.90	45.50	2.33	47.83	117.73
Total	14.10	17.57	19.90	0.87	8.24	60.67	150.18	16.88	167.06	227.74	149.69	8.54	158.23	385.97

Note: In 2007-08 'Others' under other crops include Kharif Sunflower and in 2008-09, 'Others' under other crops include Kharif Sunflower and Ladyfinger

Appendix 2: Cropping Pattern – Over All Seasons: Non-NFSM Beed District

(Area in Acres)

Category	Area Sown													G. Total
	Kharif Season									Rabi Season				
	Other Crops						Pulses			G. Total	Pulse	Other	Total	
	Soybean	Jowar	Cotton	Bajra	Others	Total	Mung	Tur	Total		Gram	Sugarcane		
2006-07														
Marginal	4.50	-	6.75	-	-	11.25	3.50	7.52	11.02	22.27	12.60	1.50	14.10	34.77
Small	7.00	-	27.00	5.00	-	39	12.00	9.60	21.6	60.6	13.00	5.00	24.00	84.6
Medium	9.00	-	36.00	0.50	-	45.5	6.75	18.50	25.25	70.75	8.50	3.50	32.70	103.45
Large	18.00	-	52.00	24.00	-	94	8.00	9.25	17.25	111.25	32.00	65.00	109.00	220.25
Total	38.50	-	121.75	29.50	-	189.75	30.25	44.87	75.12	264.87	66.10	75.00	179.80	444.77
2007-08														
Marginal	-	0.30	12.95	2.00	-	15.25	1.75	2.27	4.02	19.27	9.50	1.50	11.00	30.27
Small	11.00	-	22.50	2.00	-	35.5	11.50	10.85	22.35	57.85	16.50	8.00	31.50	89.35
Medium	5.00	1.00	41.00	-	-	47	3.00	23.45	26.45	73.45	10.50	5.50	25.50	98.95
Large	7.25	-	18.00	13.00	-	38.25	23.00	16.00	39	77.25	64.00	52.00	142.25	219.5
Total	23.25	1.30	94.45	17.00	-	136	39.25	52.57	91.82	227.82	100.50	67.00	210.25	438.32
2008-09														
Marginal	-	1.00	14.25	0.50	-	15.75	2.00	7.02	9.02	24.77	3.00	1.50	4.50	29.27
Small	4.00	-	21.75	5.50	-	31.25	23.00	9.25	32.25	63.5	25.60	3.00	33.10	96.6
Medium	3.00	1.75	39.00	-	-	43.75	12.00	12.25	24.25	68	15.70	9.50	33.70	101.7
Large	5.00	-	41.00	9.00	-	55	13.00	15.75	28.75	83.75	46.00	43.00	111.00	134.75
Total	12.00	2.75	116.00	15.00	-	145.75	50.00	44.27	94.27	240.02	90.30	57.00	182.30	422.32
Average														
Marginal	1.50	0.43	11.32	0.83	0.00	14.08	2.42	5.60	8.02	22.10	8.37	1.50	9.87	31.97
Small	7.33	0.00	23.75	4.17	0.00	35.25	15.50	9.90	25.40	60.65	18.37	5.33	29.53	90.18
Medium	5.67	0.92	38.67	0.17	0.00	45.42	7.25	18.07	25.32	70.73	11.57	6.17	30.63	101.36
Large	10.08	0.00	37.00	15.33	0.00	62.42	14.67	13.67	28.33	90.75	47.33	53.33	120.75	211.5
Total	24.58	1.35	110.73	20.50	0.00	157.17	39.83	47.24	87.07	244.24	85.63	66.33	190.78	434.05

- Note: i) In 2006-07, the total area under Rabi season include area under Gram, Sugarcane, and some other crops like Sunflower, Rabi Jowar, Wheat, Kardi, and Banana
 ii) In 2007-08, the total area under Rabi season include area under Gram, Sugarcane, and some other crops like Rabi Jowar, Sunflower,, Wheat, Onion, and Banana
 iii) In 2008-09, the total area under Rabi season include area under Gram, Sugarcane, and some other crops like Rabi Jowar, Wheat, Onion, and Kardi

Appendix 3: Households Reporting Problems with Improved Varieties of Pulses: NFSM (Amravati District) - Mung

Problem	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Total
Marginal							
Not available at all	-	-	2	-	1	1	4
Available but not on time	2	-	-	2	-	1	5
Very Expensive	3	2	1	1	-	-	7
Need large doses of other inputs	2	4	-	1	1	-	8
Much lower yield than expected	-	3	3	-	2	-	8
Pest resistance not adequate	2	-	1	-	-	2	5
Total	9	9	7	4	4	4	37
Small							
Not available at all	3	2	3	1	1	2	12
Available but not on time	1	2	2	5	1	1	12
Very Expensive	5	4	2	2	-	-	13
Need large doses of other inputs	3	2	1	-	6	-	12
Much lower yield than expected	-	4	4	1	1	2	12
Pest resistance not adequate	2	-	-	3	1	6	12
Total	14	14	12	12	10	11	73
Medium							
Not available at all	1	-	2	1	3	-	7
Available but not on time	2	1	1	2	-	1	7
Very Expensive	1	5	1	1	-	-	8
Need large doses of other inputs	2	1	1	2	1	-	7
Much lower yield than expected	2	1	1	1	3	-	8
Pest resistance not adequate	-	-	1	-	1	5	7
Total	8	8	7	7	8	6	44
Large							
Not available at all	1	1	-	2	-	-	4
Available but not on time	-	-	1	-	3	-	4
Very Expensive	2	-	-	1	-	1	4
Need large doses of other inputs	1	2	-	-	1	-	4
Much lower yield than expected	-	-	2	-	-	2	4
Pest resistance not adequate	-	1	1	1	-	1	4
Total	4	4	4	4	4	4	24
All							
Not available at all	5	3	7	4	5	3	27
Available but not on time	6	3	4	9	4	2	28
Very Expensive	11	11	4	5	-	1	32
Need large doses of other inputs	10	8	2	3	9	-	31
Much lower yield than expected	2	8	10	2	6	4	32
Pest resistance not adequate	4	1	3	4	2	14	28
Total	35	35	30	27	26	25	178

Appendix 4: Households Reporting Problems with Improved Varieties of Pulses: NFSM (Amravati District) - Gram

Problem	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Total
Marginal							
Not available at all	-	1	3	1	1	-	6
Available but not on time	2	1	-	4	-	-	7
Very Expensive	7	-	1	-	-	-	8
Need large doses of other inputs	1	3	1	1	2	1	9
Much lower yield than expected	-	2	1		3	2	8
Pest resistance not adequate	-	1	2	1	-	3	7
Total	10	8	8	7	6	6	45
Small							
Not available at all	-	2	1	4	2	1	10
Available but not on time		2	1	1	4	2	10
Very Expensive	5	1	1	1	2	1	11
Need large doses of other inputs	1	3	3	3	-	-	10
Much lower yield than expected	6	2	1	-	2	1	12
Pest resistance not adequate	-	2	4	1	-	5	12
Total	12	12	11	10	10	10	65
Medium							
Not available at all	-	-	2	3	1	1	7
Available but not on time	1	3	1	1	1	-	7
Very Expensive	4	1	1	-	-	2	8
Need large doses of other inputs	1	1	2	1	-	2	7
Much lower yield than expected	1	2	-	-	4	-	7
Pest resistance not adequate	1	-	-	2	1	3	7
Total	8	7	6	7	7	8	43
Large							
Not available at all	-	-	1	-	2	1	4
Available but not on time	1		-	2	-	1	4
Very Expensive	2	2	-	-	-	-	4
Need large doses of other inputs		1	1	1	-	1	4
Much lower yield than expected	1	-	1		1	1	4
Pest resistance not adequate		-	1	2	1	-	4
Total	4	3	4	5	4	4	24
All							
Not available at all	-	3	7	8	6	3	27
Available but not on time	4	6	2	8	5	3	28
Very Expensive	18	4	3	1	2	3	31
Need large doses of other inputs	3	8	7	6	2	4	30
Much lower yield than expected	8	6	3	-	10	4	31
Pest resistance not adequate	1	3	7	6	2	11	30
Total	34	30	29	29	27	28	177

Appendix 5: Households Reporting Problems with Improved Varieties of Pulses: NFSM (Amravati District) - Tur

Problem	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Total
Marginal							
Not available at all	-	-	-	-	-	-	-
Available but not on time	-	-	-	-	-	-	-
Very Expensive	-	-	-	-	-	-	-
Need large doses of other inputs	-	-	-	-	-	-	-
Much lower yield than expected	-	-	-	-	-	-	-
Pest resistance not adequate	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-
Small							
Not available at all	1	2	1	1	-	-	5
Available but not on time	-	-	1	2	2	-	5
Very Expensive	3	2	-	-	-	1	6
Need large doses of other inputs	-	1	1	-	4	-	6
Much lower yield than expected	2	-	1	1	-	-	4
Pest resistance not adequate	1	-	-	-	-	4	5
Total	7	5	4	4	6	5	31
Medium							
Not available at all	1	-	-	1	-	1	3
Available but not on time	-	-	-	2	1	-	3
Very Expensive	1	1	1	-	-	1	4
Need large doses of other inputs	2	-	-	-	1	-	3
Much lower yield than expected	-	1	2	-	-	-	3
Pest resistance not adequate	-	1	-	-	1	1	3
Total	4	3	3	3	3	3	19
Large							
Not available at all	-	1	-	-	-	1	2
Available but not on time	-	-	2	-	-	-	2
Very Expensive	-	1	-	-	1	-	2
Need large doses of other inputs	1	-	-	-	-	1	2
Much lower yield than expected	-	1	-	-	1	-	2
Pest resistance not adequate	1	-	-	1	-	-	2
Total	2	3	2	1	2	2	12
All							
Not available at all	-	3	1	2	-	2	10
Available but not on time	4	-	3	4	3	-	10
Very Expensive	4	4	1	1	1	2	12
Need large doses of other inputs	3	1	1	-	2	1	11
Much lower yield than expected	2	2	3	1	-	-	9
Pest resistance not adequate	2	1	-	1	6	5	10
Total	13	11	9	8	11	10	62

Appendix 6: Households Reporting Problems with Improved Varieties of Pulses: Non-NFSM (Beed District) - Mung

Problem	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Total
Marginal							
Not available at all	-	-	-	-	-	-	-
Available but not on time	-	-	-	-	-	-	-
Very Expensive	-	-	-	-	-	-	-
Need large doses of other inputs	-	-	-	-	-	-	-
Much lower yield than expected	-	-	-	-	-	-	-
Pest resistance not adequate	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-
Small							
Not available at all	1	-	-	2	2	1	6
Available but not on time	-	1	3	2	-	-	6
Very Expensive	1	1	2	-	1	1	6
Need large doses of other inputs	2	2	-	1	1	-	6
Much lower yield than expected	1	2	-	1	1	1	6
Pest resistance not adequate	1	-	1	-	1	3	6
Total	6	6	6	6	6	6	36
Medium							
Not available at all	-	-	-	1	1	1	3
Available but not on time	-	-	-	2	1	-	3
Very Expensive	-	1	-	-	1	1	3
Need large doses of other inputs	1	-	2	-	-	-	3
Much lower yield than expected	1	1	1	-	-	-	3
Pest resistance not adequate	1	1	-	-	-	1	3
Total	3	3	3	3	3	3	18
Large							
Not available at all	1	-	-	-	-	1	2
Available but not on time	1	1	-	-	-	-	2
Very Expensive	-	-	1	-	1	-	2
Need large doses of other inputs	-	1	-	-	1	-	2
Much lower yield than expected	-	-	-	2	-	-	2
Pest resistance not adequate	-	-	1	-	-	1	2
Total	2	2	2	2	2	2	12
All							
Not available at all	2	-	-	3	3	3	11
Available but not on time	1	2	3	4	1	1	11
Very Expensive	1	2	3	-	3	2	11
Need large doses of other inputs	4	3	2	1	2	-	11
Much lower yield than expected	2	3	1	3	1	1	11
Pest resistance not adequate	2	1	2	-	1	5	11
Total	11	11	11	11	11	11	66

Appendix 7: Households Reporting Problems with Improved Varieties of Pulses: Non-NFSM (Beed District) - Gram

Problem	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Total
Marginal							
Not available at all	-	2	-	-	1	-	3
Available but not on time	-	-	1	1	1	-	3
Very Expensive	2	1	-	-	-	-	3
Need large doses of other inputs	-	-	1	2	-	-	3
Much lower yield than expected	1	-	1	-	1	-	3
Pest resistance not adequate	-	-	-	-	-	3	3
Total	3	3	3	3	3	3	18
Small							
Not available at all	-	1	1	3	2	1	8
Available but not on time	2	1	3	-	1	1	8
Very Expensive	-	4	2	1	-	1	8
Need large doses of other inputs	-	2	1	3	2	-	8
Much lower yield than expected	5	-	-	-	2	1	8
Pest resistance not adequate	1	-	1	1	1	4	8
Total	8	8	8	8	8	8	48
Medium							
Not available at all	3	-	-	-	3	-	6
Available but not on time	2	1	2	1	-	-	6
Very Expensive	1	2	1	1	-	1	6
Need large doses of other inputs	-	-	-	4	1	1	6
Much lower yield than expected	-	1	3	-	2	-	6
Pest resistance not adequate	-	2	-	-	-	4	6
Total	6	6	6	6	6	6	36
Large							
Not available at all	-	2	1	-	1	-	4
Available but not on time	2	1	-	-	1	-	4
Very Expensive	2	-	1	1	-	-	4
Need large doses of other inputs	-	1	-	2	1	-	4
Much lower yield than expected	-	-	2	1	1	-	4
Pest resistance not adequate	-	-	-	-	-	4	4
Total	4	4	4	4	4	4	24
All							
Not available at all	3	5	2	3	7	1	21
Available but not on time	6	3	6	2	3	1	21
Very Expensive	5	7	4	3	-	2	21
Need large doses of other inputs	-	3	2	11	4	1	21
Much lower yield than expected	6	1	6	1	6	1	21
Pest resistance not adequate	1	2	1	1	1	15	21
Total	21	21	21	21	21	21	126

Appendix 8: Households Reporting Problems with Improved Varieties of Pulses: Non-NFSM (Beed District) - Tur

Problem	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Total
Marginal							
Not available at all	-	1	5	2	1	-	9
Available but not on time	4	3	1	-	1	-	9
Very Expensive	4	2	2	1	-	-	9
Need large doses of other inputs	1	-	-	5	3	-	9
Much lower yield than expected	-	3	1	1	4	-	9
Pest resistance not adequate	-	-	-	-	-	9	9
Total	9	9	9	9	9	9	54
Small							
Not available at all	3	-	1	2	1	3	10
Available but not on time		1	2	2	4	1	10
Very Expensive	3	3	1	1	1	1	10
Need large doses of other inputs	2	-	4	1	2	1	10
Much lower yield than expected	1	4	1	2	1	1	10
Pest resistance not adequate	1	2	1	2	1	3	10
Total	10	10	10	10	10	10	60
Medium							
Not available at all	3	-	1	1	-	-	5
Available but not on time	-	1	2	2	-	-	5
Very Expensive	-	3	-	1	-	1	5
Need large doses of other inputs	1	-	-	1	2	1	5
Much lower yield than expected	-	1	-	-	2	2	5
Pest resistance not adequate	1	-	2	-	1	1	5
Total	5	5	5	5	5	5	30
Large							
Not available at all	-	2	1	2	-	-	5
Available but not on time	3	1	-	-	1	-	5
Very Expensive	-	-	4	1	-	-	5
Need large doses of other inputs	1	1	-	1	2	-	5
Much lower yield than expected	1	1	-	1	2	-	5
Pest resistance not adequate	-	-	-	-	-	5	5
Total	5	5	5	5	5	5	30
All							
Not available at all	-	3	8	7	2	3	29
Available but not on time	4	6	5	4	6	1	29
Very Expensive	7	8	7	1	1	2	29
Need large doses of other inputs	5	1	4	8	2	2	29
Much lower yield than expected	2	9	2	4	-	3	29
Pest resistance not adequate	2	2	3	2	6	18	29
Total	29	29	29	29	29	29	174

Appendix 9: Suggested Solutions for Improved Varieties: NFSM (Amravati District) - Mung

Problems	Rank 1	Rank 2	Rank 3	Rank 4	Total
Marginal					
Cheaper availability of seeds	4	3	1	-	8
Timely availability of seeds	-	1	5	-	6
Subsidy	5	4	-	-	9
Any other (Specify)	-	-	-	-	-
Total	9	8	6	-	23
Small					
Cheaper availability of seeds	5	4	5	-	14
Timely availability of seeds	3	5	5	-	13
Subsidy	6	5	3	-	14
Any other (Specify)	-	-	-	-	-
Total	14	14	13	-	41
Medium					
Cheaper availability of seeds	3	3	2	-	8
Timely availability of seeds	3	3	1	-	7
Subsidy	2	1	4	-	7
Any other (Specify)	-	-	-	-	-
Total	8	7	7	-	22
Large					
Cheaper availability of seeds	1	1	2	-	4
Timely availability of seeds	2	1	1	-	4
Subsidy	1	2	1	-	4
Any other (Specify)	-	-	-	-	-
Total	4	4	4	-	12
All					
Cheaper availability of seeds	13	11	10	-	34
Timely availability of seeds	8	10	12	-	30
Subsidy	14	7	8	-	34
Any other (Specify)	-	-	-	-	-
Total	35	33	30	-	98

Appendix 10: Suggested Solutions for Improved Varieties : NFSM (Amravati District) - Gram

Problems	Rank 1	Rank 2	Rank 3	Rank 4	Total
Marginal				-	
Cheaper availability of seeds	2	3	3	-	8
Timely availability of seeds	1	3	3	-	7
Subsidy	6	1	1	-	8
Any other (Specify)	-	-	-	-	-
Total	9	7	7		23
Small				-	
Cheaper availability of seeds	3	7	1	-	11
Timely availability of seeds	1	1	9	-	11
Subsidy	8	3	1	-	12
Any other (Specify)	-	-	-	-	-
Total	12	11	11	-	34
Medium				-	-
Cheaper availability of seeds	4	3	1	-	8
Timely availability of seeds	3	2	2	-	7
Subsidy	1	2	4	-	7
Any other (Specify)	-	-	-	-	-
Total	8	7	7	-	22
Large					
Cheaper availability of seeds	-	4	-	-	4
Timely availability of seeds	1		3	-	4
Subsidy	3		1	-	4
Any other (Specify)	-	-	-	-	-
Total	4	4	4		12
All					
Cheaper availability of seeds	9	17	6	-	31
Timely availability of seeds	6	6	19	-	29
Subsidy	18	6	3	-	31
Any other (Specify)	-	-	-	-	-
Total	33	29	29	-	91

Appendix 11: Suggested Solutions for Improved Varieties: NFSM (Amravati District) - Tur

Problems	Rank 1	Rank 2	Rank 3	Rank 4	Total
Marginal					
Cheaper availability of seeds	-	-	-	-	-
Timely availability of seeds	-	-	-	-	-
Subsidy	-	-	-	-	-
Any other (Specify)	-	-	-	-	-
Total	-	-	-	-	-
Small					
Cheaper availability of seeds	1	3	2	-	6
Timely availability of seeds	2	3	1	-	6
Subsidy	3	-	3	-	6
Any other (Specify)	-	-	-	-	-
Total	6	6	6	-	18
Medium			1		
Cheaper availability of seeds	1	1	2	-	4
Timely availability of seeds	-	1	2	-	3
Subsidy	2	-	1	-	3
Any other (Specify)	-	-	-	-	-
Total	3	2	5	-	10
Large					
Cheaper availability of seeds	1	-	1	-	2
Timely availability of seeds	-	2	-	-	2
Subsidy	1	-	1	-	2
Any other (Specify)	-	-	-	-	-
Total	2	2	2	-	6
All					
Cheaper availability of seeds	3	4	5	-	12
Timely availability of seeds	2	6	3	-	11
Subsidy	6	-	5	-	11
Any other (Specify)	-	-	-	-	-
Total	11	10	13	-	34

Appendix 12: Suggested Solutions for Improved Varieties: Non-NFSM (Beed District) - Mung

Problems	Rank 1	Rank 2	Rank 3	Rank 4	Total
Marginal					
Cheaper availability of seeds	-	-	-	-	-
Timely availability of seeds	-	-	-	-	-
Subsidy	-	-	-	-	-
Any other (Specify)	-	-	-	-	-
Total	-	-	-	-	-
Small					
Cheaper availability of seeds	1	2	3	-	6
Timely availability of seeds	3	1	2	-	6
Subsidy	2	3	1	-	6
Any other (Specify)	-	-	-	-	-
Total	6	6	6		18
Medium					
Cheaper availability of seeds	1	1	1	-	3
Timely availability of seeds	2	1	-	-	3
Subsidy	-	1	2	-	3
Any other (Specify)	-	-	-	-	-
Total	3	3	3		9
Large					
Cheaper availability of seeds		1	1	-	2
Timely availability of seeds	2		-	-	2
Subsidy	-	1	1	-	2
Any other (Specify)	-	-	-	-	-
Total	2	2	2	-	6
All					
Cheaper availability of seeds	2	4	5	-	11
Timely availability of seeds	7	2	2	-	11
Subsidy	2	5	4	-	11
Any other (Specify)	-	-	-	-	-
Total	11	11	11	-	33

Appendix 13: Suggested Solutions for Improved Varieties: Non-NFSM (Beed District) - Gram

Problems	Rank 1	Rank 2	Rank 3	Rank 4	Total
Marginal					
Cheaper availability of seeds	-	3	-	-	3
Timely availability of seeds	-	-	3	-	3
Subsidy	3	-	-	-	3
Any other (Specify)	-	-	-	-	-
Total	3	3	3	-	9
Small					
Cheaper availability of seeds	2	2	4	-	8
Timely availability of seeds	2	4	2	-	8
Subsidy	4	2	2	-	8
Any other (Specify)	-	-	-	-	-
Total	8	8	8	-	24
Medium			1		
Cheaper availability of seeds	3	3		-	6
Timely availability of seeds	3	1	2	-	6
Subsidy	-	2	4	-	6
Any other (Specify)	-	-	-	-	-
Total	6	6	6	-	18
Large					
Cheaper availability of seeds		3	1	-	4
Timely availability of seeds	1	-	3	-	4
Subsidy	3	1	-	-	4
Any other (Specify)	-	-	-	-	-
Total	4	4	4	-	12
All					
Cheaper availability of seeds	5	11	5	-	21
Timely availability of seeds	6	5	10	-	21
Subsidy	10	5	6	-	21
Any other (Specify)	-	-	-	-	-
Total	21	21	21	-	63

Appendix 14: Suggested Solutions for Improved Varieties: Non-NFSM (Beed District) - Tur

Problems	Rank 1	Rank 2	Rank 3	Rank 4	Total
Marginal					
Cheaper availability of seeds	6	1	2	-	9
Timely availability of seeds	2	4	3	-	9
Subsidy	1	4	4	-	9
Any other (Specify)	-	-	-	-	-
Total	9	9	9	-	27
Small					
Cheaper availability of seeds	3	3	4	-	10
Timely availability of seeds	6	2	2	-	10
Subsidy	1	5	4	-	10
Any other (Specify)	-	-	-	-	-
Total	10	10	10	-	30
Medium					
Cheaper availability of seeds	2	-	3	-	5
Timely availability of seeds	1	3	1	-	5
Subsidy	2	2	1	-	5
Any other (Specify)	-	-	-	-	-
Total	5	5	5	-	15
Large					
Cheaper availability of seeds	2	3	-	-	5
Timely availability of seeds	1	1	3	-	5
Subsidy	2	1	2	-	5
Any other (Specify)	-	-	-	-	-
Total	5	5	5	-	15
All					
Cheaper availability of seeds	13	7	9	-	29
Timely availability of seeds	10	10	9	-	29
Subsidy	6	12	11	-	29
Any other (Specify)	-	-	-	-	-
Total	29	29	29	-	87

Appendix 15: Major Problems in Cultivating Pulses: NFSM Amravati District

Problem	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Rank 7	Total
Marginal								
Lack of irrigation facilities	10	3	2	-	-	-	-	15
Lack of improved varieties	2	1	1	2	1	-	-	7
Lower yield	1	6	-	2	1	-	-	10
High pest incidence	1	4	5	2	1	-	-	13
Low market price	1	1	1		2	2	-	7
No assured market/procurement	-	-	5	2	2	3	-	12
Any other (Extension service)	-	-	-	-	-	-	-	-
Total	15	15	14	8	7	5	-	64
Small								
Lack of irrigation facilities	8	3	5	1	-	-	-	17
Lack of improved varieties	1	1	5	5	2	-	-	14
Lower yield	1	6	2	2	1	2	-	14
High pest incidence	2	2	3	3	6	2	-	18
Low market price	5	4	1	2	3		-	15
No assured market/procurement	1	2	1	1	1	9	-	15
Any other (Extension service)	-	-	-	-	-	-	-	-
Total	18	18	17	14	13	13	-	93
Medium								
Lack of irrigation facilities	3	1	3	2	-	1	-	10
Lack of improved varieties	1	3	1	1	1	1	-	8
Lower yield	3		3	2	-	-	-	8
High pest incidence	-	4	-	2	4		-	10
Low market price	3	-	2	-	2	2	-	9
No assured market/procurement	-	2	1	1	1	4	-	9
Any other (Extension service)							1	1
Total	10	10	10	8	8	8	1	55
Large								
Lack of irrigation facilities	2	2	-	1	1	-	-	6
Lack of improved varieties	-	-	1	1	1	2	-	5
Lower yield	1	1	1	1	2	-	-	6
High pest incidence	2	1	1	1	1	-	-	6
Low market price	1	1	3	-	1	-	-	6
No assured market/procurement	-	1	-	2	-	3	-	6
Any other (Extension service)	-	-	-	-	-	-	1	1
Total	6	6	6	6	6	5	1	36
All								
Lack of irrigation facilities	23	9	10	4	1	1	-	48
Lack of improved varieties	4	5	8	9	5	3	-	34
Lower yield	6	13	6	7	4	2	-	38
High pest incidence	5	11	9	8	12	2	-	47
Low market price	10	6	7	2	8	4	-	37
No assured market/procurement	1	5	7	6	4	19	-	42
Any other (Extension service)	-	-	-	-	-	-	2	2
Total	49	49	47	36	34	31	2	248

Appendix 15 (a): % Distribution of Major Problems in Cultivating Pulses: NFSM Amravati District

Problem	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Rank 7	Total
Marginal								
Lack of irrigation facilities	66.67	20.00	13.33	-	-	-	-	100.00
Lack of improved varieties	28.57	14.29	14.29	28.57	14.29	-	-	100.00
Lower yield	10.00	60.00	-	-	10.00	-	-	100.00
High pest incidence	7.69	30.77	38.46	15.38	7.69	-	-	100.00
Low market price	14.29	14.29	14.29	0.00	28.57	28.57	-	100.00
No assured market/procurement	-	-	41.67	16.67	16.67	25.00	-	100.00
Any other (Extension service)	-	-	-	-	-	-	-	-
Total	23.44	23.44	21.88	12.50	10.94	7.81	-	100.00
Small								
Lack of irrigation facilities	47.06	17.65	29.41	5.88	-	-	-	100.00
Lack of improved varieties	7.14	7.14	35.71	35.71	14.29	-	-	100.00
Lower yield	7.14	42.86	14.29	14.29	7.14	14.29	-	100.00
High pest incidence	11.11	11.11	16.67	16.67	33.33	11.11	-	100.00
Low market price	33.33	26.67	6.67	13.33	20.00	-	-	100.00
No assured market/procurement	6.67	13.33	6.67	6.67	6.67	60.00	-	100.00
Any other (Extension service)	-	-	-	-	-	-	-	-
Total	19.35	19.35	18.28	15.05	13.98	13.98	-	100.00
Medium								
Lack of irrigation facilities	30.00	10.00	30.00	20.00	-	10.00	-	100.00
Lack of improved varieties	12.50	37.50	12.50	12.50	12.50	12.50	-	100.00
Lower yield	37.50	-	37.50	25.00	-	-	-	100.00
High pest incidence	0.00	40.00	0.00	20.00	40.00	-	-	100.00
Low market price	33.33	0.00	22.22	0.00	22.22	22.22	-	100.00
No assured market/procurement	0.00	22.22	11.11	11.11	11.11	44.44	-	100.00
Any other (Extension service)	-	-	-	-	-	-	100.00	100.00
Total	18.18	18.18	18.18	14.55	14.55	14.55	1.82	100.00
Large								
Lack of irrigation facilities	33.33	33.33	0.00	16.67	16.67	-	-	100.00
Lack of improved varieties	-	-	20.00	20.00	20.00	40.00	-	100.00
Lower yield	16.67	16.67	16.67	16.67	33.33	-	-	100.00
High pest incidence	33.33	16.67	16.67	16.67	16.67	-	-	100.00
Low market price	16.67	16.67	50.00	0.00	16.67	-	-	100.00
No assured market/procurement	-	16.67	0.00	33.33	0.00	50.00	-	100.00
Any other (Extension service)	0.00	-	-	-	-	-	100.00	100.00
Total	16.67	16.67	16.67	16.67	16.67	13.89	2.78	100.00
All								
Lack of irrigation facilities	47.92	18.75	20.83	8.33	2.08	2.08	-	100.00
Lack of improved varieties	11.76	14.71	23.53	26.47	14.71	8.82	-	100.00
Lower yield	15.79	34.21	15.79	18.42	10.53	5.26	-	100.00
High pest incidence	10.64	23.40	19.15	17.02	25.53	4.26	-	100.00
Low market price	27.03	16.22	18.92	5.41	21.62	10.81	-	100.00
No assured market/procurement	2.38	11.90	16.67	14.29	9.52	45.24	-	100.00
Any other (Extension service)	-	-	-	-	-	-	100.00	100.00
Total	19.76	19.76	18.95	14.52	13.71	12.50	0.81	100.00

Appendix 16: Major Problems in Cultivating Pulses: Non-NFSM Beed District

Problem	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Rank 7	Total
Marginal								
Lack of irrigation facilities	6	3	1	4	-	-	-	14
Lack of improved varieties	2	2	3	4	3	-	-	14
Lower yield		5	5	3	1	-	-	14
High pest incidence	3	1	2	3	3	2	-	14
Low market price	5	1	2	-	7	1	-	14
No assured market/procurement	-	2	1	-	-	11	-	14
Any other (Extension service)	-	-	-	-	-	-	-	-
Total	14	14	14	14	14	14	-	84
Small								
Lack of irrigation facilities	1	13	-	1	2	-	-	17
Lack of improved varieties	6	1	5	4	-	1	-	17
Lower yield	4	1	4	6	2	-	-	17
High pest incidence	2	1	5	3	6	-	-	17
Low market price	3	1	3	3	6	1	-	17
No assured market/procurement	1	-	-	-	1	15	-	17
Any other (Extension service)	-	-	-	-	-	-	-	-
Total	17	17	17	17	17	17	-	102
Medium								
Lack of irrigation facilities	2	4	3	1	3	-	-	13
Lack of improved varieties	3	2	4	3	1	-	-	13
Lower yield	4	3	2	2	1	1	-	13
High pest incidence	-	1	2	7	3	-	-	13
Low market price	4	2	2	-	4	1	-	13
No assured market/procurement	-	1	-	-	1	11	-	13
Any other (Extension service)	-	-	-	-	-	-	-	-
Total	13	13	13	13	13	13	-	78
Large								
Lack of irrigation facilities	2	1	1	1	1	-	-	6
Lack of improved varieties	-	1	3	2	-	-	-	6
Lower yield	1	-	1	1	3	-	-	6
High pest incidence	1	2	1	2	-	-	-	6
Low market price	2	-	-	-	1	3	-	6
No assured market/procurement	-	2	-	-	1	3	-	6
Any other (Extension service)	-	-	-	-	-	-	-	-
Total	6	6	6	6	6	6	-	36
All								
Lack of irrigation facilities	11	21	5	7	6	-	-	50
Lack of improved varieties	11	6	15	13	4	1	-	50
Lower yield	9	9	12	12	7	1	-	50
High pest incidence	6	5	10	15	12	2	-	50
Low market price	14	4	7	3	18	6	-	50
No assured market/procurement	1	5	1	-	3	40	-	50
Any other (Extension service)	-	-	-	-	-	-	-	-
Total	50	50	50	50	50	50	-	300

Appendix 16 (a) : % Distribution of Major Problems in Cultivating Pulses: Non-NFSM Beed District

Problem	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Rank 7	Total
Marginal								
Lack of irrigation facilities	42.86	21.43	7.14	28.57	-	-	-	100.00
Lack of improved varieties	14.29	14.29	21.43	28.57	21.43	-	-	100.00
Lower yield	-	35.71	35.71	21.43	7.14	-	-	100.00
High pest incidence	21.43	7.14	14.29	21.43	21.43	14.29	-	100.00
Low market price	35.71	7.14	14.29	-	50.00	7.14	-	100.00
No assured market/procurement	-	14.29	7.14	-	-	78.57	-	100.00
Any other (Extension service)	-	-	-	-	-	-	-	-
Total	16.67	16.67	16.67	16.67	16.67	16.67	-	100.00
Small								
Lack of irrigation facilities	5.88	76.47	-	5.88	11.76	-	-	100.00
Lack of improved varieties	35.29	5.88	29.41	23.53	-	5.88	-	100.00
Lower yield	23.53	5.88	23.53	35.29	11.76	-	-	100.00
High pest incidence	11.76	5.88	29.41	17.65	35.29	-	-	100.00
Low market price	17.65	5.88	17.65	17.65	35.29	5.88	-	100.00
No assured market/procurement	5.88	-	-	-	5.88	88.24	-	100.00
Any other (Extension service)	-	-	-	-	-	-	-	-
Total	16.67	16.67	16.67	16.67	16.67	16.67	-	100.00
Medium								
Lack of irrigation facilities	15.38	30.77	23.08	7.69	23.08	-	-	100.00
Lack of improved varieties	23.08	15.38	30.77	23.08	7.69	-	-	100.00
Lower yield	30.77	23.08	15.38	15.38	7.69	7.69	-	100.00
High pest incidence	-	7.69	15.38	53.85	23.08	-	-	100.00
Low market price	30.77	15.38	15.38	-	30.77	7.69	-	100.00
No assured market/procurement	-	7.69	-	-	7.69	84.62	-	100.00
Any other (Extension service)	-	-	-	-	-	-	-	-
Total	16.67	16.67	16.67	16.67	16.67	16.67	-	100.00
Large								
Lack of irrigation facilities	33.33	16.67	16.67	16.67	16.67	-	-	100.00
Lack of improved varieties	-	16.67	50.00	33.33	-	-	-	100.00
Lower yield	16.67	-	16.67	16.67	50.00	-	-	100.00
High pest incidence	16.67	33.33	16.67	33.33	-	-	-	100.00
Low market price	33.33	-	-	-	16.67	50.00	-	100.00
No assured market/procurement	-	33.33	-	-	16.67	50.00	-	100.00
Any other (Extension service)	-	-	-	-	-	-	-	-
Total	16.67	16.67	16.67	16.67	16.67	16.67	-	100.00
All								
Lack of irrigation facilities	22.00	42.00	10.00	14.00	12.00	-	-	100.00
Lack of improved varieties	22.00	12.00	30.00	26.00	8.00	2.00	-	100.00
Lower yield	18.00	18.00	24.00	24.00	14.00	2.00	-	100.00
High pest incidence	12.00	10.00	20.00	30.00	24.00	4.00	-	100.00
Low market price	28.00	8.00	14.00	6.00	36.00	12.00	-	100.00
No assured market/procurement	2.00	10.00	2.00	-	6.00	80.00	-	100.00
Any other (Extension service)	-	-	-	-	-	-	-	-
Total	16.67	16.67	16.67	16.67	16.67	16.67	-	100.00

Appendix 17: Important Suggestions from the Farmers for Cultivating Pulses: NFSM Amravati District

Suggestions	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Total
Marginal							
Improving irrigation facilities	11	2	2	-	-	-	15
Availability of high yielding varieties	1	8	1	2	-	-	12
Availability of pest resistant varieties	-	3	4	1	2	-	10
Assured procurement with MSP	-	1	4	4	2	-	11
Higher market price	3	1	3	4	3	-	14
Any other (Providing extension service)	-	-	-	-	-	-	-
Total	15	15	14	11	7	-	62
Small							
Improving irrigation facilities	7	3	6	1	1	-	18
Availability of high yielding varieties	5	6	2	4	-	-	17
Availability of pest resistant varieties	1	2	4	7	3	-	17
Assured procurement with MSP	1	3	2	3	8	-	17
Higher market price	5	5	4	1	3	-	18
Any other (Providing extension service)	-	-	-	-	-	-	-
Total	19	19	18	16	15	-	87
Medium							
Improving irrigation facilities	4	-	6	-	-	-	10
Availability of high yielding varieties	2	7	-	-	-	-	9
Availability of pest resistant varieties	1	3	2	3	1	-	10
Assured procurement with MSP	-	-	-	6	3	-	9
Higher market price	2	-	2	-	5	1	10
Any other (Providing extension service)	1	-	-	-	-	1	2
Total	10	10	10	9	9	2	50
Large							
Improving irrigation facilities	3	1	-	1	1	-	6
Availability of high yielding varieties	1	3	2	-	-	-	6
Availability of pest resistant varieties	-	1	2	1	2	-	6
Assured procurement with MSP	-	-	2	2	2	-	6
Higher market price	2	1	-	2	1	-	6
Any other (Providing extension service)	-	-	-	-	-	-	-
Total	6	6	6	6	6	-	30
All							
Improving irrigation facilities	25	6	14	2	2	-	49
Availability of high yielding varieties	9	24	5	6	-	-	44
Availability of pest resistant varieties	2	9	12	12	8	-	43
Assured procurement with MSP	1	4	8	15	15	-	43
Higher market price	12	7	9	7	12	1	48
Any other (Providing extension service)	1	-	-	-	-	1	2
Total	50	50	48	42	37	2	229

**Appendix 17 (a): % Distribution of Important Suggestions from the Farmers for Cultivating Pulses:
NFSM Amravati District**

Suggestions	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Total
Marginal							
Improving irrigation facilities	73.33	13.33	13.33	-	-	-	100.00
Availability of high yielding varieties	8.33	66.67	8.33	16.67	-	-	100.00
Availability of pest resistant varieties	-	30.00	40.00	10.00	20.00	-	100.00
Assured procurement with MSP	-	9.09	36.36	36.36	18.18	-	100.00
Higher market price	21.43	7.14	21.43	28.57	21.43	-	100.00
Any other (Providing extension service)	-	-	-	-	-	-	-
Total	24.19	24.19	22.58	17.74	11.29	-	100.00
Small							
Improving irrigation facilities	38.89	16.67	33.33	5.56	5.56	-	100.00
Availability of high yielding varieties	29.41	35.29	11.76	23.53	0.00	-	100.00
Availability of pest resistant varieties	5.88	11.76	23.53	41.18	17.65	-	100.00
Assured procurement with MSP	5.88	17.65	11.76	17.65	47.06	-	100.00
Higher market price	27.78	27.78	22.22	5.56	16.67	-	100.00
Any other (Providing extension service)	-	-	-	-	-	-	-
Total	21.84	21.84	20.69	18.39	17.24	-	100.00
Medium							
Improving irrigation facilities	40.00	0.00	60.00	-	-	-	100.00
Availability of high yielding varieties	22.22	77.78	-	-	-	-	100.00
Availability of pest resistant varieties	10.00	30.00	20.00	30.00	10.00	-	100.00
Assured procurement with MSP	-	-	-	66.67	33.33	-	100.00
Higher market price	20.00	-	20.00	-	50.00	10.00	100.00
Any other (Providing extension service)	50.00	-	-	-	-	50.00	100.00
Total	20.00	20.00	20.00	18.00	18.00	4.00	100.00
Large							
Improving irrigation facilities	50.00	16.67	0.00	16.67	16.67	-	100.00
Availability of high yielding varieties	16.67	50.00	33.33	-	-	-	100.00
Availability of pest resistant varieties	-	16.67	33.33	16.67	33.33	-	100.00
Assured procurement with MSP	-	-	33.33	33.33	33.33	-	100.00
Higher market price	33.33	16.67	-	33.33	16.67	-	100.00
Any other (Providing extension service)	-	-	-	-	-	-	-
Total	20.00	20.00	20.00	20.00	20.00	-	100.00
All							
Improving irrigation facilities	51.02	12.24	28.57	4.08	4.08	-	100.00
Availability of high yielding varieties	20.45	54.55	11.36	13.64	0.00	-	100.00
Availability of pest resistant varieties	4.65	20.93	27.91	27.91	18.60	-	100.00
Assured procurement with MSP	2.33	9.30	18.60	34.88	34.88	-	100.00
Higher market price	25.00	14.58	18.75	14.58	25.00	2.08	100.00
Any other (Providing extension service)	50.00	-	-	-	-	50.00	100.00
Total	21.83	21.83	20.96	18.34	16.16	0.87	100.00

Appendix 18: Important Suggestions from the Farmers for Cultivating Pulses: Non-NFSM Beed District

Suggestions	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Total
Marginal							
Improving irrigation facilities	5	3	4	2	-	-	14
Availability of high yielding varieties	2	4	4	4	-	-	14
Availability of pest resistant varieties	-	4	3	5	2	-	14
Assured procurement with MSP	-	3	2	2	7	-	14
Higher market price	7	-	1	1	5	-	14
Any other (Providing extension service)	-	-	-	-	-	-	-
Total	14	14	14	14	14	-	70
Small							
Improving irrigation facilities	10	3	3	1	-	-	17
Availability of high yielding varieties	3	3	5	5	1	-	17
Availability of pest resistant varieties	1	8	5	-	3	-	17
Assured procurement with MSP	-	3	1	7	6	-	17
Higher market price	3	-	3	4	7	-	17
Any other (Providing extension service)	-	-	-	-	-	-	-
Total	17	17	17	17	17	-	85
Medium							
Improving irrigation facilities	4	6	1	-	2	-	13
Availability of high yielding varieties	3	5	1	3	1	-	13
Availability of pest resistant varieties	1	1	7	3	1	-	13
Assured procurement with MSP	-	-	3	6	4	-	13
Higher market price	5	1	1	1	5	-	13
Any other (Providing extension service)	-	-	-	-	-	-	-
Total	13	13	13	13	13	-	65
Large							
Improving irrigation facilities	1	2	1	2	-	-	6
Availability of high yielding varieties		1	2	1	2	-	6
Availability of pest resistant varieties	1	2	1	2	-	-	6
Assured procurement with MSP	-	1	1	1	3	-	6
Higher market price	4	-	1	-	1	-	6
Any other (Providing extension service)	-	-	-	-	-	-	-
Total	6	6	6	6	6	-	30
All							
Improving irrigation facilities	20	14	9	5	2	-	50
Availability of high yielding varieties	8	13	12	13	4	-	50
Availability of pest resistant varieties	3	15	16	10	6	-	50
Assured procurement with MSP	-	7	7	16	20	-	50
Higher market price	19	1	6	6	18	-	50
Any other (Providing extension service)	-	-	-	-	-	-	-
Total	50	50	50	50	50	-	250

**Appendix 18 (a): % Distribution of Important Suggestions from the Farmers for Cultivating Pulses:
Non-NFSM Beed District**

Suggestions	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Total
Marginal							
Improving irrigation facilities	35.71	21.43	28.57	14.29	-	-	100.00
Availability of high yielding varieties	14.29	28.57	28.57	28.57	-	-	100.00
Availability of pest resistant varieties	-	28.57	21.43	35.71	14.29	-	100.00
Assured procurement with MSP	-	21.43	14.29	14.29	50.00	-	100.00
Higher market price	50.00	-	7.14	7.14	35.71	-	100.00
Any other (Providing extension service)	-	-	-	-	-	-	-
Total	20.00	20.00	20.00	20.00	20.00	-	100.00
Small							
Improving irrigation facilities	58.82	17.65	17.65	5.88	-	-	100.00
Availability of high yielding varieties	17.65	17.65	29.41	29.41	5.88	-	100.00
Availability of pest resistant varieties	5.88	47.06	29.41	-	17.65	-	100.00
Assured procurement with MSP	-	17.65	5.88	41.18	35.29	-	100.00
Higher market price	17.65	-	17.65	23.53	41.18	-	100.00
Any other (Providing extension service)	-	-	-	-	-	-	-
Total	20.00	20.00	20.00	20.00	20.00	-	100.00
Medium							
Improving irrigation facilities	30.77	46.15	7.69	-	15.38	-	100.00
Availability of high yielding varieties	23.08	38.46	7.69	23.08	7.69	-	100.00
Availability of pest resistant varieties	7.69	7.69	53.85	23.08	7.69	-	100.00
Assured procurement with MSP	-	-	23.08	46.15	30.77	-	100.00
Higher market price	38.46	7.69	7.69	7.69	38.46	-	100.00
Any other (Providing extension service)	-	-	-	-	-	-	-
Total	20.00	20.00	20.00	20.00	20.00	-	100.00
Large							
Improving irrigation facilities	16.67	33.33	16.67	33.33	-	-	100.00
Availability of high yielding varieties	-	16.67	33.33	16.67	33.33	-	100.00
Availability of pest resistant varieties	16.67	33.33	16.67	33.33	-	-	100.00
Assured procurement with MSP	-	16.67	16.67	16.67	50.00	-	100.00
Higher market price	66.67	-	16.67	-	16.67	-	100.00
Any other (Providing extension service)	-	-	-	-	-	-	-
Total	20.00	20.00	20.00	20.00	20.00	-	100.00
All							
Improving irrigation facilities	40.00	28.00	18.00	10.00	4.00	-	100.00
Availability of high yielding varieties	16.00	26.00	24.00	26.00	8.00	-	100.00
Availability of pest resistant varieties	6.00	30.00	32.00	20.00	12.00	-	100.00
Assured procurement with MSP	-	14.00	14.00	32.00	40.00	-	100.00
Higher market price	38.00	2.00	12.00	12.00	36.00	-	100.00
Any other (Providing extension service)	-	-	-	-	-	-	-
Total	20.00	20.00	20.00	20.00	20.00	-	100.00

**ANNEXURE I: COMMENTS ON DRAFT REPORT BY DESIGNATED AERC
UNIT, INSTITUTE OF ECONOMIC GROWTH, NEW DELHI**

**TITLE OF THE STUDY REPORT: POSSIBILITIES AND CONSTRAINTS IN INCREASING
PULSES PRODUCTION IN MAHARASHTRA AND THE
IMPACT OF NATIONAL FOOD SECURITY MISSION
ON PULSES**

AUTHOR: DEEPAK SHAH

**ORGANISATION: AGRO-ECONOMIC RESEARCH CENTRE, GOKHALE INSTITUTE OF
POLITICS AND ECONOMICS, PUNE**

DATE OF DISPATCH OF THE STUDY REPORT FOR COMMENTS: 07-03-2011

DATE OF RECEIPT OF COMMENTS BY THE DESIGNATED CENTRE: 05-07-2011

1. COMMENTS ON THE METHODOLOGY:

No Comments

**2. COMMENTS ON THE ADEQUACY AND QUALITY OF THE COVERAGE IN THE
STUDY:**

1. The study is well-done and I compliment the author Dr Deepak Shah for a very meticulous job.
2. Almost all the tables mentioned in the original tabulation scheme sent by the coordinating centre have been presented.
3. Executive Summary and a soft copy of all the tables in EXCEL format need to be provided

3. COMMENTS ON PRESENTATION AND GET UP ETC. OF THE REPORT:

The study is well-done and I compliment the author Dr Deepak Shah for a very meticulous job.

4. OVERALL VIEW ON ACCEPTABILITY OF REPORT:

The report is accepted in the present form.

**ANNEXURE II: ACTION TAKEN BY THE AUTHOR ON THE COMMENTS OF
THE DESIGNATED CENTRE FOR THE STUDY ENTITLED**

**“POSSIBILITIES AND CONSTRAINTS IN INCREASING PULSES PRODUCTION
IN MAHARASHTRA AND THE IMPACT OF NATIONAL
FOOD SECURITY MISSION ON PULSES “**

The author is thankful to the reviewer for the keen interest taken and the suggestions made by him on the report.

1. COMMENTS ON METHODOLOGY: No Revision Required

**2. COMMENTS ON THE ADEQUACY AND QUALITY OF THE COVERAGE OF
OBJECTIVES IN THE STUDY:**

No Revision Required

3. COMMENTS ON PRESENTATION OF GET UP ETC.:

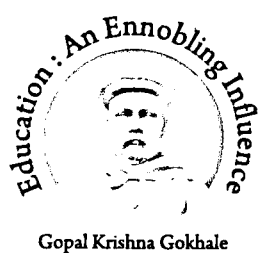
No Revision Required

4. OVERALL VIEW ON THE ACCEPTABILITY OF THE REPORT:

The report is accepted in the present form.

July 6, 2011

Deepak Shah



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