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EMERGING PROBLEMS OF AGRICULTURAL MARKETING WITH SPECIAL FOCUS ON PROCESSING AND INPUT SUPPLY

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C O N T E N T S

		PAGE
CHAPTER I	INTRODUCTION	1 - 3
1.1	Introductory	1
1.2	Objectives of the Study	2
1.3	Methodology	2
1.4	Reference Year	3
CHAPTER II	TRENDS OF AREA, PRODUCTION AND YIELDS OF GRAM AND SOYBEAN	4 - 17
2.1	Pulses in India	4
2.2	Pulses in Madhya Pradesh	4
2.3	Pulses in Narsinghpur District	5
2.4	Gram	7
2.5	Gram in India	9
2.6	Gram in Madhya Pradesh	9
2.7	Gram in Narsinghpur District	10
2.8	Oilseeds in India	12
2.9	Oilseeds in Madhya Pradesh	13
2.10	Oilseeds in Indore District	13
2.11	Soybean in India	15
2.12	Soybean in Madhya Pradesh	15
2.13	Soybean in Indore District	16
CHAPTER III	STRUCTURE OF SELECTED MARKETS AND PRICE MOVEMENTS	18 - 31
3.1	Regulated Markets	18
3.2	Mandis in Selected Districts	19
3.3	Unregulated Markets	19
3.4	Efficiency of Regulated and Unregulated Markets	20
3.4.1	Regulated Markets	20
3.4.2	Unregulated Markets	21

3.5	Arrivals of Selected Commodities	21
3.5.1	Gram	21
3.5.2	Soybean	22
3.6	Price Movements of Gram	24
3.7	Price Movements of Soybean	29
CHAPTER IV	PROJECTIONS OF PRODUCTION, MARKETED SURPLUS AND DEMAND	32 - 47
4.1	Projections of Production	32
4.1.1	Pulses	32
4.1.2	Gram	32
4.1.3	Oilseeds	34
4.1.4	Soybean	37
4.2	Projections of Marketed Surplus in Selected Mandis	37
4.2.1	Gram in Narsinghpur Mandi	39
4.2.2	Soybean in Indore Mandi	40
4.3	Marketed Surplus of Gram and Soybean	41
4.3.1	Marketed Surplus of Gram	41
4.3.2	Marketed Surplus of Soybean	41
4.4	Demand and Supply of Pulses and Oil	41
4.4.1	Estimates of Population	44
4.4.2	Demand and Supply of Pulses	45
4.4.3	Demand of Oil	45
4.4.4	Availability of Soybean Oil	45
CHAPTER V	MARKETING OF GRAM AND SOYBEAN	48 - 51
5.1	Characteristics of Sample Farms	48
5.1.1	Households Population and Castes	48

L I S T O F T A B L E S

TABLE NO.	PARTICULARS	PAGE
	CHAPTER II	
2.1	Area, production and yield of total pulses and the indices in India	5
2.2	Area, production and yield of total pulses and the indices in Madhya Pradesh	6
2.3	Area, production and yield of total pulses and indices in Narsinghpur district	7
2.4	Compound growth rates of total pulses in India, Madhya Pradesh and Narsinghpur district, 1971-72 to 1990-91	8
2.5	Proportion of gram in area and production of pulses	8
2.6	Area, production and yield of gram and the indices in India	9
2.7	Area, production and yield of gram and the indices in Madhya Pradesh	10
2.8	Area, production and yield of gram and the indices in Narsinghpur district	11
2.9	Compound growth rates of gram in India, Madhya Pradesh and Narsinghpur district, 1971-72 to 1990-91	12
2.10	Area, production and yield of total oilseeds and the indices in India	12
2.11	Area, production and yield of total oilseeds and the indices in Madhya Pradesh	13
2.12	Area, production and yield of total oilseeds and the indices in Indore district	14
2.13	Compound growth rates of total oilseeds in India, Madhya Pradesh and Indore district, 1978-79 to 1990-91	14
2.14	Area, production and yield of soybean and the indices in India	15
2.15	Area, production and yield of soybean and indices in Madhya Pradesh	16

2.16	Area, production and yield of soybean and the indices in Indore district	17
2.17	Compound growth rates of soybean in India, Madhya Pradesh and Indore district, 1978-79 to 1990-91	17

CHAPTER III

3.1	Divisionwise categories of mandis according to classes, Madhya Pradesh	18
3.2	Categories of mandis and number of sub mandis and weekly markets, selected districts, Madhya Pradesh	20
3.3	Monthwise arrivals of gulabi and local gram during 1981-82 to 1990-91, Narsinghpur mandi, M.P.	22
3.4	Monthwise arrivals of soybean during during 1981-82 to 1990-91, Indore mandi, M.P.	23
3.5	Minimum and maximum prices of local gram and months thereof, for the period 1981-82 to 1990-91, Narsinghpur mandi, M.P.	24
3.6	Minimum and maximum prices of gulabi gram and months thereof for the period 1981-82 to 1990-91, Narsinghpur mandi, M.P.	25
3.7	Minimum and maximum prices of gulabi gram for the period 1981-82 to 1990-91, Narsinghpur mandi, M.P.	25
3.8	Minimum and maximum prices of local gram for the period 1981-82 to 1990-91, Narsinghpur mandi, M.P.	26
3.9	Index numbers of average annual minimum and maximum prices for the period 1981-82 to 1990-91 of local gram, Narsinghpur mandi, M.P.	27
3.10	Index numbers of average annual minimum and maximum prices for the period 1981-82 to 1990-91 of gulabi gram, Narsinghpur mandi, M.P.	27
3.11	Seasonwise average prices of local gram for the period 1981-82 to 19990-91, Narsinghpur mandi, M.P.	28
3.12	Seasonwise average prices of gulabi gram for the period 1981-82 to 1990-91, Narsinghpur mandi, M.P.	28

3.13	Minimum and maximum prices of soybean and months thereof, for the period 1981-82 to 1990-91, Indore mandi, M.P.	29
3.14	Minimum and maximum prices of soybean for the period 1981-82 to 1990-91, Indore mandi, M.P.	30
3.15	Index numbers of average annual minimum and maximum prices for the period 1981-82 to 1990-91 of soybean, Indore mandi, M.P.	30
3.16	Seasonwise average prices of soybean for the period 1981-82 to 1990-91, Indore mandi, M.P.	31
	CHAPTER IV	
4.1	Production and estimated production of total pulses in India, Madhya Pradesh and Narsinghpur district	33
4.2	Production and estimated production of gram in India, Madhya Pradesh and Narsinghpur district	35
4.3	Production and estimated production of oilseeds in India, Madhya Pradesh and Indore district	36
4.4	Production and estimated production of soybean in India, Madhya Pradesh and Indore district	38
4.5	Marketed surplus and projections of marketed surplus of gram in Narsinghpur mandi, M.P.	39
4.6	Marketed surplus and projections of marketed surplus of soybean in Indore mandi, M.P.	40
4.7	Estimates of marketed surplus of gram in India, Madhya Pradesh and Narsinghpur district	42
4.8	Estimates of marketed surplus of soybean in India, Madhya Pradesh and Indore district.	43
4.9	Estimated population of India, Madhya Pradesh and selected districts for the period 1991 to 2001	44
4.10	Production, demand, surplus(+) and deficit(-) of pulses for India, Madhya Pradesh and Narsinghpur district.	46

4.11 Estimated demand of oil and availability of soybean oil in India, Madhya Pradesh and Indore district 47

CHAPTER V

5.1 Sample households and population by castes and tribes, selected districts, M.P. 48

5.2 Population of sample households by age and sex, selected districts, M.P. 49

5.3 Literacy among selected households, selected districts, M.P. 49

5.4 Selected households by size of holdings, selected districts, M.P. 50

5.5 Land use pattern of sample farms, selected districts, M.P. 51

5.6 Details of area sown, sample farms, selected districts, M.P. 51

5.7 Area under different crops on selected farms, selected districts, M.P. 52

5.8 Cropwise irrigated area, farms of selected districts, M.P. 53

5.9 Districtwise production and disposal of main crops, farms of selected district, M.P. 54

5.10 Total production and disposal of main crops, farms of selected districts, M.P. 55

5.11 Sale of gram by agencies and by size groups in Narsinghpur district, M.P. 56

5.12 Monthwise/seasonwise details of sale of gram by selected farmers, Narsinghpur district, M.P. 58

5.13 Monthwise/seasonwise prices of gram, selected farmers, Narsinghpur district, M.P. 59

5.14 Sale of soybean by agencies and by size groups in Indore district, M.P. 60

5.15 Monthwise/seasonwise details of sale of soybean, selected farmers, Indore district, M.P. 60

5.16 Monthwise/seasonwise prices of soybean, selected farmers, Indore district, M.P. 61

CHAPTER —I

INTRODUCTION

1.1 Introductory

Marketing is a process by which the product passes through the different channels from producer to the consumer. It includes activities like preliminary processing at the producer's level, transportation, market channels, wholesalers and retailers.

Processing is a part of marketing system and involves operations like grading, shelling, cleaning, extraction of oil, adding of preservatives, packaging, etc.

With the advent of green revolution and increasing area under irrigation diversification in farming has been noted. Not only the yields of traditional crops like paddy, wheat, jowar, maize and bajra have increased but also have posed problems of transportation, storage, processing and marketing. New crops like soybean, mustard and in some pockets, cotton have replaced less important crops and traditional varieties of jowar, bajra, and maize. Sugarcane is another example of a new crop. These new or emerging crops have thrown challenges of marketing and processing, hitherto unknown to the farmers. The new crops have different input requirements. Both qualities and quantities of inputs have changed and, therefore, supplies of inputs have posed problems in many areas.

Among the new emerging crops in M.P. soybean, mustard, sunflower, gram, cotton and sugarcane can be cited. Of these soybean and gram were prominent and, therefore, selected for this study. While soybean has created problems of marketing at some places its processing facilities are not commensurate with the increased production. In the case of gram the primary product sold by the farmer is unshelled gram seed. It goes to the dal mill where it is shelled, dried and stored for deferred sale when the prices increase with the shrinking supply at the fag end of the season.

In the case of soybean the product sold by farmer is in the form of seed. The seed is subjected to oil extraction in the mill.

While the oil is used for the manufacture of vegetable oil and cosmetics, the oil cakes are exported. The conversion of pulse gram into dal was known but the extraction of oil from soybean and export of oil cakes are comparatively new to the farmer. There are studies indicating the price spread and profit margins in the marketing of gram. However, there are not many studies which indicate profit margins of different agencies and farmers' share in the final product of soybean. It is true that there are no problems as regards marketing of both soybean and gram. The farmer is comparatively unaware of the share of his marketable surplus in the final product of either oil or dal. Some efforts have been made in this study on these lines.

1.2 Objectives of the Study

The specific objectives of the study were :

1. To study the existing market structure and its efficiency covering both private and regulated markets;
2. To identify the emerging problems of marketing both for old and new crops with added focus on processing and input supply;
3. To make projections of production, marketed surplus, demand, availability of market centres for all crops in general and for the selected crops in particular;
4. To study the present arrangements available with regard to processing of selected commodities and their problems; and,
5. To examine the present processing facilities and their adequacy to meet the future needs.

1.3 Methodology

Indore district was selected for soybean and Narsinghpur district for gram. These districts were located in two different agro-climatic zones. Two crops viz. soybean and gram were selected for the two districts respectively.

Secondary data regarding arrivals and prices of important commodities were collected from the mandis and depending upon the quantum of arrivals of gram and soybean one mandi was selected from each district. Thus Narsinghpur and Indore mandis were selected for gram and soybean respectively.

From the jurisdiction of each mandi 5 villages were selected and from each village 10 farmers were selected. Random sampling method was adopted for the selection of villages and farmers. Thus total sample included two districts, two mandis, 10 villages and 100 farmers.

Primary data from farmers was collected with the help of schedules and questionnaires. Secondary data included state and district level data, mandi arrivals, and mandi prices.

1.4 Reference Year

The reference year for the study was 1990-91.

CHAPTER-II

TRENDS OF AREA, PRODUCTION AND YIELDS OF GRAM AND SOYBEAN

2.1 Pulses in India

Pulses are important component of human diet and play a vital role specially among the vegetarians. In India production of pulses is not able to keep pace with the requirements. No significant progress in area, production and yields was achieved in the last two decades (1971-72 to 1990-91).

Index numbers were calculated for area, production and yield with the base year 1971-72. The area in 1971-72 was 22,151 thousand hectares. The index increased from 94 (1972-73) to 111 (1990-91). During this period the area was below base year in 3 years and it varied between 100 and 111 in 17 years.

The production of pulses followed the similar trend. In 1971-72 it was 11,094 thousand tonnes and increased to 14,265 thousand tonnes in 1990-91. The index went down to 77 in 1979-80 and was highest (129) in 1990-91. In 14 years it was above 100 and in 6 years it was below 100.

The yield of pulses was 501 kg/hectare in 1971-72 and increased to 578 kg/hectare in 1990-91. In 1988-89 the index was highest (119). Yield rates followed the trend of production.

While the area recorded an increase of 11 per cent over the base year the production recorded 29 per cent increase. The yield increased by 15 per cent (Table 2.1)

2.2 Pulses in Madhya Pradesh

Madhya Pradesh occupied an important position in the production of pulses. It contributed more than 20 per cent of area and production. However, the percentage contribution to area and production did not vary much during the reference period.

In 1971-72 the state contributed 19.68 per cent of the area. It increased to 20.15 per cent in 1990-91. In production the state contributed 21.20 per cent in 1971-72. The share increased to 21.75 per cent in 1990-91. The yield in Madhya Pradesh was 8 per cent higher than the average yield of India in 1971-72. The percentage slightly decreased to 7 in 1990-91.

Table 2.1 Area, production and yield of total pulses and the indices in India

Year	Area in '000 hect.	Production in '000 tonnes	Yield Kg./ hect.	Index		
				Area	Production	Yield
1971-72	22,151	11,094	501	100	100	100
1972-73	20,915	9,907	474	94	89	95
1973-74	23,427	10,008	427	106	90	85
1974-75	22,024	10,014	455	99	90	91
1975-76	24,454	13,039	533	110	117	106
1976-77	22,983	11,361	494	104	102	99
1977-78	23,497	11,973	510	106	108	102
1978-79	23,657	12,183	515	107	110	103
1979-80	22,259	8,572	385	100	77	77
1980-81	22,457	10,627	473	101	96	94
1981-82	23,843	11,507	483	108	104	96
1982-83	22,833	11,857	519	103	107	104
1983-84	23,543	12,893	548	106	116	109
1984-85	22,737	11,963	526	103	108	105
1985-86	24,418	13,361	547	110	120	109
1986-87	23,156	11,707	506	104	106	101
1987-88	21,273	10,962	515	96	99	103
1988-89	23,146	13,849	598	104	125	119
1989-90	23,415	12,858	548	106	116	109
1990-91	24,662	14,265	578	111	129	115
1991-92	22,542	12,014	533	102	108	106
1992-93	22,360	12,515	573	101	116	114
1993-94	22,250	13,305	598	100	120	119
1994-95	23,166	14,116	609	105	127	122

The index of area varied between 100 to 118 in different years. The index of production varied between 64 to 132 and index of yield varied between 60 to 114.

The indices of area, production and yield of Madhya Pradesh were similar to that of the country (Table 2.2).

2.3 Pulses in Narsinghpur District

Narsinghpur district is famous for the cultivation of pulses including gulabi gram, local gram, arhar, pea, batri, moong and urd. With the proliferation of tubewells and the sprinkler system of irrigation the area under pulses is increasing gradually.

Table 2.2 Area, production and yield of total pulses and the indices in Madhya Pradesh

Year	Area in '000 hect.	Production in '000 tonnes	Yield Kg./ hect.	Index		
				Area	Production	Yield
1971-72	4,360	2,353	540	100	100	100
1972-73	4,373	2,255	516	100	96	96
1973-74	4,784	2,074	434	110	88	80
1974-75	4,452	2,233	502	102	95	93
1975-76	4,804	2,540	529	110	108	98
1976-77	4,762	1,910	401	109	81	74
1977-78	4,651	2,044	439	107	87	81
1978-79	4,741	2,123	448	109	90	83
1979-80	4,669	1,517	325	107	64	60
1980-81	4,576	2,011	439	105	85	81
1981-82	4,857	2,473	509	111	105	94
1982-83	5,129	2,608	508	118	111	94
1983-84	4,972	2,702	544	114	115	101
1984-85	4,844	2,343	484	111	100	90
1985-86	5,149	2,610	507	118	111	94
1986-87	4,775	2,493	522	110	106	97
1987-88	4,734	2,532	528	109	108	98
1988-89	4,630	2,824	610	106	120	113
1989-90	4,543	2,505	551	104	106	102
1990-91	5,019	3,104	618	115	132	114

The index of area increased from 98 in 1972-73 to 114 in 1990-91. The increase was gradual but consistent. The index of production increased from 90 in 1973-74 to 151 (the highest) in 1990-91. Unlike area the fluctuations in production were many. The years 1977-78 and 1979-80 were bad years when the index dipped to 65. During the last 5 year period the production was consistently higher with the index number ranging between 125 to 151. With the area marginally increasing and the production showing abrupt variations the yield indices showed a positive relation with the production indices.

It was observed that the indices of area in Narsinghpur district were similar to that of average of India and those for

the state. However, the indices of production and yield in Narsinghpur district were significantly higher than those of India and the state (Table 2.3).

Table 2.3 Area, production and yield of total pulses and indices in Narsinghpur district

Year	Area in '000 hect.	Production in '000 tonnes	Yield Kg./ hect.	Index		
				Area	Production	Yield
1971-72	164	113	689	100	100	100
1972-73	161	107	665	98	95	97
1973-74	163	102	626	99	90	91
1974-75	171	119	696	104	105	101
1975-76	173	117	676	105	104	98
1976-77	175	107	611	107	95	89
1977-78	176	74	420	107	65	61
1978-79	176	106	602	107	94	87
1979-80	175	73	417	107	65	61
1980-81	179	107	598	109	95	87
1981-82	181	105	580	110	93	84
1982-83	180	111	617	110	98	90
1983-84	178	149	837	109	132	121
1984-85	181	126	696	110	112	101
1985-86	185	109	589	113	96	85
1986-87	185	149	805	113	132	117
1987-88	181	147	813	110	130	118
1988-89	182	147	806	111	130	117
1989-90	183	141	774	112	125	112
1990-91	187	171	915	114	151	133

This is also clear from growth rates. The growth rate of production in Narsinghpur district was 2.08 as compared to 1.28 for India and 1.40 for the state. The growth rate of yield in Narsinghpur district was 1.44 as compared to 0.70 for India and 0.66 for the state (Table 2.4).

2.4 Gram

Gram, well known for its wide range of uses occupied most important place in the area and production of pulses. During

Table 2.4 Compound growth rates of total pulses in India, Madhya Pradesh and Narsinghpur district, 1971-72 to 1990-91

Country/State/ District	Total pulses		
	Area	Production	Yield
India	0.52	1.28	0.70
Madhya Pradesh	0.70	1.40	0.66
Narsinghpur district	0.66	2.08	1.44

45.80 per cent of 1971-72, gram covered 35.72 per cent area and/production of total pulses. This proportion decreased to 30.50 in area and 37.55 per cent in production. In Madhya Pradesh situation was just opposite. During 1971-72 gram covered 38.67 per cent of the area under pulses. It increased to 49.05 per cent in 1990-91. Similarly of the total production of pulses, gram covered nearly 50 per cent (48.79) in 1971-72 and increased to 60.95 per cent in 1990-91. Gram occupied better position in Narsinghpur district in 1990-91 as compared to the state. It occupied 46.34 per cent area of pulses in 1971-72 and the coverage increased to 66.31 per cent in 1990-91. In the case of production it covered nearly 20 per cent in 1971-72 and the proportion increased to 71.35 in 1990-91 (Table 2.5).

Table 2.5 Proportion of gram in area and production of pulses

(Figures- Percentages)

Country/State/ District	Area		Production	
	1971-72	1990-91	1971-72	1990-91
India	35.72	30.50	45.80	37.55
Madhya Pradesh	38.67	49.05	48.79	60.95
Narsinghpur district	46.34	66.31	19.50	71.35

2.5 Gram in India

During 1971-72 gram was grown on 7,912 thousand hectares which decreased to 7,521 thousand hectares in 1990-91. The production, on the other hand was higher in 1990-91 than the year 1971-72. This was the reason of increase in yield during the reference period. It was 642 kg./hectare in 1971-72 and 712 kg./hectare in 1990-91 (Table 2.6).

Table 2.6 Area, production and yield of gram and the indices in India

(Base 1970-71 = 100)

Years	Area in '000 hect.	Production in '000 tonnes	Yield kg./ hect.	Index		
				Area	Production	Yield
1971-72	7,912	5,081	642	100	100	100
1972-73	6,967	4,537	651	88	89	101
1973-74	7,761	4,099	528	98	81	82
1974-75	7,041	4,015	570	89	79	89
1975-76	8,320	5,879	707	105	116	110
1976-77	7,974	5,424	680	101	107	106
1977-78	7,974	5,410	678	101	106	106
1978-79	7,708	5,739	745	97	113	116
1979-80	6,985	3,357	481	88	66	75
1980-81	6,584	4,328	657	83	85	102
1981-82	7,868	4,642	590	99	91	92
1982-83	7,399	5,290	715	93	104	111
1983-84	7,161	4,751	663	90	93	103
1984-85	6,904	4,562	661	87	90	103
1985-86	7,805	5,788	742	99	114	116
1986-87	6,984	4,532	649	88	89	101
1987-88	5,767	3,626	629	73	71	98
1988-89	6,809	5,129	753	86	101	117
1989-90	6,470	4,217	652	82	83	102
1990-91	7,521	5,356	712	95	105	111

2.6 Gram in Madhya Pradesh

Gram registered progressive trend in Madhya Pradesh. In 1971-72 gram was grown on 1,686 thousand hectares. The area increased from year to year with some exceptions and registered a

growth of 46 per cent in 1990-91. The production registered an increase of 65 per cent in 1990-91 over the year 1971-72. But this was not found true with yield. It remained below base year in most of the years (14 years) and in 5 years it ranged between 100 and 103. In 1990-91 it registered a highest growth of 113. Thus gram was not able to maintain the increasing trend of yield, although it showed progressive trend in area and production (Table 2.7).

Table 2.7 Area, production and yield of gram and the indices in Madhya Pradesh

(Base 1971-72 = 100)

Year	Area in '000 hect.	Production in '000 tonnes	Yield Kg./ hect.	Index		
				Area	Production	Yield
1971-72	1,686	1,146	682	100	100	100
1972-73	1,625	1,108	683	96	97	100
1973-74	1,851	1,056	571	110	92	84
1974-75	1,842	1,144	622	109	100	91
1975-76	1,917	1,226	640	114	107	94
1976-77	2,017	1,049	520	120	91	76
1977-78	1,780	907	510	106	79	75
1978-79	1,738	1,032	594	103	90	87
1979-80	2,174	924	425	129	80	62
1980-81	1,807	1,063	587	107	93	86
1981-82	2,029	1,362	672	120	119	99
1982-83	2,387	1,644	689	142	143	101
1983-84	2,106	1,425	677	125	124	99
1984-85	2,076	1,303	628	123	114	92
1985-86	2,282	1,557	683	135	136	100
1986-87	2,218	1,480	668	132	129	98
1987-88	2,236	1,484	664	133	129	97
1988-89	2,237	1,567	701	133	136	103
1989-90	2,157	1,427	662	128	124	97
1990-91	2,462	1,892	769	146	165	113

2.7 Gram in Narsinghpur District

In Narsinghpur district gram was very popular and in particular gulabi gram was very famous. In 1971-72 gram was grown on 76 thousand hectares and the area increased from year to year with some exceptions. In 1990-91 the area covered was 124 thousand hectares.

Similar situation existed in the case of production. It was 70 thousand tonnes in 1971-72 and 122 thousand tonnes in 1991-92. The yield was 921 kg/hect.in 1971-72 and 982 kg/hect.in 1990-91. (Table 2.8)

Table 2.8 Area, Production and yield of gram and the indices in Narsinghpur district

(Base 1971-72 = 100)

Year	Area in '000 hect.	Production in '000 tonnes	Yield Kg./ hect.	Index		
				Area	Production	Yield
1971-72	76	70	921	100	100	100
1972-73	79	60	762	104	86	83
1973-74	78	57	718	103	81	78
1974-75	83	66	798	109	94	97
1975-76	86	60	702	113	86	76
1976-77	89	63	702	117	90	76
1977-78	89	35	387	117	50	42
1978-79	92	58	630	121	83	68
1979-80	91	47	509	120	67	55
1980-81	96	63	655	126	90	71
1981-82	91	52	526	120	74	57
1982-83	102	65	632	134	93	69
1983-84	100	92	917	132	131	100
1984-85	107	80	749	141	114	81
1985-86	112	64	574	147	91	62
1986-87	116	96	830	153	137	90
1987-88	113	92	816	149	131	89
1988-89	116	87	753	153	124	82
1989-90	119	90	755	157	129	82
1990-91	124	122	982	163	174	107

The compound growth rates for area, production and yield for India were (-) 0.26, 0.24 and 0.52 per cent respectively. The compound growth rates for Madhya Pradesh were 1.91, 2.54 and 0.61 per cent respectively. In Narsinghpur district there was significant increase in area and production and the figures were 2.47 and 2.81 per cent respectively. The growth rate of yield was, however, only 0.34. Thus the compound growth rates for area and production

were higher in Narsinghpur district as compared to India and M.P. The compound growth rate of yield was higher for Madhya Pradesh as compared to India and Narsinghpur district. (Table 2.9)

Table 2.9 Compound growth rates of gram in India, Madhya Pradesh and Narsinghpur district, 1971-72 to 1990-91

Country/State/ District	Gram		
	Area	Production	Yield
India	- 0.26	0.24	0.52
Madhya Pradesh	1.91	2.54	0.61
Narsinghpur district	2.47	2.81	0.34

2.8 Oilseeds in India

Production of oilseeds did not match the requirement. Therefore the per capita intake decreased. There was increase in area, production and yield of oilseeds but the import of oil could not be avoided. In 1978-79 area under oilseeds in India was 17,708 thousand hectares and increased by 36 per cent by the end of 1990-91 when oilseeds covered 24,148 thousand hectares. Production in 1978-79 was 10,100 thousand tonnes and registered a growth of 84 per cent with production of 18,609 thousand tonnes in 1990-91. There was improvement in yield which was 563 kg./hect. in 1978-79 and increased to 771 kg./hect. in 1990-91. Indices fluctuated but there was an overall increase except in 1979-80, 1980-81 and 1982-83 (Table 2.10).

Table 2.10 Area, production and yield of total oilseeds and the indices in India

(Base 1978-79 = 100)

Year	Area in '000 hect.	Production in '000 tonnes	Yield Kg./ hect.	Index		
				Area	Production	Yield
1978-79	17,708	10,100	563	100	100	100
1979-80	16,941	8,739	516	96	87	92
1980-81	17,603	9,372	532	99	93	94
1981-82	18,907	12,079	639	107	120	113
1982-83	17,755	9,995	563	100	99	100
1983-84	18,639	12,692	679	105	126	121
1984-85	18,924	12,946	684	107	128	121
1985-86	19,020	10,833	570	107	107	101
1986-87	18,626	12,270	605	105	121	107
1987-88	20,132	12,655	629	114	125	112
1988-89	21,897	18,033	824	124	179	146
1989-90	22,799	16,924	742	129	168	132
1990-91	24,148	18,609	771	136	184	137

2.9 Oilseeds in Madhya Pradesh

The area, production and yield did not indicate steady but fluctuating growth. The area grew by 88 per cent and there has been remarkable progress in production which was 5 times the base year. The production in 1978-79 was 641 thousand tonnes and went up to 3,210 thousand tonnes. This reflected in yield which increased by 167 per cent. In 1978-79 the yield was 298 kg/hect. and increased to 795 kg/hect. in 1990-91. (Table 2.11).

Table 2.11 Area, production and yield of total oilseeds and the indices in Madhya Pradesh

(Base 1978-79 = 100)

Year	Area in '000 hect.	Production in '000 tonnes	Yield Kg./ hect.	Index		
				Area	Production	Yield
1978-79	2,150	641	298	100	100	100
1979-80	1,753	394	225	82	61	76
1980-81	1,809	608	336	84	95	113
1981-82	2,046	833	407	95	130	137
1982-83	2,198	797	363	102	124	122
1983-84	2,381	1,184	497	111	185	167
1984-85	2,768	1,378	498	129	215	167
1985-86	2,846	1,416	510	132	221	171
1986-87	2,746	1,252	456	128	295	153
1987-88	3,030	1,610	521	141	251	175
1988-89	3,305	2,348	710	154	366	238
1989-90	3,656	2,365	660	170	369	221
1990-91	4,039	3,210	795	188	501	267

2.10 Oilseeds in Indore District

Indore district is popular for growing oilseeds, particularly soybean and has made a remarkable progress. The area under oilseeds in 1978-79 was 13 thousand hectares. It went up to 152 thousand hectares. The production was 20 thousand tonnes in 1978-79 and increased to 189 thousand tonnes meaning nearly 10 fold increase. As the production could not keep pace with the increasing area the yield suffered very badly and index for yield was below 30 and did not touch base year till 1990-91. Average yield during 1978-79 was 1,538 kg/hect. and decreased to 1,241 kg./hect. It suffered very

badly in 1979-80 and 1980-81 when it was 362 and 412 kg./hect. respectively (Table 2.12).

Table 2.12 Area, production and yield of total oilseeds and the indices in Indore district

(Base 1978-79 = 100)

Year	Area in '000 hect.	Production in '000 tonnes	Yield Kg./ hect.	Index		
				Area	Production	Yield
1978-79	13	20	1,538	100	100	100
1979-80	47	17	362	362	85	24
1980-81	43	19	412	331	95	27
1981-82	52	37	712	400	185	46
1982-83	64	37	578	492	185	38
1983-84	75	52	693	577	260	45
1984-85	98	80	816	754	400	53
1985-86	106	68	642	815	340	42
1986-87	106	73	687	815	365	45
1987-88	114	48	417	877	240	27
1988-89	120	95	795	923	475	52
1989-90	130	143	1,102	1,000	715	72
1990-91	152	189	1,241	1,169	945	81

The growth rates of area, production and yield for oilseeds for India were 2.39, 4.80 and 2.45 respectively. These were higher for Madhya Pradesh i.e. 4.57, 13.20 and 7.87 respectively. For Indore district the rates for area and production were still higher i.e.20.82, 18.86. However, the growth rate of yield was (-) 1.61. (Table 2.13)

Table 2.13 Compound growth rates of total oilseeds in India, Madhya Pradesh and Indore district, 1978-79 to 1990-91

Country/State/ District	Total Oilseeds		
	Area	Production	Yield
India	2.39	4.80	2.45
Madhya Pradesh	4.97	13.20	7.85
Indore	20.82	18.86	(-) 1.61

2.11 Soybean in India

Soybean is one of the emerging oilseed crops of India. The area and production increased from year to year. In 1978-79 soybean was grown on 310 thousand hectares. The area increased to 2,364 thousand hectares in 1990-91. Similarly production in 1978-79 was 300 thousand tonnes. It went up to 2,602 thousand tonnes in 1990-91.

However, the yield recorded a very small increase. It was because the production could not increase with that of the increasing rate of area. The yield between 1978-79 and 1989-90 fluctuated between 568 and 975 kg./hect. In 1990-91 it was 1,015 kg/hectare, the highest during the reference period (Table 2.14).

Table 2.14 Area, production and yield of soybean and the indices in India

(Base 1978-79 = 100)

Year	Area in '000 hect.	Production in '000 tonnes	Yield Kg./ hect.	Index		
				Area	Production	Yield
1978-79	310	300	975	100	100	100
1979-80	500	280	568	165	93	58
1980-81	610	440	728	197	147	75
1981-82	480	350	741	155	117	76
1982-83	770	490	637	248	163	65
1983-84	840	610	735	271	283	75
1984-85	1,240	950	768	400	317	79
1985-86	1,340	1,020	764	432	340	78
1986-87	1,528	891	584	493	297	60
1987-88	1,542	898	582	497	299	60
1988-89	1,734	1,547	892	559	516	91
1989-90	2,253	1,806	801	727	602	82
1990-91	2,364	2,602	1,015	763	867	104

2.12 Soybean in Madhya Pradesh

Madhya Pradesh is a homeland of soybean and the state is named on 'soybean state'. Madhya Pradesh constituted largest share (nearly two-third) of area as well as production of the country.

In 1978-79, area under soybean was 199 thousand hectares and production of 87 thousand tonnes. These figures in 1990-91 increased to 2,149 thousand hectares and 2,184 thousand tonnes. It meant more than 10 times increase in area (1080 per cent) and more than 25 times increase in production (2,510 per cent). The yield was 437 kg/hect. in 1978-79 and increased to 1,016 kg/hect. in 1990-91(Table 2.15).

Table 2.15 Area, production and yield of soybean and the indices in Madhya Pradesh

(Base 1978-79 = 100)

Year	Area in '000 hect.	Production in '000 tonnes	Yield Kg./ hect.	Index		
				Area	Production	Yield
1978-79	199	87	437	100	100	100
1979-80	262	90	343	132	103	78
1980-81	239	97	406	120	111	93
1981-82	307	235	765	154	270	175
1982-83	458	280	611	230	322	140
1983-84	614	462	752	309	531	172
1984-85	987	770	780	496	885	178
1985-86	1,097	829	756	551	953	173
1986-87	1,210	677	560	608	778	128
1987-88	1,329	767	577	668	882	132
1988-89	1,476	1,313	890	742	1,509	204
1989-90	1,878	1,496	797	944	1,720	182
1990-91	2,149	2,184	1,016	1,080	2,510	232

2.13 Soybean in Indore District

Area under soybean in Indore district during the reference period increased nearly 5 times. Production increased at a higher rate(13 times) as against the area, the figures being 14 thousand tonnes in 1978-79 and 188 thousand tonnes in 1990-91. The yield of soybean in 1978-79 was 446 kg./hect. and 1,254 kg/hectare in 1990-91 or an increase of 2.8 times. (Table 2.16)

The compound growth rates for area, production and yield for India were 16.92, 18.07 and 0.30. For Madhya Pradesh the growth rates were higher viz. 20.09, 28.13 and 6.69 respectively. For Indore district the

Table 2.16 Area, production and yield of soybean and the indices in Indore district

(Base 1978-79 = 100)

Year	Area in '000 hect.	Production in '000 tonnes	Yield Kg./ hect.	Index		
				Area	Production	Yield
1978-79	31	14	446	100	100	100
1979-80	36	13	355	116	93	80
1980-81	32	14	446	103	100	100
1981-82	39	32	814	126	229	182
1982-83	51	33	636	165	236	143
1983-84	65	48	736	210	343	165
1984-85	88	76	868	284	543	195
1985-86	97	66	676	313	471	152
1986-87	98	70	712	316	500	160
1987-88	109	45	416	352	321	93
1988-89	114	92	808	368	657	181
1989-90	126	141	1,118	406	1,007	251
1990-91	150	188	1,254	484	1,343	281

growth rates were 12.90, 22.12 and 8.27 respectively. (Table 2.17) Thus the growth rates for area and productions were higher for the state. However the growth rate of yield was highest for Indore district.

Table 2.17 Compound growth rates of soybean in India, Madhya Pradesh and Indore district, 1978-79 to 1990-91

Country/State/ District	Soybean		
	Area	Production	Yield
India	16.92	18.07	0.30
Madhya Pradesh	20.09	28.13	6.69
Indore	12.90	22.12	8.27

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CHAPTER-III

STRUCTURE OF SELECTED MARKETS AND PRICE MOVEMENTS

3.1 Regulated Markets

There is a network of regulated agricultural markets in the state. These are statutory bodies established by the Agricultural Produce Markets Acts passed by the State Government. The regulated markets are administered at the state level by the Directorate of Agricultural Marketing. There are 290 mandis and 293 sub mandis and 2,166 weekly markets in the state. Bhopal division had highest number of 42 mandis followed closely by Gwalior division having 41 mandis. Bastar division had lowest number of 11 mandis. As regards sub mandis Indore division had maximum number (45) of sub mandis and Ujjain division had 41 sub mandis. Rewa division had lowest number of 11 sub mandis. There were 4 classes of mandis viz. A, B, C and D. There were 16 A class mandis in the state. B class mandis numbered 33 and C class mandis, 79. The number of D class mandis was maximum (162 out of 290) (Table 3.1).

Table 3.1 Divisionwise distribution of mandis according to classes, Madhya Pradesh

Division	Classes of mandis					Sub- mandis
	A	B	C	D	Total	
Indore	4	4	12	12	32	45
Raipur	4	3	11	10	28	30
Rewa	1	-	3	13	17	11
Jabalpur	1	5	9	16	31	35
Sagar	1	-	6	15	22	19
Bhopal	2	8	9	23	42	35
Gwalior	2	5	10	24	41	34
Bilaspur	-	1	5	23	29	21
Bastar	-	1	2	8	11	22
Ujjain	1	6	12	18	37	41
All M.P.	16	33	79	162	290	293

Source: Krishi Upaj Mandi Board, Bhopal (M.P.)

These are governed by the Madhya Pradesh Krishi Upaj Mandi Act, 1972 implemented in 1973. The main objectives of the Act were :

1. To benefit the seller by competitive prices
2. To control the correct weighment, and,
3. To control the cash payment to the seller

The transactions were done by mandi workers and, therefore, the expenditure was less. It was compulsory that the seller got the payment on the same day. If itwas deferred he was entitled to get surcharge between 1 to 5 per cent on the delay of each day. If the delay exceeded 5 days the licence of the seller was withdrawn. The sold goods could be taken out of mandi only when payment to the seller was made. The buyer had to pay 1 per cent commission to mandi.

Each mandi had a committee constituted of elected members. If not, an officer-in-charge looked after the work of mandi. Besides sale and purchase of agricultural commodities 187 mandis were authorised to sell fertilisers since rabi, 1993.

3.2 Mandis in Selected Districts

Narsinghpur district had 4 mandis of which 2 were B class and the rest 2, C class mandis. All the four mandis sold the fertilizers. There were 3 sub mandis and 37 weekly markets in the district.

Indore district had four mandis. Of these one each was of A class and C class and the remaining two mandis were categorised as D class. All the four mandis sold fertilizers. There were four submandis and 16 weekly markets in the district (Table 3.2).

3.3 Unregulated Markets

While regulated markets included mandis and sub mandis, unregulated markets included weekly markets and smaller retail outlets where sale and purchase transactions occurred without having any control whatsoever of the government authorities. Occassional checks of taxing authorities, quality control authorities concerned with correct weighment and measurement did take place. But the

Table 3.2 Categories of mandis and number of sub mandis and weekly markets, selected districts, Madhya Pradesh

Selected Districts	Class of mandis A	B	C	D	Total	Sub mandis	Weekly markets
Narsinghpur	-	2	2	-	4	3	37
Indore	1	-	1	2	4	4	16
Total	1	2	3	2	8	7	53

Source: Krishi Upaj Mandi Board, Bhopal (M.P.)

basic objective of keeping the control on the sale and purchases, price fixation and giving the due advantage of sale proceeds to both seller and buyer, thereby to the ultimate consumer, was not kept in view.

3.4 Efficiency of Regulated and Unregulated Markets

3.4.1 Regulated Markets

A regulated market was administered by a market committee representing both producers and traders. Only licenced traders, commission agents were allowed to operate in the premise of market. The laws fixed their commission and other charges. The sale was carried out by open auction method by announcing the details of commodity such as quality, grade, etc. and by letting the price be determined by mutual agreement by producer on one hand and the buyer on the other. The other objective was to achieve stability in prices. Of course, there would be fluctuations in agricultural prices from one season to another and from one year to another. To restrict the fluctuations in the prices it was suggested that every regulated market should have a warehouse of its own or that of the warehousing corporation or that of marketing cooperative. Adequate warehousing should also be available in the market yard or close to it. Another important point was regarding the market intelligence. Every market committee should exhibit the minimum price announced by the govern ment, the price prevailing in the previous week and the price prevailed a day before. All these measures were meant to increase the efficiency of regulated markets by reducing the cost of marketing, allowing the producer the maximum possible price and access to warehousing facilities.

3.4.2 Unregulated Markets

As the nomenclature suggested there was no control over the transactions in the unregulated markets. Prices were fixed arbitrarily and malpractices prevailed to the disadvantage of the producer. Since there were no registered or licenced commission agents, small traders and retailers also operated. There were no strict rules regarding weights and measures.

3.5 Arrivals of Selected Commodities

As mentioned earlier Narsinghpur Krishi Upaj Mandi, Narsinghpur, was selected to study the arrivals and price movements of gulabi and local gram and Indore Krishi Upaj Mandi, Indore, was selected for soybean. Monthwise data on arrivals and prices was collected for last 10 years from 1981-82 to 1990-91 from mandi records. Both the mandis maintained yearwise/monthwise records, from October to September. Thus present analysis was done from October to September to indicate the trends of arrivals and prices.

3.5.1 Gram

Narsinghpur district was well known for the cultivation of gulabi gram which fetched higher price than local varieties. It was noted that from 1981-82 to 1990-91 both gulabi and local varieties of gram arrived in mandi every month.

Analysis of arrivals indicated seasonal variation. During last 10 years the total gulabi gram brought to mandi was 76,304 quintals of which 38.16 per cent arrived in harvest season (March, April and May), 21.58 per cent in post harvest season (June, July and August), 32.41 per cent during sowing season (September, October and November) and 7.85 per cent in the pre-harvest season (December, January and February). In the case of local gram the situation was some what different as 51.80 per cent arrivals took place during harvesting season and nearly 20 per cent each in post harvest and sowing seasons and nearly 9 per cent in the pre harvest season. Gram could not be stored for a long time without taking measures against stored grain pests. Therefore, the farmers sold the marketable surplus during the harvesting season and a minimum quantity was retained till the pre harvestseason which generally gave the higher prices. (Table 3.3) (See appendix tables A 3.1, A 3.2, A 3.3 and A 3.4).

Table 3.3 Monthwise arrivals of gulabi and local gram during 1981-82 to 1990-91, Narsinghpur mandi, M.P.

Months/Seasons	Arrivals			
	Gulabi gram		local gram	
	Quintals	Percentage to total	Quintals	Percentage to total
March	6,207	8.13	57,838	15.74
April	12,385	16.23	70,141	19.09
May	10,527	13.80	62,339	16.97
Harvest season	29,119	38.16	1,90,318	51.80
June	7,691	10.08	33,078	9.00
July	5,449	7.14	23,691	6.45
August	3,328	4.36	15,774	4.29
Post Harvest season	16,468	21.58	72,543	19.74
September	7,964	10.45	25,164	6.85
October	11,026	14.44	25,730	7.00
November	5,736	7.52	20,885	5.69
Sowing season	24,726	32.41	71,779	19.54
December	2,527	3.31	8,567	2.33
January	2,266	2.67	5,698	1.55
February	1,198	1.57	18,503	5.04
Pre Harvest season	5,991	7.85	32,768	8.92
Total	76,304	100.00	3,67,408	100.00

3.5.2 Soybean

During last 10 years 24,16,530 quintals of soybean arrived in mandi. The seasonwise analysis indicated that 74.20 per cent arrivals took place during the harvesting season (October, November, December and January). During post harvest season (February, March, April & May) the arrivals reduced to 15.22 per cent and during the sowing period (June & July) arrivals were 7.34 per cent. In the

pre harvest months (August and September) these decreased to 3.24 per cent. During these four months arrivals were lower than the post harvest season. Thus the farmers sold most of the produce during the harvest season. (Table 3.4, See appendix tables A 3.5 & A 3.6)

Table 3.4 Monthwise arrivals of soybean during 1981-82 to 1990-91, Indore mandi, M.P.

Months/Seasons	Arrivals	
	Quintals	Percentage
October	2,61,316	10.81
November	6,89,866	28.55
December	5,32,165	22.02
January	3,09,766	12.82
Harvest Season	17,93,113	74.20
February	1,27,651	5.28
March	98,312	4.07
April	68,667	2.84
May	73,194	3.03
Post harvest season	3,67,824	15.22
June	88,104	3.65
July	89,226	3.69
August	46,878	1.94
September	31,380	1.30
Sowing and Pre harvest season	2,55,593	10.58
Total	24,16,530	100.00

Monthwise arrivals indicated that soybean was brought for sale round the year. In the year 1981-82, 2,70,358 quintals of soybean was brought to the mandi. This figure in 1990-91 was 4,40,750 quintals or 63 per cent more. However, the increase during the intervening years was not uniform.

3.6 Price Movements of Gram

Krishi Upaj Mandis maintained monthwise maximum and minimum prices of each commodity. The price data for last 10 years were analysed and results were summarised separately for gram and soybean.

The minimum price of local gram in 1981-82 was Rs.175 per quintal which increased to Rs.576 per quintal in 1990-91. Similarly the maximum price went up from Rs.320 to Rs.724.

The lowest minimum price was in the months of October and February while highest maximum price was in the months of September and November. (Table 3.5)

Table 3.5 Minimum and maximum prices of local gram and months thereof, for the period 1981-82 to 1990-91, Narsinghpur mandi, M.P.

Year	Price per quintal		Months of	
	Minimum	Maximum	Minimum price	Maximum price
1981-82	175	320	December	August
1982-83	204	258	January	November
1983-84	230	450	October	September
1984-85	230	480	October	September
1985-86	370	515	February	September
1986-87	300	550	September	November
1987-88	378	740	October	September
1988-89	550	860	April	October
1989-90	569	747	February	July
1990-91	576	724	March	October

Almost similar situation was in the case of gulabi gram. The lowest minimum price of gulabi gram was in March and April and maximum price in September and January. (Table 3.6)

The prices depended on the arrivals in the market. The arrivals in turn depended on the 4 seasons of harvest, post harvest, sowing and pre harvest seasons. During harvest season the arrivals were high and the prices were low. On the other hand during sowing and pre harvest seasons the arrivals were weak and the prices soared.

Table 3.6 Minimum and maximum prices of gulabi gram and months thereof for the period 1981-82 to 1990-91 Narsinghpur mandi, M.P.

Year	Price per quintal		Months of	
	Minimum	Maximum	Minimum price	Maximum price
1981-82	300	450	October	March
1982-83	255	370	April	September
1983-84	311	590	April	January
1984-85	310	590	April	January
1985-86	367	560	February	September
1986-87	446	620	March	February
1987-88	421	850	October	September
1988-89	630	990	March	October
1989-90	596	861	February	August
1990-91	871	1161	March	January

The example of price variation of gulabi gram in different seasons in the year 1990-91 can be quoted. During the harvest season the minimum and maximum prices were Rs.883 and Rs.931. In post harvest season these increased to Rs.1,086 and Rs.1,102 respectively. In sowing season the prices rose to Rs.1,048 and Rs.1,132 respectively. (Table 3.7)

Table 3.7 Minimum and maximum prices of gulabi gram for 1981-82 to 1990-91, Narsinghpur mandi, M.P.

Year	Harvest		Post-harvest		Sowing		Pre-harvest	
	March, April & May		June, July & August		September, October & November		December, January & February	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
1981-82	393	427	383	403	347	380	413	427
1982-83	273	311	309	326	312	360	344	357
1983-84	337	367	430	465	407	463	493	527
1984-85	337	367	437	465	421	450	493	533
1985-86	412	438	485	510	510	530	434	460
1986-87	477	500	497	517	536	563	568	593
1987-88	515	541	642	670	555	593	465	502
1988-89	710	751	760	790	907	940	851	875
1989-90	674	721	758	806	801	827	646	661
1990-91	883	931	1086	1102	1048	1132	1050	1050

In the case of local gram the price variation during different seasons in 1990-91 was such that the minimum and maximum prices during harvest season were Rs.556 and Rs.582 respectively. The prices rose to Rs.589 and Rs.623 respectively during the post harvest season. These further increased to Rs.634 and Rs.686 respectively during the sowing season (Table 3.8).

Table 3.8 Minimum and maximum prices of local gram for the period 1981-82 to 1990-91, Narsinghpur mandi, M.P.

Year	Harvest March, April & May		Post-harvest June, July & August		Sowing September, October & November		Pre-harvest December, January & February	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
1981-82	277	295	290	313	220	250	195	215
1982-83	218	232	232	244	224	246	211	231
1983-84	308	332	386	415	312	340	335	363
1984-85	286	317	388	427	308	352	332	363
1985-86	395	415	445	467	471	493	423	450
1986-87	370	387	312	331	448	468	496	513
1987-88	443	462	580	607	494	520	412	433
1988-89	585	610	656	689	763	787	684	705
1989-90	596	630	694	719	664	691	594	602
1990-91	556	582	589	623	634	686	614	621

The monthwise data for the minimum and maximum prices during the period 1981-82 to 1990-91 was available. From this data the average annual prices were derived. The average annual price for 1981-82 was taken to be base. Indices were calculated for the years 1982-83 to 1990-91 for both minimum and maximum prices.

Since the overall prices have registered increase during the reference years, the prices of gram and soybean have also increased.

The average annual minimum price of local gram increased from Rs.245 to Rs.598 per quintal. The corresponding index increased from 100 (1981-82) to 244 (1990-91). The average annual maximum price increase from Rs.268 to Rs.636 with a corresponding increase in index from 100 to 237 (Table 3.9)(Also see appendix table Nos. A 3.7 to A 3.10).

Table 3.9 Index numbers of average annual minimum and maximum prices for the period 1981-82 to 1990-91 of local gram, Narsinghpur mandi, M.P.

Year	Minimum Price		Maximum Price	
	Price	Index	Price	Index
1981-82	245	100	268	100
1982-83	221	90	238	89
1983-84	335	137	363	135
1984-85	328	134	365	136
1985-86	435	177	456	170
1986-87	407	166	425	186
1987-88	482	197	506	189
1988-89	672	274	698	260
1989-90	637	260	661	247
1990-91	598	244	636	237

In the case of gulabi gram the average annual minimum price increased from Rs.384 in 1981-82 to Rs.1,017 in 1990-91. The index showed an increase from 100 to 264 for the period. The average annual maximum price recorded an increase from Rs.409 in 1981-82 to Rs.1,054 in 1990-91. The index recorded an increase from 100 to 236 (Table 3.10).(Also see appendix table nos.A 3.11 to A 3.14).

Table 3.10 Index numbers of average annual minimum and maximum prices for the period 1981-82 to 1990-91 of gulabi gram, Narsinghpur mandi, M.P.

Year	Minimum Price		Maximum Price	
	Price	Index	Price	Index
1981-82	384	100	409	100
1982-83	309	80	338	83
1983-84	417	109	455	111
1984-85	422	110	454	111
1985-86	460	120	485	119
1986-87	520	135	543	133
1987-88	544	142	576	141
1988-89	807	210	839	205
1989-90	720	187	754	184
1990-91	1,017	264	1,054	236

An attempt is made to see if there was any relation between the variation in average prices and the 4 seasons of the crop.

In the case of local gram the average price was lowest in the harvest and pre harvest seasons in 9 out of 10 years. Again the prices were highest in post harvest and sowing seasons in 9 out of 10 years. (Table 3.11)

Table 3.11 Seasonwise average prices of local gram for the period 1981-82 to 1990-91, Narsinghpur mandi, M.P.

Year	Harvest March, April & May	Post harvest June, July, & August	Sowing September, October & November	Pre harvest December, January & February
1981-82	282	293**	237	200*
1982-83	227	237**	236	225*
1983-84	319*	399**	324	347
1984-85	298*	399**	325	347
1985-86	403*	455	481**	434
1986-87	378	322*	458	505**
1987-88	453	594**	507	422*
1988-89	596*	672	773**	690
1989-90	607	706**	674	597*
1990-91	573*	607	660**	616

* -Minimum Price ** - Maximum Price

In the case of gulabi gram the average price was lowest in harvest season in 7 out of 10 years. The average price was highest in pre harvest season in 5 out of 10 years, in sowing season in 3 out of 10 years and in post harvest season in 2 out of 10 years. Thus, the spread of highest prices was more in the case of gulabi gram. The reason of this was that gulabi gram fetched higher price with the weaning of marketing season and farmers could take the chance of deferred sale with the intention of getting higher price (Table 3.12).

Table 3.12 Seasonwise average prices of gulabi gram for the period 1981-82 to 1990-91, Narsinghpur mandi, M.P.

Year	Harvest March, April & May	Post harvest June, July & August	Sowing September, October & November	Pre harvest December, January & February
1981-82	417	393	358*	418**
1982-83	302*	317	355	357**
1983-84	352*	445	432	505**
1984-85	347*	447	431	507**
1985-86	425*	494	519**	444
1986-87	487*	507	547	578**
1987-88	525	652**	569	482*
1988-89	728*	778	925**	865
1989-90	701	778	811**	654*
1990-91	904*	1094**	1049	1050

* - Minimum Price ** - Maximum Price

3.7 Price Movements of Soybean

The data pertained to last 10 years collected from Krishi Upaj Mandi, Indore. The minimum price of soybean in 1981-82 was Rs.240 per quintal and increased to Rs.475 per quintal in 1990-91. The maximum price went up from Rs.405 per quintal to Rs.875 per quintal. The lowest minimum price was observed to be in the two months of September and October. The maximum price was reached in the two months of July and August (Table 3.13).

Table 3.13 Minimum and maximum prices of soybean and months thereof, for the period 1981-82 to 1990-91, Indore mandi, M.P.

Year	Price per quintal		Months of	
	Minimum	Maximum	Minimum price	Maximum price
1981-82	240	405	October	July
1982-83	257	445	October	September
1983-84	265	385	September	May
1984-85	255	305	October	July
1985-86	245	415	October	July
1986-87	315	625	October	August
1987-88	525	600	September	December
1988-89	470	625	October	August
1989-90	454	695	October	July
1990-91	475	875	October	August

Prices of any commodity depended on the general principle of supply and demand. The supply or arrivals of soybean in mandi were highest during the harvest season of October to January. In 1990-91, the minimum and maximum prices during harvest season were Rs.529 and 588 respectively. The prices increased to Rs.616 and Rs.706 in the post harvest season (February to May) respectively. The prices further increased to Rs.768 and Rs.809 respectively in the sowing and pre harvest season (June to September) (Table 3.14).

Thus, the fact that the prices reached the lowest during the harvest season and increased in post harvest and subsequently in the sowing and pre harvest seasons proved in both the selected crops/varieties.

The average annual minimum price of soybean was Rs.301 in 1981-82. It increased to Rs.638 in 1990-91. The index increased

Table 3.14 Minimum and maximum prices of soybean for the period 1981-82 to 1990-91, Indore mandi, M.P.

Year	Harvest October, November December & January		Post harvest February, March, April & May		Sowing & pre harvest June, July, August & September	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
1981-82	263	273	284	294	358	376
1982-83	265	280	293	329	330	360
1983-84	331	346	361	375	309	324
1984-85	261	270	275	280	285	287
1985-86	258	275	328	344	371	388
1986-87	416	429	482	506	528	571
1987-88	559	582	525	544	543	566
1988-89	481	513	552	585	571	600
1989-90	464	485	555	576	612	645
1990-91	529	588	616	706	768	809

from 100 to 212. The average annual maximum price registered an increase from Rs.314 to Rs.701 with the corresponding increase in index numbers from 100 to 223.(Table 3.15)(See appendix tables A 3.15 to A 3.18)

Table 3.15 Index numbers of average annual minimum and maximum prices for the period 1981-82 to 1990-91 of soybean, Indore mandi, M.P.

Year	Minimum Price	Minimum Price Index	Maximum Price	Maximum Price Index
1981-82	301	100	314	100
1982-83	296	98	323	103
1983-84	334	111	348	111
1984-85	272	90	279	89
1985-86	319	106	335	107
1986-87	475	158	502	160
1987-88	542	180	564	180
1988-89	535	178	566	180
1989-90	544	181	569	181
1990-91	638	212	701	223

The average price was highest in sowing and pre harvest seasons in 8 out of 10 years. The average price was lowest in harvest season in 8 out of 10 years as in the case of two varieties of gram. (Table 3.16)

Table 3.16 Seasonwise average prices of soybean for the period 1981-82 to 1990-91, Indore mandi, M.P.

Year	Harvest October, November, December &January	Post harvest February, March, April & May	Sowing & pre harvest June, July August & September
1981-82	268*	289	367**
1982-83	272*	311	345**
1983-84	339	368**	317*
1984-85	266*	278	284**
1985-86	267*	336	380**
1986-87	423*	495	550**
1987-88	571**	535*	550
1988-89	497*	569	580**
1989-90	475*	566	620**
1990-91	586*	661	780**

* - Minimum price ** - Maximum price

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CHAPTER-IV

PROJECTIONS OF PRODUCTION, MARKETED SURPLUS AND DEMAND

One of the objectives of the study was to estimate the production, marketed surplus and demand of the selected commodities.

4.1 Projections of Production

The data on production of pulses was taken for a period of 20 years from 1971-72 to 1990-91. The data on production of oilseeds was taken for a 13 year period from 1978-79 to 1990-91. On the basis of this data the projections of production were made till the year 2000-2001. The method used was straight line method with the equation $y = a + bx$.

4.1.1 Pulses

Observed quantity of production of total pulses in India for 1971-72 was 11,049 thousand tonnes. It increased to 14,265 thousand tonnes in 1990-91. The estimated production for the year 2000-2001 would be 14,612 thousand tonnes. The equation derived is

$$y = 10128.52 + 149.4647x$$

Production of pulses in Madhya Pradesh in 1971-72 was 2,353 thousand tonnes. It increased to 3,104 thousand tonnes in 1990-91 with very few fluctuations. The estimated production in the year 2000-2001 would be 3,069 thousand tonnes. The equation derived is

$$y = 1982.474 + 36.21203x$$

In Narsinghpur district the production of pulses increased from 113 thousand tonnes in 1971-72 to 171 thousand tonnes in 1990-91. It was observed that the increase was noticeable since 1986-87. Prior to 1986-87 the variation was very little. With the rate of increase obtained during the period 1971-72 to 1990-91 the estimate of production in 2000-2001 would be 174 thousand tonnes. (Table 4.1) The equation derived is $y = 89.1579 + 2.842105x$

4.1.2 Gram

The production of gram in India in 1971-72 was 5,081 thousand tonnes. In 1990-91 it increased to 5356 thousand tonnes. The fluctuations in production were not only high but the production actually decreased from the base year in as many as 10 years. This has

Table 4.1 Production and estimated production of total pulses in India, Madhya Pradesh and Narsinghpur district

(Unit - Thousand tonnes)

Year	India	Madhye Pradesh	Narsinghpur district
1971-72	11,049	2,353	113
1972-73	9,907	2,255	107
1973-74	10,008	2,074	102
1974-75	10,014	2,233	119
1975-76	13,039	2,540	117
1976-77	11,361	1,910	107
1977-78	11,973	2,044	74
1978-79	12,183	2,123	106
1979-80	8,572	1,517	73
1980-81	10,627	2,011	107
1981-82	11,507	2,473	105
1982-83	11,857	2,608	111
1983-84	12,893	2,702	149
1984-85	11,963	2,343	126
1985-86	13,361	2,610	109
1986-87	11,707	2,493	149
1987-88	10,962	2,532	147
1988-89	13,849	2,824	147
1989-90	12,858	2,505	141
1990-91	14,265	3,104	171
1991-92	13,267	2,743	149
1992-93	13,417	2,779	152
1993-94	13,566	2,815	155
1994-95	13,716	2,851	157
1995-96	13,865	2,888	160
1996-97	14,015	2,924	163
1997-98	14,164	2,960	166
1998-99	14,314	2,996	169
1999-2000	14,463	3,033	172
2000-2001	14,612	3,069	174

resulted in the lower estimates in the year 2000-2001 than the current year. The equation derived is

$$y = 4836.464 - 4.606015x$$

This meant net decrease in the estimates for 2000-2001.

In Madhya Pradesh the production in 1971-72 stood at 1,148 thousand tonnes. It increased steadily to 1,427 thousand tonnes in 1989-90. It suddenly increased to 1,892 thousand tonnes in 1990-91. The estimate for the year 2000-2001 came to 1,967 thousand tonnes. The equation derived is

$$y = 925.1159 + 34.74135x$$

The production in Narsinghpur district in the year 1971-72 was 70 thousand tonnes. It increased gradually to 90 thousand tonnes till the year 1989-90 and abruptly increased to 122 thousand tonnes in 1990-91. It is estimated that by the year 2000-2001 it would increase to 118 thousand tonnes. Although the figure is less than the current year's figure of 122 thousand tonnes, the trend is increasing (Table 4.2) (see appendix table A 4.1). The equation derived is $y = 45.53683 + 2.420302x$

4.1.3 Oilseeds

The production of oilseeds in India in 1978-79 was 10,100 thousand tonnes. It generally followed an increasing trend except in the years 1979-80, 1980-81 and 1982-83. It was 18,609 thousand tonnes in 1990-91. It is estimated that the production would be 24,231 thousand tonnes in 2000-2001. The equation derived is

$$y = 7671.231 + 720.011x$$

The production of oilseeds in Madhya Pradesh has increased from 641 thousand tonnes in 1978-79 to 3,210 thousand tonnes in 1990-91. The production picked up from 1983-84 and nearly followed the increasing trend. This was reflected in the estimate for 2000-2001 which would be 4,526 thousand tonnes. The equation derived is

$$y = 14.23071 + 196.1648x$$

Table 4.2 Production and estimated production of gram in India, Madhya Pradesh and Narsinghpur district

(Unit- Thousand tonnes)

Year	Gram		
	India	Madhya Pradesh	Narsinghpur district
1971-72	5,081	1,148	70
1972-73	4,537	1,108	60
1973-74	4,099	1,056	57
1974-75	4,015	1,144	66
1975-76	5,879	1,226	60
1976-77	5,424	1,049	63
1977-78	5,410	907	35
1978-79	5,739	1,032	58
1979-80	3,357	924	47
1980-81	4,328	1,063	63
1981-82	4,642	1,362	52
1982-83	5,290	1,644	65
1983-84	4,751	1,425	92
1984-85	4,562	1,303	80
1985-86	5,788	1,557	64
1986-87	4,532	1,480	96
1987-88	3,626	1,484	92
1988-89	5,129	1,567	87
1989-90	4,217	1,427	90
1990-91	5,356	1,892	122
1991-92	4,740	1,655	96
1992-93	4,735	1,689	99
1993-94	4,731	1,724	101
1994-95	4,726	1,759	104
1995-96	4,721	1,794	106
1996-97	4,717	1,828	108
1997-98	4,712	1,863	111
1998-99	4,707	1,898	113
1999-2000	4,703	1,933	116
2000-2001	4,698	1,967	118

In Indore district the production in 1978-79 was only 20 thousand tonnes. It increased to 189 thousand tonnes by 1990-91. Since the trend was of increasing nature the estimate for 2000-2001 came to 249 thousand tonnes. (Table 4.3) The equation derived is $y = (-) 12.03846 + 11.36813x$.

Table 4.3 Production and estimated production of oilseeds in India, Madhya Pradesh and Indore district

(Unit - Thousand tonnes)

Year	Oil seeds		
	India	Madhya Pradesh	Indore district
1978-79	10,100	641	20
1979-80	8,739	394	17
1980-81	9,372	608	19
1981-82	12,079	833	37
1982-83	9,995	797	37
1983-84	12,692	1,184	52
1984-85	12,946	1,378	80
1985-86	10,833	1,416	68
1986-87	12,270	1,252	73
1987-88	12,655	1,610	48
1988-89	18,033	2,348	95
1989-90	16,924	2,365	143
1990-91 *	18,609	3,210	189
1991-92	17,751	2,761	147
1992-93	18,471	2,957	158
1993-94	19,191	3,153	169
1994-95	19,911	3,349	181
1995-96	20,631	3,545	193
1996-97	21,351	3,741	204
1997-98	22,071	3,938	215
1998-99	22,791	4,134	227
1999-2000	23,511	4,330	238
2000-2001	24,231	4,526	249

4.1.4 Soybean

The production of soybean in India in 1978-79 stood at 300 thousand tonnes. It showed an increasing trend and was 2,602 thousand tonnes in 1990-91. This increasing trend was reflected in the estimates and it is hoped that it would reach the level of 3,463 thousand tonnes by 2000-2001. The equation derived is

$$y = (-)\ 167.6153 + 157.8352x$$

In Madhya Pradesh the production in 1978-79 was 87 thousand tonnes and increased year after year to reach the record production of 2,184 thousand tonnes in 1990-91. The increasing trend could be seen in the estimates of future production and the estimate for 2000-2001 could be forecast to 3,105 thousand tonnes. The equation derived is

$$y = (-)\ 332.3461 + 149.467x$$

Indore district has taken big strides in the production of soybean. In 1978-79 the production was 14 thousand tonnes. Since then it never looked back except in few years and recorded a mammoth production of 188 thousand tonnes in 1990-91. The trend of 13 year period when extended to the future 10 year period forecasts that the production in 2000-2001 would be 251 thousand tonnes (Table 4.4) (see appendix table A 4.2).

The equation derived is

$$y = (-)\ 17.80769 + 11.68681x$$

4.2 Projections of Marketed Surplus in Selected Mandis

The figures of marketed surplus in the selected mandis were equal to the arrivals in those mandis.

Table 4.4 Production and estimated production of soybean in India, Madhya Pradesh and Indore district

(Unit- Thousand tonnes)

Year	Soybean		
	India	Madhya Pradesh	Indore district
1978-79	300	87	14
1979-80	280	90	13
1980-81	440	97	14
1981-82	350	235	32
1982-83	490	280	33
1983-84	610	462	48
1984-85	950	770	76
1985-86	1,020	829	66
1986-87	891	677	70
1987-88	898	767	45
1988-89	1,547	1,313	92
1989-90	1,806	1,490	141
1990-91	2,602	2,184	188
1991-92	2,042	1,760	146
1992-93	2,200	1,910	157
1993-94	2,358	2,059	169
1994-95	2,516	2,209	181
1995-96	2,673	2,358	193
1996-97	2,831	2,508	204
1997-98	2,989	2,657	216
1998-99	3,147	2,806	228
1999-2000	3,305	2,956	239
2000-2001	3,463	3,105	251

4.2.1 Gram in Narsinghpur Mandi

In 1981-82 the total arrivals were 35,854 quintals. The arrivals fluctuated during the next 10 years and were 52,382 quintals in 1990-91. The estimates calculated for 2000-2001 were 64,589 quintals. (Table 4.5)

The equation derived is

$$y = 36702.27 + 1394.352x$$

Table 4.5 Marketed surplus and projections of marketed surplus of gram in Narsinghpur mandi, M.P.

(Figures- qunitals)

Year	Gram
	Narsinghpur mandi
1981-82	35,854
1982-83	47,049
1983-84	43,610
1984-85	41,336
1985-86	28,669
1986-87	46,037
1987-88	46,447
1988-89	60,144
1989-90	42,184
1990-91	52,382
1991-92	52,040
1992-93	53,434
1993-94	54,829
1994-95	56,223
1995-96	57,618
1996-97	59,012
1997-98	60,406
1998-99	61,801
1999-2000	63,195
2000-2001	64,589

4.2.2 Soybean in Indore Mandi

The figure of arrivals of soybean in Indore mandi in 1981-82 was 2,70,358 quintals. It was nearly stagnant for the next 8 years. In 1990-91 it suddenly increased to 4,40,750 quintals. The estimated arrival figures in the future 10 years could not go beyong 3,36,450 quintals in 2000-2001. (Table 4.6)

The equation derived is

$$y = 205695.9 + 6537.734x$$

Table 4.6 Marketed surplus and projections of marketed surplus of soybean in Indore mandi, M.P.

(Figures - quintals)

Year	Soybean Indore mandi
1981-82	2,70,358
1982-83	2,14,843
1983-84	2,26,095
1984-85	2,75,057
1985-86	2,67,756
1986-87	1,38,102
1987-88	1,34,573
1988-89	2,06,146
1989-90	2,42,850
1990-91	4,40,750
1991-92	2,77,611
1992-93	2,84,148
1993-94	2,90,686
1994-95	2,97,224
1995-96	3,03,762
1996-97	3,10,299
1997-98	3,16,837
1998-99	3,23,375
1999-2000	3,29,912
2000-2001	3,36,450

4.3 Marketed Surplus of Gram and Soybean

We have the figures of production of gram and soybean for the country, Madhya Pradesh and selected districts. We have collected data about production and disposal including marketed surplus for the selected farms. Applying the average proportion of marketed surplus in the total production we have estimated the marketed surplus.

4.3.1 Marketed Surplus of Gram

With the percentage of marketed surplus to total production to be 76.01, the marketed surplus in India in 1971-72 was 3,862 thousand tonnes. The estimate for the year 2000-2001 would be 3,571 thousand tonnes. In Madhya Pradesh with the production of 1,148 thousand tonnes in 1971-72 the marketed surplus came to 873 thousand tonnes. The estimate for the year 2000-2001 would be 1,495 thousand tonnes. In Narsinghpur district the marketed surplus in 1971-72 was 53 thousand tonnes. The estimate for the year 2000-2001 would be 90 thousand tonnes. (Table 4.7)

4.3.2 Marketed Surplus of Soybean

With the percentage of marketed surplus to total production to be 88.02, the marketed surplus in India in 1978-79 was 264 thousand tonnes. It might increase to 3,048 thousand tonnes by 2000-2001. For Madhya Pradesh the marketed surplus in 1978-79 was estimated to be 77 thousand tonnes. It is further estimated that the marketed surplus by 2000-2001 would increase to 2,733 thousand tonnes. In Indore district marketed surplus in 1978-79 came to 12 thousand tonnes. It is estimated that by the year 2000-2001 the marketed surplus would go upto 221 thousand tonnes. (Table 4.8)

4.4 Demand and Supply of Pulses and Oil

The estimated demand for pulses and oil is based on the projected population upto 2001. The requirements of pulses and oil were calculated at the rate of 48 grams of pulses per day per person and 40 grams of oil per day per person.

Table 4.7 Estimates of marketed surplus of gram in India, Madhya Pradesh and Narsinghpur district

(Unit-Thousand tonnes)

Years	India		Madhya Pradesh		Narsinghpur	
	Production	Marketed surplus (76.01% of production)	Production	Marketed surplus (76.01% of production)	Production	Marketed surplus (76.01% of production)
1971-72	5,081	3,862	1,148	873	70	53
1972-73	4,537	3,449	1,108	842	60	46
1973-74	4,099	3,116	1,056	803	57	43
1974-75	4,015	3,052	1,144	870	66	50
1975-76	5,879	4,469	1,226	932	60	46
1976-77	5,424	4,123	1,049	797	63	48
1977-78	5,410	4,112	907	689	35	27
1978-79	5,739	4,362	1,032	784	58	44
1979-80	3,357	2,552	924	702	47	36
1980-81	4,328	3,290	1,063	808	63	48
1981-82	4,642	3,529	1,362	1,035	52	40
1982-83	5,290	4,021	1,644	1,250	65	49
1983-84	4,751	3,611	1,425	1,083	92	70
1984-85	4,562	3,468	1,303	990	80	61
1985-86	5,788	4,399	1,557	1,183	64	49
1986-87	4,532	3,445	1,480	1,125	96	73
1987-88	3,626	2,756	1,484	1,128	92	70
1988-89	5,129	3,899	1,567	1,191	87	66
1989-90	4,217	3,205	1,427	1,085	90	68
1990-91	5,356	4,071	1,892	1,438	122	93
1991-92	4,740	3,603	1,655	1,258	96	73
1992-93	4,735	3,599	1,689	1,284	99	75
1993-94	4,731	3,596	1,724	1,310	101	77
1994-95	4,726	3,592	1,759	1,337	104	79
1995-96	4,721	3,588	1,794	1,364	106	81
1996-97	4,717	3,585	1,828	1,389	108	82
1997-98	4,712	3,582	1,863	1,416	111	84
1998-99	4,707	3,578	1,898	1,443	113	86
1999-2000	4,703	3,575	1,933	1,469	116	88
2000-2001	4,698	3,571	1,967	1,495	118	90

Table 4.8 Estimates of marketed surplus of soybean in India, Madhya Pradesh and Indore district

(Figures in Thousand tonnes)

	India		Madhya Pradesh		Indore	
	Production	Marketed surplus (88.02% of production)	Production	Marketed surplus (88.02% of production)	Production	Marketed surplus (88.02% of production)
1978-79	300	264	87	77	14	12
1979-80	280	246	90	79	13	11
1980-81	440	387	97	85	14	12
1981-82	350	308	235	207	32	28
1982-83	490	431	280	246	33	29
1983-84	610	537	462	407	48	42
1984-85	950	836	770	678	76	67
1985-86	1,020	898	829	730	66	58
1986-87	891	784	677	596	70	62
1987-88	898	790	767	675	45	40
1988-89	1,547	1,362	1,313	1,156	92	81
1989-90	1,806	1,590	1,496	1,317	141	124
1990-91	2,602	2,290	2,184	1,922	188	165
1991-92	2,042	1,797	1,760	1,549	146	129
1992-93	2,200	1,936	1,910	1,681	157	138
1993-94	2,358	2,076	2,059	1,812	169	149
1994-95	2,516	2,215	2,209	1,944	181	159
1995-96	2,673	2,353	2,358	2,076	193	170
1996-97	2,831	2,492	2,508	2,208	204	180
1997-98	2,989	2,631	2,657	2,339	216	190
1998-99	3,147	2,770	2,806	2,470	228	201
1999-2000	3,305	2,909	2,956	2,602	239	210
2000-2001	3,463	3,048	3,105	2,733	251	221

4.4.1 Estimates of Population

The population of India in 1991 was 8,38,584 thousand persons. The population in Madhya Pradesh was 66,181 thousand persons and that of Narsinghpur district was 785 thousand persons. The population of Indore district was 1,836 thousand persons. The estimate of population for the year 2001 for India was done by presuming the annual compound growth rate of 2.25. The estimated population for 2001 came to 10,47,562 thousand persons. The annual compound growth rate for Madhya Pradesh, Narsinghpur district and Indore district was taken to be 2.29. The population of Madhya Pradesh thus estimated would be 82,997 thousand persons. The population of Narsinghpur and Indore districts would be 985 and 2,302 thousand persons respectively. (Table 4.9)

Table 4.9 Estimated population of India, Madhya Pradesh and selected districts for the period 1991 to 2001

(Figures- Thousand persons)

Year	India	Madhya Pradesh	Narsinghpur	Indore
1991	8,38,584	66,181	785	1,836
1992	8,57,452	67,697	803	1,878
1993	8,76,745	69,247	821	1,921
1994	8,96,472	70,833	840	1,965
1995	9,16,643	72,455	859	2,010
1996	9,37,267	74,114	879	2,056
1997	9,58,356	75,811	899	2,103
1998	9,79,919	77,547	920	2,151
1999	10,01,967	79,323	941	2,200
2000	10,24,511	81,139	963	2,250
2001	10,47,562	82,997	985	2,302

4.4.2 Demand and Supply of Pulses

The demand of pulses for the country in 1991 was 15,095 thousand tonnes. The demand would swell to 18,856 thousand tonnes by 2001. The demand for Madhya Pradesh in 1991 was 1,191 thousand tonnes. It would go up to 1,494 thousand tonnes by 2001. Similarly in the case of Narsinghpur district the demand in 1991 was 14 thousand tonnes. It is expected that the demand would increase to 18 thousand tonnes by 2001.

Against this the production of pulses in India is estimated to be 14,612 thousand tonnes. The production of Madhya Pradesh and Narsinghpur district would be 3,069 and 174 thousand tonnes respectively.

It is thus observed that the production of pulses in India would fall short of demand by 4,244 thousand tonnes by 2001. However, the production in Madhya Pradesh and Narsinghpur district would be in excess of demand by 1575 thousand tonnes and 156 thousand tonnes respectively by the year 2001. (Table 4.10)

4.4.3 Demand of Oil

The demand of oil in the country in 1991 was 12,579 thousand tonnes. It is expected that the demand would increase to 15,713 thousand tonnes by 2001. The demand in Madhya Pradesh in 1991 was 993 thousand tonnes. By 2001 the demand would increase to 1,245 thousand tonnes. For Indore district the demand in 1991 stood at 28 thousand tonnes. It is expected to rise to 35 thousand tonnes by 2001.

4.4.4 Availability of Soybean Oil

The availability of soybean oil calculated on the basis of 20 per cent oil content was 520 thousand tonnes in the country. In 2001 it would increase to 693 thousand tonnes.

In Madhya Pradesh the availability was 437 thousand tonnes in 1991. In the year 2001 the availability would go up to 621 thousand tonnes.

In Indore district the availability of 38 thousand tonnes in 1991 would increase to 50 thousand tonnes in 2001 (Table 4.11).

Table 4.10 Production, demand, surplus (+) and deficit (-) of pulses for India, Madhya Pradesh and Narsinghpur district

Years	Production			Demand			Surplus(+)/Deficit(-)		
	India	Madhya Pradesh	Narsinghpur	India	Madhya Pradesh	Narsinghpur	India	Madhya Pradesh	Narsinghpur
1991	14,265	3,104	171	15,095	1,191	14	(-) 830	(+) 1913	(+) 157
1992	13,267	2,743	149	15,434	1,219	14	(-)2,167	(+) 1524	(+) 135
1993	13,417	2,779	152	15,781	1,246	15	(-)2364	(+) 1533	(+) 137
1994	13,566	2,815	155	16,136	1,275	15	(-)2570	(+) 1540	(+) 140
1995	13,716	2,851	157	16,500	1,304	15	(-)2784	(+) 1547	(+) 142
1996	13,865	2,888	160	16,871	1,334	16	(-)3006	(+) 1554	(+) 144
1997	14,015	2,924	163	17,250	1,365	16	(-)3235	(+) 1559	(+) 147
1998	14,164	2,960	166	17,639	1,395	17	(-)3475	(+) 1565	(+) 149
1999	14,314	2,996	169	18,035	1,428	17	(-)3721	(+) 1568	(+) 152
2000	14,463	3,033	172	18,441	1,461	17	(-)3978	(+) 1572	(+) 155
2001	14,612	3,069	174	18,856	1,494	18	(-)4244	(+) 1575	(+) 156

Table 4.11 Estimated demand of oil and availability of soybean oil in India, Madhya Pradesh and Indore district

(Figures- Thousand tonnes)

Years	Demand			Availability		
	India	Madhya Pradesh	Indore	India	Madhya Pradesh	Indore
1991	12,579	993	28	520	437	38
1992	12,862	1,015	28	408	352	29
1993	13,151	1,039	29	440	382	31
1994	13,447	1,062	29	472	412	34
1995	13,750	1,087	30	503	442	36
1996	14,059	1,112	31	535	472	39
1997	14,375	1,137	32	566	502	41
1998	14,699	1,163	32	598	531	43
1999	15,030	1,190	33	629	561	46
2000	15,368	1,217	34	661	591	48
2001	15,713	1,245	35	693	621	50

Page 53

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CHAPTER V

MARKETING OF GRAM AND SOYBEAN

As mentioned earlier Narsinghpur and Indore districts were selected for the present study. From each district one mandi, namely, Narsinghpur from Narsinghpur district and Indore from Indore district were selected to study the marketing of gram and soybean respectively. From the villages covered by these mandis 50 farmers from each mandi were selected. Thus in all 100 farmers were selected to study the marketing of gram and soybean at the farm level.

5.1 Characteristics of Sample Farms

5.1.1 Households Population and Castes

Among the selected farmers 90 were from other castes, 7 from scheduled castes and 3, scheduled tribes. These households had a total population of 745. The population included 91.95 per cent other castemen, 3.09 per cent scheduled tribes and 4.96 per cent, scheduled castes. (Table 5.1)

Table 5.1 Sample households and population by castes and tribes, selected districts, M.P.

District	Scheduled castes		Scheduled tribes		Other castes		Total	
	House-holds	Popula-tion	House-holds	Popula-tion	House-holds	Popula-tion	House-holds	Popula-tion
Narsinghpur	6 (12.00)	31 (8.40)	2 (4.00)	19 (5.15)	42 (84.00)	319 (86.45)	50 (100.00)	369 (100.00)
Indore	1 (2.00)	6 (1.60)	1 (2.00)	4 (1.06)	48 (96.00)	366 (97.34)	50 (100.00)	376 (100.00)
Total	7 (7.00)	37 (4.96)	3 (3.00)	23 (3.09)	90 (90.00)	685 ((91.95)	100 (100.00)	745 (100.00)

The population of the sample households was dominated by adults belonging to 15 to 59 years age group . These persons constituted 58 per cent population while children up to 14 years comprised nearly 34 per cent. The aged were 8 per cent. Out of 745 persons 53.15 per cent were males and 46.85 per cent, females (Table 5.2).

Table 5.2 Population of sample households by age and sex, selected districts, M.P.

Sex	Age group (Age in years)	Narsinghpur	Indore	Total
Male	0-14	66	64	130
	15-59	116	123	238
	60& Above	17	11	28
	Total	199	197	396
Female	0-14	61	62	123
	15-59	92	102	194
	60& Above	17	15	32
	Total	170	179	349
Total population	0-14	127	126	253
	15-59	208	224	432
	60 & Above	34	26	60
	Total	369	376	745
Percentage	Male	53.93	52.39	53.15
	Female	46.07	47.61	46.85
	Total	100.00	100.00	100.00

As regards literacy standards 18 heads of households were illiterate, 23 were educated up to primary level, 27 upto eighth standard and 22 were educated upto higher secondary level. Among the remaining 10 heads of households 5 obtained education upto graduation and remaining 5 upto post graduation. (Table 5.3)

Table 5.3 Literacy among selected heads of households, selected districts, M.P.

Literacy standard	Narsinghpur	Indore	Total
Illiterate	12 (24.00)	6 (12.00)	18 (18.00)
Primary	9 (18.00)	14 (28.00)	23 (23.00)
Middle	10 (20.00)	17 (34.00)	27 (27.00)
Higher Secondary	14 (28.00)	8 (16.00)	22 (22.00)
Graduation	3 (6.00)	2 (4.00)	5 (5.00)
Post graduation	2 (4.00)	3 (6.00)	5 (5.00)
Total	50 (100.00)	50 (100.00)	100 (100.00)

5.1.2 Households and Size of Farms

Among the selected farmers 4 were marginal having land up to 1 hectare, 25 small farmers with land between 1 to 2 hectares and 28 semi-medium farmers possessing 2 to 4 hectares. There were 27 medium size farmers who owned land between 4-10 hectares and 16 large farmers who occupied 10.00 hectares and more of land each (Table 5.4).

Table 5.4 Selected households by size of holdings, selected districts, M.P.

Size of holdings	Narsinghpur	Indore	Total
Marginal (Up to 1 hectare)	1 (2.00)	3 (6.00)	4 (4.00)
Small (1 to 2 hectares)	13 (26.00)	12 (24.00)	25 (25.00)
Semi medium (2 to 4 hectares)	14 (28.00)	14 (28.00)	28 (28.00)
Medium (4 to 10 hectares)	12 (24.00)	15 (30.00)	27 (27.00)
Large (10 hectares & above)	10 (20.00)	6 (12.00)	16 (16.00)
Total	50 (100.00)	50 (100.00)	100 (100.00)

5.1.3 Land Use of Sample Farms

The sample farmers owned 538.95 hectares of which 506.41 hectares were under cultivation. During the reference year the sample farmers leased out 17.81 hectares and leased in 28.53 hectares. Thus the operated area was 517.13 hectares of which 296.03 hectares were owned by the sample farmers of Narsinghpur district and 221.10 hectares by the farmers of Indore district. No land was leased out in Indore district while land was leased-in in both the districts.

On an average a farmer owned 5.39 hectares and operated 5.17 hectares during reference year. In Narsinghpur district these figures were higher (6.09 hectares owned and 5.92 hectares operated) than Indore district. In Indore district the figures were 4.69 and 4.42 hectares respectively. (Table 5.5)

Table 5.5 Land use pattern of sample farms, selected districts, M.P.

(Area - hectares)

Particulars	Narsinghpur	Indore	Total
Land owned	304.50 (102.86)	234.45 (106.04)	538.95 (104.22)
(i) Land under Non-Agricultural uses	1.00 (0.34)	11.93 (5.40)	12.93 (2.50)
(ii) Old fallow	3.23 (1.09)	1.21 (0.54)	4.44 (0.86)
(iii) Current fallow	7.08 (2.39)	8.09 (3.66)	15.17 (2.93)
Land cultivated	293.19 (99.04)	213.22 (96.44)	506.41 (97.93)
Land leased out	17.81 (6.02)	-	17.81 (3.44)
Land leased in	20.65 (6.98)	7.88 (3.56)	28.53 (5.17)
Total land operated	296.03 (100.00)	221.10 (100.00)	517.13 (100.00)

The net sown area was 517.13 hectares of which 349.05 hectares or 67.05 per cent was sown more than once. Thus the gross cropped area was 866.18 hectares. The area sown more than once in Narsinghpur district was 70.85 per cent and in Indore district, 63.01 per cent.

The irrigated area was 350.31 hectares or 67.74 per cent. The percentage of irrigated area in Narsinghpur and Indore districts was 78.77 and 52.98 per cent respectively. (Table 5.6)

Table 5.6 Details of area sown, sample farms, selected districts, M.P.

(Area- hectares)

Particulars	Narsinghpur	Indore	Total
Net area sown	296.03 (100.00)	221.10 (100.00)	517.13 (100.00)
Gross cropped area	505.76 (170.85)	360.42 (163.01)	866.18 (167.50)
Area sown more than once	209.73 (70.85)	139.32 (63.01)	349.05 (67.50)
Area irrigated	233.18 (78.77)	117.13 (52.98)	350.31 (67.74)

5.1.4 Cropping Pattern

Wheat, gram and soybean were important crops. The area covered by these 3 crops constituted 80.79 per cent of the gross cropped area. Wheat covered 19.30 per cent, gram, 21.15 per cent and soybean, 40.34 per cent. Soybean covered the largest area in both the districts viz. 30.98 per cent in Narsinghpur district and 53.48 per cent in Indore district. Gram covered 30.15 per cent in Narsinghpur district and 8.56 per cent in Indore district. The other crops worth mentioning were jowar, arhar, moong, lentil and pea in Narsinghpur district and maize and vegetables in Indore district. (Table 5.7)

Table 5.7 Area under different crops on selected farms, selected districts, M.P.

(Area- Hectares)

Crop	Narsinghpur		Indore		Total	
	Area	Percentage	Area	Percentage	Area	Percentage
Paddy	0.40	0.08	-	-	0.40	0.05
Wheat	98.43	19.46	68.70	19.06	167.13	19.30
Jowar	1.00	0.20	3.84	1.07	4.84	0.56
Arhar + jowar	15.38	3.04	-	-	15.38	1.78
Arhar + soybean	8.30	1.64	-	-	8.30	0.96
Maize	-	-	22.00	6.10	22.00	2.54
Gram	152.47	30.15	30.85	8.56	183.32	21.15
Arhar	11.42	2.26	1.82	0.50	13.24	1.53
Summer moong	30.44	6.02	-	-	30.44	3.51
Lentil	12.50	2.47	-	-	12.50	1.44
Pea	13.86	2.74	-	-	13.86	1.60
Teora	2.02	0.40	-	-	2.02	0.23
Soybean	156.72	30.98	192.75	53.48	349.47	40.34
Sunflower	2.02	0.40	-	-	2.02	0.23
Groundnut	-	-	0.40	0.11	0.40	0.05
Sugarcane	-	-	1.62	0.45	1.62	0.19
Fruits & vegetables	0.40	0.08	35.20	9.77	35.60	4.12
Fodder	0.40	0.08	3.24	0.90	3.64	0.42
Total	505.76	100.00	360.42	100.00	866.18	100.00

5.1.5 Irrigated Crops

Irrigated crops were grown on 606.25 hectares which included 397.14 hectares of Narsinghpur district and 209.11 hectares of Indore district. The irrigated area was mainly occupied by wheat, gram and soybean which together covered 83.07 per cent and individually 24.98, 20.78 and 37.31 per cent respectively. (Table 5.8)

Table 5.8 Cropwise irrigated area, farms of selected districts, M.P.

(Area- Hectares)

Crop	Narsinghpur		Indore		Total	
	Area	Percentage	Area	Percentage	Area	Percentage
Wheat	85.67	21.57	65.75	31.44	151.42	24.98
Paddy	0.40	0.10	-	-	0.40	0.07
Maize	-	-	9.10	4.35	9.10	1.50
Gram	113.45	28.58	12.54	6.00	125.99	20.78
Summer moong	30.44	7.66	-	-	30.44	5.02
Lentil	8.46	2.13	-	-	8.46	1.39
Pea	12.24	3.08	-	-	12.24	2.02
Teora	2.02	0.51	-	-	2.02	0.33
Soybean	141.64	35.66	84.60	40.46	226.24	37.31
Sunflower	2.02	0.51	-	-	2.02	0.33
Groundnut	-	-	0.40	0.19	0.40	0.07
Sugarcane	-	-	1.62	0.77	1.62	0.27
Fruits &Vegetables	0.40	0.10	31.86	15.24	31.86	5.26
Fodder	0.40	0.10	3.24	1.55	3.64	0.60
Total	397.14	100.00	209.11	100.00	606.25	100.00

5.2 Production, Disposal and Marketing

5.2.1 Production

There were in all 9 important crops on the selected farms. The production of soybean was 4,880 quintals and that of wheat, 3,501.30 quintals. The production of gram was 2,119.95 quintals. Gram was more important in Narsinghpur district than Indore district. Narsinghpur district had more diversified cropping. Pea, lentil and moong were not cultivated on the selected farms of Indore district. (Table 5.9)

Table 5.9 Districtwise production and disposal of main crops, farms of selected district, M.P.

(Quantity- quintals)

Crop	Narsinghpur district						Indore district					
	Production	Disposal					Production	Disposal				
		Consumed	Retained for seed	Other uses	Sold	Total		Consumed	Retained for seed	Other uses	Sold	Total
Wheat	1987.00	392.00 (19.73)	321.00 (16.16)	156.00 (7.85)	1118.00 (56.26)	1987.00 (100.00)	1514.30	383.30 (25.31)	92.00 (6.08)	60.00 (3.96)	979.00 (64.65)	1514.30 (100.00)
Maize	-	-	-	-	-	-	90.45	17.15 (18.96)	3.00 (3.32)	6.00 (6.63)	64.30 (71.09)	90.45 (100.00)
Jowar	42.00	40.25 (95.83)	1.75 (4.17)	-	-	42.00 (100.00)	22.00	16.50 (75.00)	1.50 (6.82)	4.00 (18.18)	-	22.00 (100.00)
Gram	1857.60	105.85 (5.70)	212.75 (11.45)	127.00 (6.84)	1412.00 (76.01)	1857.60 (100.00)	262.35	16.00 (6.10)	17.50 (6.67)	-	228.85 (87.23)	262.35 (100.00)
Pea	236.00	2.50 (1.06)	14.00 (5.93)	3.00 (1.27)	216.50 (91.74)	236.00 (100.00)	-	-	-	-	-	-
Lentil	149.00	5.25 (3.52)	16.75 (11.24)	15.50 (10.40)	111.50 (74.84)	149.00 (100.00)	-	-	-	-	-	-
Arhar	170.00	36.95 (21.74)	7.95 (4.68)	13.50 (7.94)	111.60 (65.64)	170.00 (100.00)	9.00	1.50 (16.67)	0.50 (5.55)	-	7.00 (77.78)	9.00 (100.00)
Moong	129.00	7.65 (5.93)	7.85 (6.08)	10.00 (7.75)	103.50 (80.24)	129.00 (100.00)	-	-	-	-	-	-
Soybean	2407.50	8.75 (0.36)	193.50 (8.04)	263.00 (10.92)	1942.25 (80.68)	2407.50 (100.00)	2472.50	-	296.20 (11.98)	-	2176.30 (88.02)	2472.50 (100.00)

5.2.2 Disposal

Disposal of a crop depends on many factors :

1. The quantity of produce
2. The urgency of cash for the farmer
3. Availability of storage facility
4. Perishability of the produce
5. Type of produce (consumable or non consumable)

On the above criteria the observations in the field were :

1. Pea, soybean, moong and gram were produced mainly for sale and very little for consumption. Therefore, the percentage of produce sold was 91.74, 84.40, 80.23 and 77.40 respectively.

2. Jowar, wheat and arhar were produced for household consumption and, therefore, the proportion of the quantity sold was nil, 59.89 and 66.26 respectively.

As described earlier pea and moong were grown only on Narsinghpur district sample farms. In the case of soybean the percentage of produce sold was 88.02 in Indore district and 80.68 in Narsinghpur district. In the case of gram the percentage of produce sold was 87.23 in Indore district as compared to 76.01 in Narsinghpur district.

It was observed that the proportion of produce retained for seed ranged between 3.32 in the case of maize to 11.24 in the case of lentil. The proportion of produce retained for "other uses" varied between 1.27 in the case of pea to 10.40 in the case of lentil. (Table 5.10)

Table 5.10 Total production and disposal of main crops, farms of selected districts, M.P.

(Figures-quintals)

Crop	Production	Disposal			
		Consumed	Retained for seed	Other uses	Sold
Wheat	3501.30	775.30 (22.14)	413.00 (11.80)	216.00 (6.17)	2097.00 (59.89)
Maize	90.45	17.15 (18.96)	3.00 (3.32)	6.00 (6.63)	64.30 (71.09)
Jowar	64.00	56.75 (88.67)	3.25 (5.08)	4.00 (6.25)	-
Gram	2119.95	121.85 (5.75)	230.25 (10.86)	127.00 (5.99)	1640.85 (77.40)
Pea	236.00	2.50 (1.06)	14.00 (5.93)	3.00 (1.27)	216.50 (91.74)
Lentil	149.00	5.25 (3.52)	16.75 (11.24)	15.50 (10.40)	111.50 (74.84)
Arhar	179.00	38.45 (21.48)	8.45 (4.72)	13.50 (7.54)	118.60 (66.26)
Moong	129.00	7.65 (5.93)	7.85 (6.09)	10.00 (7.75)	103.50 (80.23)
Soybean	4880.00	8.75 (0.18)	489.70 (10.03)	263.00 (5.39)	4118.55 (84.40)
Total	11348.70	1033.65 (9.11)	1186.25 (10.45)	658.00 (5.80)	8470.80 (74.64)

Note:- Figures in brackets denote percentage to total production

5.2.3 Marketing

The aspects of marketing studied were :

1. Place of marketing i.e. within or outside the village,
2. The agency to whom sold,
3. Seasonal variation in quantity sold,
4. The relationship between size of holdings and the proportion of quantity marketed to different agencies, and,
5. Seasonal variation in prices

5.2.3.1 Marketing of Gram in Narsinghpur District

Although the government had taken steps to regulate the agricultural marketing system by establishing mandis, the importance of private traders still persists. Of the total quantity of gram marketed, 46.19 per cent was sold to traders. Further, of this quantity 32.58 per cent was sold to the traders in the village itself. Slightly more than 50 per cent (53.81) was sold in the mandi.

It is generally observed that marginal and small farmers with a small quantity of produce, lack of bargaining capacity, lack of storage capacity and transportation facility prefarred to sell the produce within the village itself. The large farmers, on the other hand, had larger marketed surplus and larger storage and transportation facility took the produce outside the village.

However, in this study marginal and small farmers seemed to prefer sale outside the village. In the case of medium farmers as high as 56.55 per cent of the produce was sold within the village. In the case of large farmers, however, the percentage of produce sold within the village was only 21.67 and proportion sold outside the village was 78.33. In the quantity sold outside the village the major portion was in mandi. (Table 5.11)

Table 5.11 : Sale of gram by agencies and by size groups of selected farmers in Narsinghpur district, M.P.

(Quantity-quintals)

Size group (hectares)		Within the village	Outside the village			Grand Total
		Trader	Mandi	Trader	Total	
Marginal	Upto 2	16.00 (12.96)	52.00 (42.10)	55.50 (44.94)	107.50 (87.04)	123.50 (100.00)
Small	2 to 4	76.50 (41.92)	81.00 (44.38)	25.00 (13.70)	106.00 (58.08)	182.50 (100.00)
Medium	4 to 10	198.50 (56.55)	152.50 (43.45)	-	152.50 (43.45)	351.00 (100.00)
Large	10 & above	153.00 (21.67)	448.00 (63.46)	105.00 (14.87)	553.00 (78.33)	706.00 (100.00)
Total		444.00 (32.58)	733.50 (53.81)	185.50 (13.61)	919.00 (67.42)	1,363.00 (100.00)

The secondary data on arrivals indicated that major portion of the produce arrived in the market in the harvest and post harvest seasons. The farmers' level data also showed that three fourths of the total marketed surplus was sold in the harvest and post harvest seasons. The remaining one-fourth of the marketed surplus was disposed of in the sowing season. (Table 5.12)

The average price fetched by the farmers for gram during the reference year was Rs.645 per quintal.

As is known the sale within the village to the trader or middleman is a common practice even now. The middleman, the commission agent (Adhatia) and representatives of traders or traders themselves visited the villages alongwith transport and purchased the commodity in the villages. It saved the farmers of transportation charges and searching for the buyers. However, such sales in the villages fetched lower prices than those in the nearby town or mandi. In our investigation the price of gram received within the village was Rs.617, whereas, the average price received outside the village was Rs.658. The price received from the trader outside village was Rs.621. The price received in mandi outside the village was Rs.667.

It is thus evident that the maximum price could be obtained by selling the product in mandi. The price received from trader outside the village was lower and the price received within the village was lowest.

Secondary data on market arrivals and prices indicated that there was inverse relation between the arrivals and prices. More the arrivals lower were the prices. This fact was also noticed in the analysis of primary data. While the maximum sales were undertaken in harvest season followed by post harvest season the prices were least in harvest season and increased in the post harvest season. (Table 5.13)

5.2.3.2 Marketing of Soybean in Indore District

Soybean was comparatively less perishable commodity and, therefore could be stored for a longer period. Secondly, State Oil Federation collected the produce from the villages at a fixed price. Traders also purchased soybean in the villages. However, outside the village the produce was sold in mandis only and no trader was involved. Of the total marketed surplus of 1,996 quintals 43.44 per cent was sold to the traders in the villages and 35.92 per cent to the Oil Federation in the villages. Thus, 79.36 per cent of the produce was sold within the village.

Table 5.12 Monthwise/seasonwise details of sale of gram by selected farmers, Narsinghpur district, M.P.

(Quantity - quintals)

Months/seasons	Within the village				Outside the village				Total					
	Trader		Mandi		Trader		Total		Trader		Mandi		Total	
	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage
March	-	-	-	-	-	-	-	-	-	-	-	-	-	-
April	22	4.95	89	12.13	105	56.60	194	21.11	127	20.17	89	12.13	216	15.85
May	118	26.58	208	28.36	21.50	11.60	229.50	24.97	139.50	22.17	208	28.36	347.50	25.49
Harvest season	140	31.53	297	40.49	126.50	68.20	423.50	46.08	266.50	42.34	297	40.49	563.50	41.34
June	102	22.97	205.50	28.02	29	15.63	234.50	25.52	131	20.81	205.50	28.02	336.50	24.69
July	-	-	104	14.18	22	11.86	126	13.71	22	3.49	104	14.18	126	9.24
August	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post harvest season	102	22.97	309.50	42.20	51	27.49	360.50	39.23	153	24.30	309.50	42.20	462.50	33.93
September	175	40.09	60	8.18	-	-	60	6.53	175	27.80	60	8.18	235	17.24
October	27	6.08	-	-	-	-	-	-	27	4.29	-	-	27	1.98
November	-	-	67	9.13	-	-	67	7.29	-	-	67	9.13	67	4.92
Sowing season	202	45.50	127	17.31	-	-	127	13.82	202	32.09	127	17.31	329	24.14
December	-	-	-	-	8	4.31	8	0.87	8	1.27	-	-	8	0.59
January	-	-	-	-	-	-	-	-	-	-	-	-	-	-
February	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre harvest season	-	-	-	-	8	4.31	8	0.87	8	1.27	-	-	8	0.59
Total	444	100.00	733.50	100.00	185.50	100.00	919.00	100.00	629.50	100.00	733.50	100.00	1363.00	100.00

Table 5.13 Monthwise/seasonwise prices of gram, selected farmers, Narsinghpur district, M.P.

(Figures- Price in Rs.per quintal)

Months/season	Within the village	Outside the village			Total		
	Trader	Trader	Mandi	Total	Trader	Mandi	Total
March	-	-	-	-	-	-	-
April	614	605	669	634	606	669	632
May	589	635	653	652	596	653	630
Harvest season	593	610	658	644	601	658	631
June	610	653	687	683	620	687	661
July	-	650	663	660	650	663	660
August	-	-	-	-	-	-	-
Post harvest season	610	652	679	675	624	679	661
September	640	-	700	700	640	700	656
October	640	-	-	-	640	-	640
November	-	-	628	628	-	628	628
Sowing season	640	-	662	662	640	662	650
December	-	600	-	600	600	-	600
January	-	-	-	-	-	-	-
February	-	-	-	-	-	-	-
Pre harvest season	-	600	-	600	600	-	600
Total	617	621	667	658	619	667	645

No significant relationship was seen between the proportion of produce sold to different agencies and size of holdings. The proportion of soybean sold outside the village increased from 15.79 in the marginal size group to 29.23 in the small size group, and, further to 35.03 in the medium size group. However, the farmers of large size group sold the entire produce within the village and larger quantity of it to Oil Federation.

This showed that Oil Federation had not only established itself in the soybean marketing business but also played a major role. (Table 5.14)

Table 5.14 Sale of soybean by agencies and by size groups in Indore district, M.P.

(Quantity- Quintals)

Size group (hectares)	Within the village			Outside the village mandi	Grand Total
	Trader	Tilhan Sangh	Total		
Marginal Upto 2	47 (24.74)	113 (59.47)	160 (84.21)	30 (15.79)	190 (100.00)
Small 2 to 4	166 (42.56)	110 (28.21)	276 (70.77)	114 (29.23)	390 (100.00)
Medium 4 to 10	359 (46.93)	138 (18.04)	497 (64.97)	268 (35.03)	765 (100.00)
Large 10 & above	295 (45.31)	356 (54.69)	651 (100.00)	-	651 (100.00)
Total	867 (43.44)	717 (35.92)	1,584 (79.36)	412 (20.64)	1,996 (100.00)

Seasonwise marketing of soybean showed that 75.40 per cent of the marketed surplus was sold during the harvest season and remaining 24.60 per cent in the post harvest season. No marketed surplus was sold in sowing and pre harvest seasons. (Table 5.15)

Table 5.15 Monthwise/seasonwise details of sale of soybean, selected farmers, Indore district, M.P.

(Quantity- Quintals)

Months/seasons	With in the village						Outside the village		Total	
	Trader		Oil Federation		Total		Mandi			
	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage
October	114	13.15	223	31.10	337	21.28	31	7.52	368	18.44
November	476	54.90	333	46.45	809	51.07	75	18.20	884	44.28
December	116	13.38	31	4.32	147	9.28	24	5.83	171	8.57
January	-	-	35	4.88	35	2.21	47	11.41	82	4.11
Harvest season	706	81.43	622	86.75	1328	83.84	177	42.96	1505	75.40
February	46	5.31	-	-	46	2.90	92	22.33	138	6.91
March	115	13.26	35	4.88	150	9.47	90	21.84	240	12.03
April	-	-	60	8.37	60	3.79	23	5.58	83	4.16
May	-	-	-	-	-	-	30	7.28	30	1.50
Post harvest season	161	18.57	95	13.25	256	16.16	235	57.04	491	24.60
June	-	-	-	-	-	-	-	-	-	-
July	-	-	-	-	-	-	-	-	-	-
August	-	-	-	-	-	-	-	-	-	-
September	-	-	-	-	-	-	-	-	-	-
Sowing and Pre harvest season	-	-	-	-	-	-	-	-	-	-
Total	867	100.00	717	100.00	1584	100.00	412	100.00	1996	100.00

The average price of soybean was Rs.725 per quintal. It was Rs.719 for the marketed surplus sold within the village and Rs.748 for the marketed surplus sold outside the village in the mandi. The price was lower in the harvest season (Rs.724) than the post harvest season (Rs.731). (Table 5.16)

Table 5.16 Monthwise/seasonwise prices of soybean, selected farmers, Indore district, M.P.

(Figures- Prices-Rs.per quintal)

Months/seasons	Within the village			Outside the village	Total
	Trader	Oil Federation	Total	Mandi	
October	703	701	702	741	705
November	743	741	742	749	743
December	670	694	675	700	679
January	-	663	663	721	696
Harvest season	724	720	722	733	724
February	865	-	865	783	810
March	687	645	677	700	686
April	-	650	650	768	683
May	-	-	-	860	860
Post harvest season	738	648	705	759	731
June	-	-	-	-	-
July	-	-	-	-	-
August	-	-	-	-	-
September	-	-	-	-	-
Sowing and Pre harvest season	-	-	-	-	-
Total	727	711	719	748	725

Page 68

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CHAPTER VI

INPUT SUPPLY, PROCESSING AND EMERGING PROBLEMS

Since gram and soybean were emerging and high value crops these needed modern and high value inputs. As the prices fetched by these crops were high, the farmers did not hesitate to use costly inputs; adequately and timely. It will be useful to enumerate the recommended cultural practices for gram and soybean so as to compare the cultural practices and inputs actually used by the selected farmers.

6.1 Gram

6.1.1 Recommended Cultural Practices of Gram

Following varieties of local gram were recommended -

1. Jawahar gram 74
2. Jawahar gram 315
3. H- 335
4. Ujjain- 21
5. Ujjain 24
6. Radhey

The recommended variety of gulabi gram was Jawahar-5.

The choice of variety depended on the type of soil, duration and the productivity.

The recommended seed rate was 80 to 100 kg. per hectare. The ideal time of sowing was 15th October to 15th November. It was recommended that seed be sown along with fertiliser by a suitable seed drill. The recommended line to line distance was 30 cm. and plant to plant distance was 10 cm.

The seed should be treated by mixture of thyrum or brasical in equal quantity. One kg. seed be treated with 2.5 grams of mixture. The seed should be treated with 5 gm. of rhizobium culture per kg. of seed.

The fertiliser in the form of diammonium phosphate at the rate of 1 quintal per hectare for irrigated gram and at the rate of 80 kg. per hectare for unirrigated gram was recommended. Alternatively, 20 kg. of urea and 60 kg. of super phosphate should be applied. The first irrigation should be given 40 days after sowing. The second irrigation should be given within 50 to 55 days after sowing at the flowering stage.

Among the plant protection measures BHC 10% at the rate of 25 kg. per hectare was recommended where cutworms and white ants infect the soils. For gram caterpillar 2 per cent parathion or 1.5 per cent quinolphos at the rate of 25 kg. per hectare be dusted. Monocrotophos or endosulfan or quinolphos were recommended for spraying.

6.1.2 Doses Applied by Selected Farmers

The farmers of Narsinghpur district were well versed with the recommended inputs and doses. With the strong extension work done by the J.N.K.V.V. scientists the adoption of recommended practices was quiet high.

Against the recommended seed rate of 80-100 kg./hect. the seed rate used was 90 kg./hect. In the case of rhizobium culture instead of dose of 5 gramms per kg.seed the farmers used 3 gramms per kg. Although there was no recommendation about the F.Y.M. the selected farmers applied 1.5 bullock carts per hectare. In the case of fertilisers there was a choice between different brands of fertilizers. It was observed that the fertiliser doses used by the selected farmers were slightly lower than the recommended doses.

The application of insecticides and pesticides depended on the infestation. The farmers were aware of different kinds of insecticides and applied those according to the need. (Table 6.1)

Table 6.1 Recommended doses for gram and doses followed by selected farmers, Narsinghpur district, M.P.

Input	Recommended doses	Doses applied by selected farmers
1. Seed	80-100 kg./hect.	90 kg./hect.
2. Culture	5 gm.of rhizobium culture per kg.of seed	3 gm.of rhizobium culture per kg. of seed
3. F.Y.M.	-	1½ Bullock carts/hect.
4. Fertilizers		
DAP	80- 100 kg./hect.	67 kg./hect.
Super phosphate	60 kg./hect.	38 kg./hect.
Urea	20 kg./hect.	10 kg./hect.
5. Insecticides/Pesticides		
BHC- 10%	25 kg./hect.	8 kg./hect.
DDT	-	1 kg./hect.
Folidol -2%	25 kg./hect.	5 kg./hect.
Monocrotophos	650-750 ml./hect.	250 ml./hect.
Quinolphos	1000 ml./hect.	500 ml./hect.

6.1.3 Supply of Inputs

There were two aspects to be studied in the supply of inputs:

1. The source or agency supplying, and,
2. Quality, quantity and timeliness of supply.

It was observed that nearly entire quantity of seed and F.Y.M. was home produced. On the other hand, the entire quantity of super phosphate and insecticides and pesticides were purchased in cash from the market. Urea was obtained from cooperative societies to the extent of 67.53 per cent. DAP was fetched from cooperative societies to the extent of 32.02 per cent. The farmers opined that not all the fertilisers were available in the cooperative societies. These were also not available in time. The farmers had to purchase these from the open market although the prices were higher. (Table 6.2) In general, the farmers got the inputs of desired quality and quantity although they had to pay a higher price.

Table 6.2 Percentage contribution of supplying agencies for gram for inputs, selected farmers, Narsinghpur district, M.P.

Input		Percentage of different supplying agencies			
		Home produced	Credit		Purchased
			Private	Cooperative	
1.	Seed	95.76	2.46	-	1.78
2.	Culture	-	-	-	100.00
3.	F.Y.M.	100.00	-	-	-
4.	Fertilisers				
	DAP	-	-	32.02	67.98
	Super phosphate	-	-	-	100.00
	Urea	-	-	67.53	32.47
5.	Insecticides/ Pesticides				
	BHC - 10%	-	-	4.32	95.68
	DDT	-	-	-	100.00
	Folidol - 2%	-	-	-	100.00
	Monocrotophos	-	-	-	100.00
	Quinolphos	-	-	-	100.00

6.2 Soybean

6.2.1 Recommended Cultural Practices of Soybean

The choice of variety depended on the soil, rainfall, rotation, insect infestation and availability of irrigation.

It was recommended that the fields should be deep ploughed in the summer and harrowed twice. Twenty five to thirty cartloads of F.Y.M. should be applied at least once in three years.

The recommended varieties were following :

A. Short duration varieties : Punjab-1, JS-71-5, JS-335
B. Medium duration varieties : Gaurav (JS-72-44), Durga (JS-72-280), Max-13, JS-75-46, JS-76-205, PK-472, Max- 58, JS-80-21

The seed rate varied from 60 to 100 kg. per hectare depending on the varieties.

For seed treatment 3 gm. of thvrum or diathen M-45 per kg.of seed be used. In addition, the seed should be treated with 5 gm. of rhizobium culture per kg. of seed.

Following fertilisers were recommended per hectare :

A. 43 kg.of urea
B. 400 to 500 kg. of single superphosphate or 100 kg.of DAP.

In the fields which were deficient in sulphur 20 kg. per hectare should be given.

The sowing should be done from the third week of June to first week of July. The seed should be sown at a depth of 2.5 cm. The line to line distance should be 30-45 cm. The plant to plant distance should be 7-8 cm.

The first weeding should be done between 20 to 25 days after sowing. The second weeding should be done after 40-45 days of sowing.

For plant protection the insecticides and pesticides such as BHC-10%, monocrotophos, endosulfan, diathen M-45, quinolphos and folidol were recommended.

Irrigation should be given when there was a long dry spell specially at the time of flowering and seed formation.

6.2.2 Doses Applied by Selected Farmers

With the institutes like College of Agriculture, Indore and Central Soybean Research Institute, Indore and their extension services the farmers of Indore district had become quite aware of the recommended doses of soybean. The selected farmers applied the recommended doses of seed and culture. The dose of FYM was nearly equal to the recommended dose. Among fertilisers the dose of DAP and Super phosphatewere lower than the recommended doses. However, the dose of urea was about equal the recommended dose. Insecticides and pesticides were recommended to be applied on infestation and the doses depended on the intensity of infestation. The selected farmers were in the knowledge of different insecticides and pesticides and applied the necessary doses. (Table 6.3)

Table 6.3 Recommended doses for soybean and doses followed by selected farmers, Indore district, M.P.

Input	Recommended doses	Doses applied by selected farmers
1. Seed	60-100 kg./hect.	85 kg./hect.
2. Culture	5 gm.of rhizobium culture per kg.of seed	4.5 gm. of rhizobium culture per kg.of seed
3. F.Y.M.	10 cart loads/hect.	8 cart loads/hect.
4. Fertilisers		
DAP	100 kg./hect.	65 kg./hect.
Single Super Phosphate	400-500 kg./hect.	180 kg./hect.
Urea	43 kg./hect.	44 kg./hect.
5. Insecticides/ Pesticides		
BHC- 10%	25 kg./hect.	20 kg./hect.
DDT	-	5 kg./hect.
Folidol-2%	25 kg./hect.	10 kg./hect.
Monocrotophos	600-800 ml./hect.	400 ml./hect.
Endosulfan 4%	25 kg./hect.	10 kg./hect.

6.2.3 Supply of Inputs

Seed (77.30 per cent) and manure (100.00) were home produced. About 15 per cent of quantity of seed was taken from cooperative societies. The quantity of culture purchased in the open market was 58.25 per cent. The remaining quantity was obtained from cooperative societies. For fertilisers the farmers depended to a larger extent on cooperative societies. The entire quantity of DDT, 83.33 per cent of monocrotophos and 71.43 per cent of BHC was purchased from cooperative societies. The remaining quantities were purchased from the open market. (Table 6.4)

As regards quality, quantity and timelines of supply of inputs two-thirds of the farmers got the quality of inputs they desired and sufficient quantity. About same number of farmers reported that the supplies were timely and at fair prices.

Table 6.4 Percentage contribution of supplying agencies for soybean for inputs, selected farmers, Indore district, M.P.

Input	Percentage of different agencies			
	Home produced	Credit		Purchased
		Private	Cooperative	
1. Seed	77.30	7.38	14.06	2.76
2. Culture	-	-	41.75	58.25
3. F.Y.M.	100.00	-	-	-
4. Fertilisers				
DAP	-	-	64.89	35.11
Single super phosphate	-	-	71.34	28.66
Urea	-	-	84.43	15.57
5. Insecticides/ Pesticides				
BHC - 10%	-	-	71.43	28.57
DDT	-	-	100.00	-
Folidol- 2%	-	-	83.33	16.67
Monocrotophos	-	-	-	100.00
Endosulfan 4%	-	-	15.15	84.45

6.3 Processing of Gram

It may be mentioned that processing of gram was not done at the household or the village level except for the needs of own consumption. The produce was sold to the adhatias, agents of dal mills and traders. These, in turn, sold the produce to the dal mills. At the dal mills the processing of all kinds of pulses including gram was undertaken. We have conducted the investigation of 6 dal mills. The quantity processed varied from 25 qtls.a day to 120 qtls. per day. It varied with the capacity of the mill, season and the demand for gram dal. The processing of dal resulted in the obtaining of following products with their proportions. It was estimated that in one quintal of gram processed, 75 kg. of fine dal was obtained. The damaged dal weighed about 2 kg. Among the by-products bran weighed 12 kg., shell 8 kg. and small pieces 3 kg. On applying the price per quintal of these products at the time of investigation, an estimate of value of different products was obtained in a quintal of gram. The value so obtained was Rs.875. With the purchase price of gram by the mill being Rs.700, the gross profit came to Rs.175 or 25 per cent over and above the purchase price. (Table 6.5)

Table 6.5 Products obtained from a quintal of gram and prices of products, Narsinghpur district, M.P.

Product/By-product (1)	Percentage by weight (2)	Average price per quintal (3)	Value product of column 2 (4)
1. Fine product	75	1,025	768.75
2. Damaged	2	850	17.00
3. By products			
a) Small pieces	3	575	54.00
b) Bran	12	450	18.00
c) Shell	8	225	17.25
Total	100	-	875.00

6.4 Processing of Soybean

It may be mentioned that soybean was not processed in the house or in the village. The reasons were two: Firstly, oil extracting was a difficult and complicated process. Secondly, the

oil extracted needed filtration and other processes to make it consumable. It was, therefore, sold to different agencies which carried the soybean to oil mills. The products obtained were oil and oil cakes. We could not name either of the two as main or by product. Normally, in oilseeds oil was a main product and cakes, by product. In the case of soybean, however, the cake was an exportable commodity and earned foreign exchange. While oil was converted into vegetable ghee and other products within the country cakes were exported. In economic terms both the products were equally important. One quintal of soybean contained 20 kg. of oil and 80 kg.of oil cakes. At the time of investigation the price per quintal of oil was Rs.2,940 and that of oil cakes, Rs.570. Thus, the value of oil came to Rs.588 and that of oil cakes, Rs.456. Thus the value of both the products together was Rs.1,044 (Table 6.6).

Table 6.6 Products obtained from a quintal of soybean and prices of products, Indore district, M.P.

Product (1)	Percentage by weight (2)	Average price per quintal (3)	Value product of column 2 (4)
1. Oil	20	2,940	588
2. Oil cake	80	570	456
Total	100	-	1,044

The price of one quintal of soybean at the time of investigation was Rs.930. The cost of processing was Rs.60 per quintal. With the product price of Rs.1,044, the net profit came to Rs.54 per quintal.

6.5 Emerging Problems of Marketing

6.5.1 Gram

Although gram was a traditionally important crop of the state and Narsinghpur district, continuous and scientific research including pest control and development of irrigation facilities together with development of sophisticated irrigation equipments such as sprinklers and drip have made the spread of the crop very wide. Due to extensive cultivation the pressure on markets, channels of marketing and processing units increased tremendously. At times these agencies were not able to cope up with the increasing production.

This resulted in the export of gram to other states. There were cases of glut in the market. Gram being a commodity not as hardy as wheat and rice had to be disposed of quickly. The farmer was in a need of cash because the crop had become capital intensive. The farmers suffered from three ills.

(1) The product being less hardy had to be sold in the harvest and post harvest seasons, when there was glut in the market and the prices were low.

(2) As he was not able to process and defer the sale he was deprived of the much higher price the dal obtained in the later period, both within the district and outside the district and the state.

(3) Not only the farmers faced distress sale but had to wait for the returns of the product for months.

The processing industry of gram had the main problem of sales tax of 2 per cent in the state. It may be mentioned that the adjoining states of Gujrat and Maharashtra did not levy any tax on dal. This made the product of this state costlier than the other states.

It may be said that the real beneficiary of marketing and processing of gram was the dal mill owner who purchased gram at the lowest price of the season, processed the gram and got the value of every small product and by product. He deferred the sale of products and by products to the lean season and got the highest price. The farmers, on the other hand got no benefit of marketing and processing. With the high level of production and increasing marketed surplus the processors intended to run the mills for the maximum period of the day. However, they faced with the problem of supply of electricity. It was neither adequate nor regular. The only way to benefit the small and big farmers was to set up dal mills in the cooperative sector by the farmers cooperatives.

6.5.2 Soybean

With the ever increasing productivity and production, soybean had become the most profitable cash crop of the state. This had resulted in the pressure on channels of marketing and markets themselves. The problem would have been very serious had the OILFED or the oil federation not made its entry in the marketing fields. Because of OILFED the farmers were getting suitable price for their products in the village itself. However, those selling to the traders

and mandis did face the problems of proliferation of agencies and channels. The entry of OILFED has benefitted the farmers by higher minimum price. The real beneficiary in the entire soybean marketing and processing was the processor. He benefitted not only by oil which had become a precious and also costly commodity but also the exportable DOC which brought in precious foreign exchange. This has resulted in the expansion of soybean oil industry and exporters of DOC. The farmer, on the other land, was deprived of the benefits of exports. The oil extraction industry was very capital intensive and if the farmer had to accrue the benefits of the entire process he should form cooperativesnot only at the marketing level but also oil mills' level. The example of Cooperative Sugar Mills in Maharashtra can be cited.

All efforts should be made to make use of DOC within the country in the form of human and animal feed. Efforts were being made by some food processors and cosmetic industries. These should be encouraged to lessen the dependence on exports. This was necessary in the face of competition by other soybean exporting countries.

6.6 Emerging Problems of Input Supply

Gram and soybean needed higher and varied types of inputs in the form of seed, seed treatment chemicals, culture, manure, fertilisers, pesticides and equipments for dusting, spraying and irrigation. All these inputs being costly but unavoidable farmer searched for them far and near. The government had endeavour to provide these in the vicinity of the villages through govt. agencies and cooperatives. However, it was observed that the supplies were affected due to ills of quality, adequacy and timeliness, besides prices. It was observed that not all the inputs were stored by the govt. agencies and cooperatives. The farmer, therefore, had to search the open market and got it even at higher prices. There were numerous complaints regarding the quality of seed, fertilisers, insecticides and pesticides supplied to the farmers. The govt., therefore, should ensure adequate, timely and quality products in the cooperative societies. It is heartening to know that recently the govt. started the scheme of selling the fertilisers through mandis. It was also proposed that henceforth the OIL FEDERATION would supply pesticides as a nodal agency at the subsidised rates. These were welcome steps.

Possible Solutions to Marketing and Processing Problems

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CHAPTER-VII

SUMMARY AND CONCLUSIONS

7.1.1 Marketing included activities like preliminary processing at the producer's level, transportation, market channels, wholesalers and retailers. Processing is a part of marketing system and involved operations like grading, shelling, cleaning, extraction of oil, adding of preservatives, packaging, etc. The new emerging crops were high yielding cash crops which had increased the volume of transportation, storage, processing and marketing. The input requirements were higher and both qualities and quantities had changed. For this study gram and soybean have been selected. In the case of gram the products sold by the farmer was unshelled gram. It was shelled in the dal mill, dried and stored for the deferred sale when the prices increased. In the case of soybean the processing facilities were not commensurate with the increased production.

7.1.2 The specific objectives of the study were :

1. To study the existing market structure and its efficiency covering both private and regulated markets;
2. To identify the emerging problems of marketing both for old and new crops with added focus on processing and input supply;
3. To make projections of production, marketed surplus, demand, availability of market centres for all crops in general and for the selected crops in particular;
4. To study the present arrangements available with regard to processing of selected commodities and their problems; and,
5. To examine the present processing facilities and their adequacy to meet the future needs.

7.1.3 Narsinghpur district was selected for gram and Indore district was selected for soybean. The selected districts belonged to two different agro-climatic zones. In Narsinghpur district Narsinghpur mandi and in Indore district Indore mandi were selected. Further, 5 villages each were selected from the jurisdiction of the mandi and from each village, 10 farmers were selected by random method. Thus the total sample included 2 districts, 2 mandis, 10 villages and 100 farmers. The reference year for the study was 1990-91.

7.2.1 In India production of pulses was not able to keep pace with the requirements. No significant progress in area, production and productivity was achieved in the last two decades (1971-72 to 1990-91). The area in 1971-72 was 22,151 thousand hectares. The index of area increased from 94 (1972-73) to 111 (1990-91). During this period the area was below base year in 3 years and varied between 100 and 111 in 17 years. The production in 1971-72 was 11,094 thousand tonnes. The index went down to 77 in 1979-80 and was highest (129) in 1990-91. In 14 years it was above 100 and in 6 years it was below 100. The productivity of pulses was 501 kg./hect. in 1971-72 and increased to 578 kg./hect. in 1990-91. In 1988-89 the index was highest (119). While the area recorded an increase of 11 per cent over the base year, the production recorded 29 per cent increase. The productivity increased by 15 per cent.

7.2.2 In 1971-72, Madhya Pradesh contributed 19.68 per cent of the area of pulses of the country. The percentage increased to 20.15 in 1990-91. The state contributed 21.20 per cent to the country's production in 1971-72. The share increased to 21.75 per cent in 1990-91. The productivity in the state was 8 per cent higher than the average productivity of India in 1971-72. The percentage decreased to 7 in 1990-91. The index of area varied between 100 to 118 and the index of production varied between 64 to 132. The index of productivity varied from 62 to 114.

7.2.3 In Narsinghpur district index of area increased from 98 in 1972-73 to 114 in 1990-91. The index of production increased from 90 in 1973-74 to 151-the highest-in 1990-91. The index of production showed an increase during the past 5 years when it ranged between 125 to 151. The indices of production and productivity in Narsinghpur district were significantly higher than those of India and the state.

The growth rate of production in Narsinghpur district was 2.08 as compared to 1.28 for India and 1.40 for the state. The growth rate of productivity in Narsinghpur district was 1.44 as compared to 0.70 for India and 0.66 for the state.

7.2.4 In 1971-72 gram occupied 35.72 per cent of the area under pulses and 45.80 per cent of production. The proportion of area decreased to 30.50 and that of production to 37.55. In Madhya Pradesh,

however, the situation was opposite. In 1971-72, gram occupied 38.67 per cent of the area. In 1990-91 the percentage increased to 49.05. Similarly in production the proportion of gram increased from 48.79 to 60.95. Gram occupied still better position in Narsinghpur district. It had 46.34 per cent of the area of pulses in 1971-72 which increased to 66.31 per cent in 1990-91. In the case of production the percentage increased from 19.50 in 1971-72 to 71.35 in 1990-91.

7.2.5 In India during 1971-72 gram was grown on 7,912 thousand hectares. The area decreased to 7,521 thousand hectares in 1990-91. However, the production during this period increased. Therefore, the productivity increased from 642 kg./hect. in 1971-72 to 712 kg./hect. in 1990-91.

7.2.6 In Madhya Pradesh, gram was grown on 1,686 thousand hectares in 1971-72. The area registered a growth of 46 per cent by 1990-91. The production registered an increase of 65 per cent during the same period. The yield registered the highest growth of 113 in 1990-91.

7.2.7 In Narsinghpur district the area under gram in 1971-72 was 76 thousand hectares. The area increased from year to year and was 124 thousand hectares in 1990-91. The production in 1971-72 was 70 thousand tonnes and increased to 122 thousand tonnes in 1990-91. The yield increased from 921 kg./hect. in 1971-72 to 982 kg./hect. in 1990-91.

The compound growth rates for area, production and yield for India were (-) 0.26, 0.24 and 0.52 per cent respectively. These were 1.91, 2.54 and 0.61 per cent respectively for Madhya Pradesh. In Narsinghpur district the growth rates were 2.47, 2.81 and 0.34 per cent respectively.

7.2.8 In 1978-79 area under oilseeds in India was 17,708 thousand hectares and increased by 36 per cent by the year 1990-91. Production in 1978-79 was 10,100 thousand tonnes and registered a growth of 84 per cent by 1990-91. The yield increased from 563 kg./hect. in 1978-79 to 771 kg./hect. in 1990-91.

7.2.9 The area under oilseeds in Madhya Pradesh grew from 2,150 thousand hectares in 1978-79 to 4,039 thousand hectares in 1990-91. The production was 641 thousand tonnes and went up to 3,210 thousand tonnes. The yield increased from 298 kg./hect. to 795 kg./hect.

7.2.10 In Indore district the area under oilseeds in 1978-79 was 13 thousand hectares. It increased to 152 thousand hectares. The production increased from 20 thousand tonnes to 189 thousand tonnes. The yield in 1978-79 was 1,538 kg./hect. It decreased to 1,241 kg./ hect. at the end of reference period.

The growth rates for area, production and yield for oilseeds for India were 2.39, 4.80 and 2.45 per cent respectively. These were higher for Madhya Pradesh viz. 4.57, 13.20 and 7.87 respectively. For Indore district the rates of area and production were 20.82 and 18.86 per cent respectively. However, the growth rate of yield was (-)1.61.

7.2.11 In India the area under soybean in 1978-79 was 310 thousand hectares. The area increased to 2,364 thousand hectares in 1990-91. During the same period the production increased from 300 thousand tonnes to 2,602 thousand tonnes. However, the yield recorded small increase from 975 kg./hect. in 1978-79 to 1,015 kg./hect. in 1990-91.

7.2.12 In Madhya Pradesh, the area under soybean in 1978-79 was 199 thousand hectares and increased to 2,149 thousand hectares in 1990-91. The production in these two years was 87 thousand tonnes and 2,184 thousand tonnes. The yield was 437 kg./hect. and increased to 1,016 kg./hect.

7.2.13 In Indore district the area under soybean in 1978-79 was 31 thousand hectares and increased to 150 thousand hectares by 1990-91. During the same period the production increased from 14 thousand tonnes to 188 thousand tonnes and the yield increased from 446 kg./hect. to 1,254 kg./hect.

The compound growth rates for area, production and yield for India were 16.92, 18.07 and 0.30 per cent. For Madhya Pradesh the growth rates were higher viz. 20.09, 28.13 and 6.69 per cent respectively. For Indore district the growth rates were 12.90, 22.12 and 8.27 per cent respectively.

7.3.1 There were 290 mandis, 293 sub mandis and 2,166 weekly markets in the state. There were 4 classes of mandis viz. A, B, C and D. There were 16 'A' class mandis, 33 'B' class mandis and 79 'C' class mandis. The number of 'D' class mandis were maximum (162 out of 290). The main objectivesin establishing the mandis were (i) to benefit the seller by competitive prices (ii) to control the correct weighment and (iii) to control the cash payment to the

seller. Narsinghpur district had 4 mandis of which 2 were 'B' class and the rest 2 'C' class mandis. There were 3 sub mandis and 37 weekly markets in the district. Indore district also had 4 mandis. Of these 1 each was of 'A' class and 'C' class and the remaining two mandis were 'D' class. There were 4 sub mandis and 16 weekly markets in the district.

7.3.2 Monthwise data on arrivals and prices was collected for 10 years from 1981-82 to 1990-91 from mandi records. The data referred to October to September. The total quantity of gulabi gram brought to mandi was 76,304 qtls. of which 38.16 per cent arrived in harvest season (March, April & May), 21.58 per cent in post harvest season (June, July and August), 32.41 per cent during sowing season (September, October & November) and 7.85 per cent in the pre harvest season (December, January and February). In the case of local gram 51.80 per cent arrivals took place during harvesting season and nearly 20.00 per cent each in post harvest and sowing seasons.

7.3.3 A total quantity of 24,16,530 qtls.of soybean arrived in mandi. Of this 74.20 per cent arrivals took place in the harvesting season (October, November, December and January). During post harvest season (February, March, April and May) the arrivals reduced to 15.22 per cent.

7.3.4 The lowest minimum price of local gram was in the months of October and February while the highest maximum price was in September and November. In the case of gulabi gram the lowest minimum price was in March and April and maximum price in September and January. The prices depended on the arrivals. During harvest season the arrivals were high and the prices were low. During sowing and pre harvest seasons the arrivals were weak and the prices soared. In the case of local gram, the average price was lowest in the harvest and pre harvest seasons in 9 out of 10 years. The prices were highest in post harvest and sowing seasons in 9 out of 10 years. In the case of gulabi gram the average price was lowest in harvest season in 7 out of 10 years. The average price was highest in pre harvest season in 5 out of 10 years, in sowing season in 3 out of 10 years and in post harvest season in 2 out of 10 years. Thus the spread of highest prices was more in the case of gulabi gram.

7.3.5 The lowest minimum price of soybean was observed to be in the two months of September and October. The maximum price was reached

in the two months of July and August. Thus, the fact that the prices reached the lowest during the harvest season and increased in post harvest and subsequently in the sowing and pre harvest seasons was proved in all the selected crops/varieties. The average price was highest in sowing and pre harvest seasons in 8 out of 10 years. The average price was lowest in harvest season in 8 out of 10 years.

7.4.1 The data on production of pulses was for a period of 20 years from 1971-72 to 1990-91. The data on production of oilseeds was taken for a 13 year period from 1978-79 to 1990-91. On the basis of this data the projections of production were made till the year 2000-2001. The method used was straight line method with the equation $y = a + bx$.

7.4.2 The projections of production of pulses have been studied alongwith the projections of production of gram. These were given for India, Madhya Pradesh and Narsinghpur district. The three years referred were 1971-72 (the first year of the observed values), 1990-91 (the last year of the observed values) and 2000-2001 (the estimate at the begining of the new century). (Table 7.1)

Table 7.1 Observed and estimated production of pulses and gram for India, Madhya Pradesh and Narsinghpur district

(Figures - '000 tonnes)

Year	Pulses			Gram		
	India	Madhya Pradesh	Narsinghpur district	India	Madhya Pradesh	Narsinghpur district
1971-72	11,049	2,353	113	5,081	1,148	70
1990-91	14,265	3,104	171	5,356	1,892	122
2000-2001	14,612	3,069	174	4,698	1,967	118
Equation derived						
India	Y= 10128.52 + 149.4647x			Y= 4836.464-4.606015x		
Madhya Pradesh	Y= 1982.474 + 36.21203x			Y= 925.1159+34.74135x		
Narsinghpur district	Y= 89.1579 + 2.842105x			Y= 45.53683+ 2.420302X		

7.4.3 The production of oilseeds in India generally followed an increasing trend except in the years1979-80, 1980-81 and 1982-83. In Madhya Pradesh the production picked up from 1983-84 and nearly followed the increasing trend. In the case of Indore district also the trend was of increasing nature (Table 7.2).

Table 7.2 Observed and estimated production of oilseeds and soybean for India, Madhya Pradesh & Indore district

(Figures- '000 tonnes)

Year	Oilseeds			Soybean		
	India	Madhya Pradesh	Indore district	India	Madhya Pradesh	Indore district
1978-79	10,100	641	20	300	87	14
1990-91	18,609	3,210	189	2,602	2,184	188
2000-2001	24,231	4,526	249	3,463	3,105	251
Equation derived						
India	Y = 7671.231 + 720.011x			Y= (-) 167.6153 + 157.8352x		
Madhya Pradesh	Y = 14.23071 + 196.1648x			Y= (-) 332.3461 + 149.467 x		
Indore district	Y = (-)12.03846 + 11.36813x			Y= (-) 17.80769 + 11.68681x		

7.4.4 Marketed surplus in the selected mandis is equal to arrivals in those mandis. In the case of gram the arrivals fluctuated during the 10 year period. In the case of soybean the arrivals were nearly stagnant for the first 8 years. In 1990-91 these suddenly increased to 4,40,750 quintals (Table 7.3).

Table 7.3 Observed and estimated marketed surplus of gram in Narsinghpur mandi and soybean in Indore mandi, M.P.

(Figures- quintals)

Year	Gram	Soybean
	Narsinghpur mandi	Indore mandi
1981-82	35,854	2,70,358
1990-91	52,382	4,40,750
2000-2001	64,589	3,36,450
Equation derived :	Y= 36702.27+1394.352x	Y= 205695.9 + 6537.734x

7.4.5 The production figures of gram and soybean for the country, Madhya Pradesh and selected districts were available. On the basis of data collected from sample farmers we could arrive at the proportions of disposal which included marketed surplus. It was observed that the percentage of marketed surplus to total production of gram was 76.01 and that for soybean, 88.02. Applying these proportions, the marketed surplus of gram and soybean were derived (Table 7.4).

Table 7.4 Estimated marketed surplus of gram and soybean for India, Madhya Pradesh and selected districts

(Figures- '000 tonnes)

Year	Gram			Soybean		
	India	Madhya Pradesh	Narsinghpur district	India	Madhya Pradesh	Indore district
1971-72	3,862	873	53	-	-	-
1978-79	-	-	-	264	77	12
1990-91	4,071	1,438	93	2,290	1,922	165
2000-2001	3,571	1,495	90	3,048	2,733	221

7.4.6 The estimated demand for pulses and oil was based on projected population upto 2001. The requirements of pulses and oil were calculated at the rate of 48 gm. of pulses and 40 gm. of oil per day per person. The population of India in 1991 was 8,38,584 thousand persons. The population of Madhya Pradesh was 67,181 thousand persons and that of Narsinghpur district was 785 thousand persons. The population of Indore district was 1,836 thousand persons. The estimated compound growth rate for the country was 2.25. The rate of growth for Madhya Pradesh, Narsinghpur district and Indore district was taken to be 2.29.

7.4.7 The demand of pulses for the country in 1991 was 15,095 thousand tonnes. The demand would swell to 18,856 thousand tonnes by 2001. The demand for Madhya Pradesh in 1991 was 1,191 thousand tonnes. It would go up to 1,494 thousand tonnes by 2001. Similarly in the case of Narsinghpur district the demand in 1991 was 14 thousand tonnes. It is expected that the demand would increase to 18 thousand tonnes by 2001.

Against this the production of pulses in India is estimated to be 14,612 thousand tonnes. The production of Madhya Pradesh and Narsinghpur district would be 3,069 and 174 thousand tonnes respectively.

It is thus observed that the production of pulses in India would fall short of demand by 4,244 thousand tonnes by 2001. However, the production in Madhya Pradesh and Narsinghpur district would be in excess of demand by 1,575 thousand tonnes and 156 thousand tonnes respectively by the year 2001.

7.4.8 The demand of oil in the country in 1991 was 12,579 thousand tonnes. It is expected that the demand would increase to 15,713 thousand tonnes by 2001. The demand in Madhya Pradesh in 1991 was 993 thousand tonnes. By 2001 the demand would increase to 1,245 thousand tonnes. For Indore district the demand in 1991 stood at 28 thousand tonnes. It is expected to rise to 35 thousand tonnes by 2001.

7.4.9 The availability of soybean oil calculated on the basis of 20 per cent oil content was 520 thousand tonnes in the country. In 2001 it would increase to 693 thousand tonnes.

In Madhya Pradesh the availability was 437 thousand tonnes in 1991. In the year 2001 the availability would go up to 621 thousand tonnes.

In Indore district the availability of 38 thousand tonnes in 1991 would increase to 50 thousand tonnes in 2001.

7.5.1 Among the selected 100 farmers 90 were from other castes, 7 from scheduled castes and 3 scheduled tribes. The total population of the selected households was 745: 53.15 per cent males and 46.85 per cent females. Of the 100 heads of households 18 were illiterate, 23 were educated up to primary, 27 upto 8th standard and 22 were educated upto higher secondary level. Among the remaining 10 heads of households 5 were graduates and 5 post graduates. Among the selected farmers 4 were marginal having land up to 1.00 hectare, 25 small farmers with land between 1.00 - 2.00 hectares and 28 semi-medium farmers possessing 2.00-4.00 hectares. There were 27 medium size farmers owning land between 4.00-10.00 hectares and 16 large farmers who occupied 10.00 hectares or more each. The operated area of the sample farmers was 517.13 hectares. The gross cropped area was 866.18 hectares. The percentage of irrigated area in Narsinghpur district was more (78.77) than Indore district (52.98). Wheat, gram and soybean were important crops. The area covered by these three crops was 80.79 per cent. Irrigated crops were grown on 606.25 hectares. The irrigated area was mainly occupied by wheat, gram and soybean.

7.5.2 The production of soybean was 4,680.00 quintals and that of wheat 3,501.30 quintals. The production of gram was 2,119.95 quintals. As regards disposal, it was noted that 91.74 per cent of pea, 84.40 per cent of soybean, 80.23 per cent of moong and 77.40 per cent of gram was sold. Jowar, wheat and arhar were produced for household consumption. The proportion of quantity sold was Nil, 59.89 and 66.26 respectively.

7.5.3 Of the total quantity of gram marketed, 32.58 per cent was sold to the traders in the village itself. Slightly more than 50.00 per cent (53.81) was sold in the mandi. The remaining 13.61 per cent was sold to the traders outside the village. Marginal and small farmers

preferred sale outside the village. In the case of medium farmers 56.55 per cent of the produce was sold within the village. In the case of large farmers the percentage of produce sold within the village was only 21.67 and the proportion sold outside the village was 78.33. In the quantity sold outside the village the major proportion was in mandi. Three fourths of the total marketed surplus was sold in the harvest and post harvest seasons. The remaining one-fourth was disposed of in the sowing season. The average price fetched was Rs.645 per quintal. The price received within the village was Rs.617, whereas, the price received outside the village was Rs.658. While the price received from traders outside the village was Rs.621, the price received in mandi was Rs.667. While the maximum sales were undertaken in harvest season followed by post harvest season the prices were least in harvest season and increased in the post harvest season.

7.5.4 In the case of soybean of the total marketed surplus 43.44 per cent was sold to the traders in the village and 35.92 per cent to the oil federation in the village. Thus, 79.36 per cent of the produce was sold within the village. There was no relationship between the proportion of produce sold to different agencies and size of holdings. The oil federation played a major role in the procurement of soybean. The season wise marketing showed that 75.40 per cent of the marketed surplus was sold during harvest season and remaining 24.60 per cent in post harvest season. The average price of soybean was Rs.725 per quintal.

It was Rs.719 for the marketed surplus sold within the village and Rs.748 for the marketed surplus sold in the mandi. The price was lower in the harvest season (Rs.724) than the post harvest season (Rs.731).

7.6.1 Both gram and soybean were emerging and high value crops. These needed modern and high value inputs. In Narsinghpur district the extension activities of the J.N.K.V.V., Jabalpur had a definite impact on the cultivation of gram. In Indore district the extension activities of College of Agriculture, Indore and Central Soybean Research Institute, Indore influenced the farmers to adopt the recommended practices of soybean.

7.6.2 In the case of gram the farmers of Narsinghpur district very nearly adopted the recommended doses of seed, culture and Farm Yard Manure. The fertiliser doses used by the farmers were slightly lower than the recommended doses. The farmers were aware of the plant protection measures and used these according to the needs. Nearly entire quantity of seed and FYM was home produced. On the other hand super

phosphate and insecticides/pesticides were purchased in cash from the market. Urea was obtained from cooperative societies to the extent of 67.53 per cent. DAP was procured to the extent of 32.02 per cent from the cooperative societies. The farmers opined that neither all kinds of fertilisers were available in the cooperative societies nor these were available in time. Therefore, the farmers had to purchase fertilisers in open market at higher prices. Although the farmers got the inputs of desired quality and quantity, they had to pay higher prices.

7.6.3 In the case of soybean, the farmers of Indore district applied the recommended doses of seed and culture. The dose of FYM was nearly equal the recommended dose. Among fertilisers, the doses of DAP and single super phosphate were lower than the recommended doses. However, the dose of urea was equal the recommended dose. The insecticides and pesticides were applied according to the infestation. The seed and manure of soybean were home produced. Only about 15 per cent of the seed was taken from cooperative societies. The quantity of culture purchased in the open market was 58.25 per cent. The remaining quantity was obtained from cooperative societies. For fertilisers and insecticides farmers depended to a larger extent on cooperative societies. Only one third of the quantities of these were purchased from the open market. As regards quality, quantity and timeliness of inputs, two thirds of farmers had favourable opinion.

7.6.4 The processing of gram was done in dal mills. It was estimated that in one quintal of gram processed, 75 kg. of fine dal was obtained. The damaged dal weighed about 2 kg. Among the by-products bran weighed 12 kg., shell 8 kg. and small pieces 3 kg. The value of main product and by products derived from a quintal of gram was Rs.875. With the purchase price of gram being Rs.700, the gross profit came to Rs.175 or 25.00 per cent over the purchase price.

7.6.5 Soybean was entirely processed in the oil mills. Farmers sold soybean to different agencies and the agencies sold it to oil mills. The products obtained were oil and oilcake. One quintal of soybean contained 20 kg. of oil and 80 kg. of oilcakes. The price per quintal of oil was Rs.2,940 and that of oilcake Rs.570. Thus the value of oil came to Rs.588 and that of oilcake, Rs.456. The value of both the products together was Rs.1,044. The price of one quintal of soybean was Rs.930. The cost of processing was Rs.60 per quintal. With the product price of Rs.1,044, the net profit came to Rs.54 per quintal.

7.6.6 The first problem of gram marketing was that due to extensive cultivation the pressure on market channels and processing units increased tremendously. Many times these were not able to cope up with increasing production. This resulted in the export of gram to other states. The another reason for the export was no tax was levied on dal and therefore traders from neighbouring states purchased gram at competitive prices. The farmers suffered from three problems.

(i) The product being less hardy was sold in harvest and post harvest seasons, when there was a glut in the market and the prices were low.

(ii) As the farmer was not able to process, he was deprived of much higher prices, the dal obtained in the later period.

(iii) He not only faced distress sale but also had to wait for the returns for months.

The processors faced the problem of supply of electricity. It was neither adequate nor regular. The only way to benefit the small and big farmers was to set up dal mills in the cooperative sector.

7.6.7 Due to increasing production of soybean there was mounting pressure on the channels of marketing and markets themselves. However, due to the entry of oil federation (OILFED), the farmers have been benefitted by higher minimum prices and procurement in the village itself. The real beneficiary, however, was processor. He benefitted not only by oil which was a precious commodity but also by De Oiled Cake (DOC) which brought in foreign exchange. The farmers were deprived of benefits of export. If they wanted to share benefits they should form cooperatives for marketing and oil mills. Efforts should be made to make use of DOC within the country. This would lessen the dependence on export.

7.6.8 Both gram and soybean needed new and costly inputs. Farmers searched for them far and near. It was observed that not all the inputs were stored by government agencies and cooperatives. The inputs suffered from the ills of quality, adequacy, timeliness and prices. It is suggested that all efforts should be made to supply these through cooperative societies.

Recently the government started the scheme of selling the fertilisers through mandis. It was also thought of supplying pesticides through 'OILFED' at subsidised rates. These were welcome steps.

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A P P E N D I X T A B L E S

Appendix Table A 3.1 Monthwise arrivals of gulabi gram for the period 1981-82 to 1990-91, Narsinghpur mandi, M.P.

(Figures - quintals)

Month	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	Total
			A	R	R	I	V	A	L	S	
October	915	1,340	1,541	639	1,880	858	1,826	711	349	967	11,026
November	514	1,051	361	423	795	1,074	489	96	691	242	5,736
December	451	445	191	248	350	392	272	11	145	22	2,527
January	238	729	23	457	406	104	174	34	95	6	2,266
February	267	264	11	321	2	29	23	161	120	-	1,198
March	71	1,498	732	1,660	333	132	858	262	421	240	6,207
April	1,794	1,539	1,660	2,625	1,111	1,152	714	912	484	394	12,385
May	2,053	1,470	1,634	1,871	1,296	688	407	680	255	173	10,527
June	1,307	1,853	1,199	920	503	859	508	240	77	225	7,691
July	535	689	632	1,180	139	1,224	617	135	137	161	5,449
August	102	301	160	1,035	150	957	192	55	246	130	3,328
September	1,022	1,032	553	1,338	502	1,138	1,168	537	508	166	7,964
All	9,269	12,211	8,697	12,717	7,467	8,607	7,248	3,834	3,528	2,726	76,304

Appendix Table A 3.2 Monthwise arrivals of local gram for the period 1981-82 to 1990-91, Narsinghpur mandi, M.P.

(Figures - quintals)

Month	1981-82	1982-83	A 1983-84	R 1984-85	R 1985-86	I 1986-87	V 1987-88	A 1988-89	L 1989-90	S 1990-91	Total
October	1,143	2,431	2,149	2,197	1,326	3,163	3,120	2,543	2,885	4,773	25,730
November	1,376	5,003	1,648	1,117	1,351	3,295	1,016	1,012	3,525	1,542	20,885
December	1,487	1,866	572	636	536	817	312	389	1,422	530	8,567
January	914	2,091	157	244	198	687	55	278	895	179	5,698
February	328	2,362	112	5,336	30	588	4,441	3,447	1,647	212	18,503
March	1,260	4,882	6,363	5,174	3,597	1,592	10,463	9,899	9,480	5,128	57,838
April	3,925	4,879	6,366	5,202	3,226	10,505	7,279	13,961	6,742	8,046	70,141
May	7,020	4,992	8,500	3,143	5,282	7,390	3,989	9,574	4,221	8,228	62,339
June	3,526	2,942	3,891	1,418	1,828	4,062	3,138	4,019	1,576	6,678	33,078
July	3,434	1,170	2,332	1,972	487	2,492	1,678	4,074	1,304	4,748	23,691
August	1,100	913	490	1,031	747	1,650	860	1,995	2,939	4,049	15,774
September	1,062	1,307	2,333	1,149	2,594	1,189	2,848	5,119	2,020	5,543	25,164
All	26,585	34,838	34,913	28,619	21,202	37,430	39,199	56,310	38,656	49,656	3,67,408

Appendix Table A 3.3 Seasonal arrivals of gulabi gram for the period 1981-82 to 1990-91, Narsinghpur mandi, M.P.

(Figures- quintals)

Year	Seasonal Arrivals				
	Harvest	Post-harvest	Sowing	Pre- harvest	Total
	March, April & May	June, July & August	September, October & November	December, January & February	
1981-82	3,918	1,944	2,451	956	9,269
1982-83	4,507	2,843	3,423	1,438	12,211
1983-84	4,026	1,991	2,455	225	8,697
1984-85	6,156	3,135	2,400	1,026	12,717
1985-86	2,740	792	3,177	758	7,467
1986-87	1,972	3,040	3,070	525	8,607
1987-88	1,979	1,317	3,483	469	7,248
1988-89	1,854	430	1,344	206	3,834
1989-90	1,160	460	1,548	360	3,528
1990-91	807	516	1,375	28	2,726
Total	29,119	16,468	24,726	5,991	76,304

Appendix Table A 3.4 Seasonal arrivals of local gram for the period 1981-82 to 1990-91, Narsinghpur mandi, M.P.

(Figures- quintals)

Year	Seasonal Arrivals				
	Harvest	Post-harvest	Sowing	Pre - harvest	Total
	March, April & May	June, July & August	September, October & November	December, January & February	
1981-82	12,205	8,060	3,581	2,729	26,585
1982-83	14,753	5,025	8,741	6,319	34,838
1983-84	21,229	6,713	6,130	841	34,913
1984-85	13,519	4,421	4,463	6,216	28,619
1985-86	12,105	3,062	5,271	764	21,202
1986-87	19,487	8,204	7,647	2,092	37,430
1987-88	21,731	5,676	6,984	4,808	39,199
1988-89	33,434	10,088	8,674	4,114	56,310
1989-90	20,443	5,819	8,430	3,964	38,656
1990-91	21,402	15,475	11,858	921	49,656
Total	1,90,318	72,543	71,779	32,768	3,67,408

Appendix Table A 3.5 Monthwise arrivals of soybean for the period 1981-82 to 1990-91, Indore mandi, M.P.

(Figures - quintals)

Month	A R R I V A L S										
	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	Total
October	9,180	14,052	13,587	41,617	8,866	33,459	9,197	36,877	25,693	68,788	2,61,316
November	35,976	44,771	96,022	76,027	88,428	52,426	19,808	72,563	68,546	1,35,299	6,89,866
December	95,997	53,068	44,281	51,548	74,730	21,616	17,421	28,231	36,809	1,08,464	5,32,165
January	32,555	31,340	27,951	34,725	50,557	6,150	13,452	25,612	33,323	54,091	3,09,766
February	19,949	15,305	8,686	11,483	13,211	4,222	9,241	14,681	20,700	10,173	1,27,651
March	20,582	13,821	6,410	11,724	8,641	2,873	8,023	6,718	10,645	8,875	98,312
April	6,146	5,647	5,756	15,453	7,623	1,333	6,920	3,837	11,436	4,316	68,667
May	8,412	5,738	4,470	12,736	4,468	3,495	9,624	3,938	11,635	8,678	73,194
June	7,751	7,853	8,632	8,523	3,294	5,140	17,364	4,897	13,237	11,418	88,104
July	15,190	13,724	5,839	6,120	3,871	4,122	14,709	5,940	7,652	12,059	89,226
August	13,447	6,300	3,184	3,679	2,063	1,552	7,048	1,845	1,343	6,417	46,878
September	5,173	3,224	1,277	1,422	1,804	1,704	1,766	1,007	1,831	12,172	31,380
All	2,70,358	2,14,843	2,26,095	2,75,057	2,67,756	1,38,102	1,34,573	2,06,146	2,42,850	4,40,750	24,16,530

Appendix Table A 3.6 Seasonal arrivals of soybean for the period 1981-82 to 1990-91, Indore mandi, M.P.

(Figures- quintals)

Year	Seasonal Arrivals			Total
	Harvest	Post- harvest	Sowing & Pre- harvest	
	October, November, December & January	February, March, Apri. & May	June, July, August & September	
1981-82	1,73,708	55,089	44,561	2,70,358
1982-83	1,43,231	40,511	31,101	2,14,843
1983-84	1,81,841	25,322	18,932	2,26,095
1984-85	2,03,917	51,396	19,744	2,75,057
1985-86	2,22,581	34,143	11,032	2,67,756
1986-87	1,13,661	11,923	12,518	1,38,102
1987-88	59,878	33,808	40,887	1,34,573
1988-89	1,63,283	29,174	13,689	2,06,146
1989-90	1,64,374	54,416	24,063	2,42,850
1990-91	3,66,642	32,042	42,066	4,40,750
Total	17,93,113	3,67,824	2,55,593	24,16,530

Appendix Table A 3.7 Monthwise minimum price of local gram, for the period 1981-82 to 1990-91, Narsinghpur mandi, M.P.

(Figures- Rupees per quintal)

Month	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
October	180	225	230	230	463	515	378	830	687	700
November	190	207	280	270	460	530	403	730	603	630
December	175	216	330	325	460	502	411	714	616	615
January	195	204	360	360	440	504	437	687	597	624
February	215	214	315	310	370	482	389	650	569	602
March	250	222	341	280	383	400	386	564	576	576
April	280	213	267	260	400	358	465	550	603	540
May	300	218	317	317	402	351	477	640	611	552
June	280	216	350	356	406	324	525	640	669	580
July	290	244	403	403	443	308	603	620	730	576
August	300	235	404	404	486	304	613	707	683	610
September	290	240	425	425	489	300	700	730	701	572
Annual Average	245	221	335	328	435	407	482	672	637	598
Variation	125	40	195	195	119	230	314	280	132	160

Appendix Table A 3.8 Monthwise maximum price of local Gram, for the period 1981-82 to 1990-91, Narsinghpur mandi, M. P.

(Figures- Rupees per quintal)

Month	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
October	220	233	270	280	480	535	398	860	712	724
November	220	258	300	295	485	550	423	750	652	700
December	200	230	350	350	490	520	431	744	635	627
January	215	239	390	390	460	520	457	700	583	629
February	230	225	350	350	400	500	410	670	589	608
March	280	235	360	310	415	415	405	584	603	590
April	300	235	286	290	410	375	485	565	643	567
May	305	225	350	350	420	371	497	680	644	590
June	310	230	380	390	430	344	545	680	689	606
July	310	253	435	430	465	325	633	650	747	609
August	320	250	430	460	506	324	643	737	720	654
September	310	248	450	480	516	320	740	750	710	633
Annual Average	268	238	363	365	456	425	506	698	661	636
Variation	105	33	180	200	115	230	342	295	244	157

Appendix Table A 3.9 Indices of minimum monthwise prices of local gram for the period 1981-82 to 1990-91, Narsinghpur mandi, M.P.

Month	1981-82		Price Index								
	Price (Rs.)	Index	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
October	180	100	125	128	128	257	286	210	461	382	389
November	190	100	109	147	142	242	279	212	384	317	332
December	175	100	123	189	186	263	287	235	408	352	351
January	195	100	105	185	185	226	258	224	352	306	320
February	215	100	100	147	144	172	224	181	302	265	280
March	250	100	89	136	112	153	160	154	226	230	230
April	280	100	76	95	93	143	128	166	196	215	193
May	300	100	73	106	106	134	117	159	213	204	184
June	280	100	77	125	127	145	116	188	229	239	207
July	290	100	84	139	139	153	106	208	214	252	199
August	300	100	78	135	135	162	101	204	236	228	203
September	290	100	83	147	147	169	103	241	252	242	197
Annual Average	245	100	90	137	134	177	166	197	274	260	244

Appendix Table A 3.10 Indices of maximum monthwise prices of local gram for the period 1981-82 to 1990-91, Narsinghpur mandi, M. P.

Month	1981-82		Price Index								
	Price (Rs.)	Index	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
October	220	100	106	123	127	218	243	181	391	324	329
November	220	100	117	136	134	220	250	192	341	296	318
December	200	100	115	175	175	245	260	216	372	318	314
January	215	100	111	181	181	214	242	213	326	271	293
February	230	100	98	152	152	174	217	178	291	256	264
March	280	100	84	129	112	148	148	145	209	215	211
April	300	100	78	95	96	137	125	162	188	214	189
May	305	100	74	115	115	138	122	163	223	211	193
June	310	100	74	123	126	139	111	176	219	222	195
July	310	100	82	140	139	150	105	204	210	241	196
August	320	100	78	134	144	158	101	201	230	225	204
September	310	100	80	145	155	166	103	239	242	229	204
Annual Average	268	100	80	135	136	170	186	189	260	247	237

Appendix Table A 3.11 Monthwise minimum price of gulabi gram, for the period 1981-82 to 1990-91, Narsinghpur mandi, M. P.

(Figures- Rupees per quintal)

Month	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
Cctober	300	290	330	357	508	558	421	970	818	915
November	330	290	430	425	480	560	443	930	757	915
December	400	329	440	443	471	535	457	904	692	938
January	410	355	550	547	465	577	506	890	651	1161
February	430	348	490	490	367	592	433	760	596	-
March	390	298	350	350	402	446	473	630	625	871
April	400	255	311	310	409	466	548	670	706	874
May	390	265	350	350	425	520	525	830	692	903
June	360	275	400	409	442	505	560	750	719	925
July	390	321	440	441	513	506	674	730	822	1055
August	400	330	450	460	500	480	690	800	733	1279
September	410	355	460	480	541	490	800	820	829	1315
Annual Average	384	309	417	422	460	520	544	807	720	1017
Variation	130	100	239	237	174	146	379	340	233	376

Appendix Table A 3.12 Monthwise maximum price of gulabi gram for the period 1981-82 to 1990-91, Narsinghpur mandi, M. P.

(Figures- Rupees per quintal)

Month	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
October	350	350	400	380	530	588	451	990	843	925
November	360	361	450	460	500	590	477	970	793	1000
December	410	358	470	490	500	560	487	934	713	938
January	430	365	590	590	490	600	556	910	659	1161
February	440	348	520	520	390	620	463	780	611	-
March	450	346	380	380	425	466	493	652	667	921
April	430	306	340	340	440	490	578	700	759	940
May	400	280	380	380	450	545	553	900	737	933
June	390	389	430	430	470	525	590	780	720	945
July	410	346	480	475	540	526	700	760	836	1081
August	410	342	485	490	520	500	720	830	861	1279
September	430	370	540	510	560	510	850	860	845	1470
Annual Average	409	338	455	454	485	543	576	839	754	1054
Variation	100	90	250	250	170	154	399	338	250	545

Appendix Table A 3.13 Indices of minimum monthwise prices of gulabi gram for the period 1981-82 to 1990-91, Narsinghpur mandi, M.P.

Month	1981-82		Price Index								
	Price (Rs.)	Index	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
October	300	100	97	110	119	169	186	140	323	273	305
November	330	100	88	130	129	145	170	134	282	229	277
December	400	100	82	110	111	118	134	114	226	173	235
January	410	100	87	134	133	113	141	123	217	159	283
February	430	100	81	114	114	85	138	101	177	139	264
March	390	100	76	90	90	103	114	121	162	160	223
April	400	100	64	78	77	102	116	137	167	176	218
May	390	100	68	90	90	109	133	135	213	177	232
June	360	100	76	111	114	123	140	156	208	200	257
July	390	100	82	113	113	132	130	173	187	211	271
August	400	100	82	112	115	125	120	172	200	183	320
September	410	100	87	112	117	132	120	195	200	202	321
Annual Average	384	100	80	109	110	120	135	142	210	187	264

Appendix Table A 3.14 Indices of maximum monthwise prices of gulabi gram for the period 1981-82 to 1990-91, Narsinghpur mandi, M.P.

Month	1981-82		Price Index								
	Price (Rs.)	Index	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
October	350	100	100	114	109	151	168	129	283	241	264
November	360	100	100	125	128	139	164	132	269	220	278
December	410	100	87	115	120	122	137	119	228	174	229
January	430	100	85	137	137	114	140	129	212	153	270
February	440	100	79	118	118	89	141	105	177	139	236
March	450	100	77	84	84	94	104	110	145	148	205
April	430	100	71	79	79	102	114	134	163	177	219
May	400	100	70	95	95	112	136	138	225	184	233
June	390	100	74	110	110	121	135	151	200	185	242
July	410	100	84	117	116	132	128	171	185	204	264
August	410	100	83	118	120	126	122	176	202	210	312
September	430	100	86	126	119	130	119	198	200	197	342
Annual Average	409	100	83	111	111	119	133	141	205	184	236

Appendix Table A 3.15 Monthwise minimum price of soybean for the period 1981-82 to 1990-91, Indore mandi, M.P.

(Figures-Rupees per quintal)

Month	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
October	240	256	295	255	245	315	540	470	450	475
November	255	265	307	260	250	395	575	475	460	485
December	280	265	355	275	270	480	570	480	460	575
January	275	273	365	255	265	475	550	500	485	580
February	270	260	365	270	280	460	525	500	520	585
March	275	270	345	280	315	470	525	535	540	600
April	285	315	365	275	340	500	525	585	570	600
May	305	325	370	273	375	500	525	590	590	680
June	335	330	360	270	380	550	560	580	640	680
July	370	250	340	295	400	580	550	580	685	800
August	385	340	270	280	380	580	535	600	575	840
September	340	400	265	275	325	400	525	525	550	750
Annual Average	301	296	334	272	319	475	542	535	544	638
Variation	145	144	105	40	155	265	50	130	235	365

Appendix Table A 3.16 Monthwise maximum price of soybean for the period 1981-82 to 1990-91, Indore mandi, M.P.

(Figures- Rupees per quintal)

Month	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
October	251	270	312	265	272	325	570	515	470	510
November	265	272	318	268	270	417	590	490	480	525
December	287	282	375	285	278	490	600	510	480	635
January	288	294	378	262	280	485	570	535	510	680
February	284	290	375	276	295	475	540	525	540	665
March	282	315	365	286	325	480	545	575	565	750
April	293	350	375	280	370	520	545	615	590	670
May	318	360	385	278	385	550	545	625	610	740
June	340	360	370	274	390	615	580	610	660	740
July	405	270	355	305	415	605	585	615	695	840
August	400	365	300	290	390	625	560	625	625	875
September	357	445	270	280	355	440	540	550	600	780
Annual Average	314	323	348	279	335	502	564	566	569	701
Variation	154	175	115	43	145	300	50	135	225	365

Appendix Table A 3.17 Indices of minimum monthwise prices of soybean for the period 1981-82 to 1990-91, Indore mandi, M.P.

Month	1981-82		Price Index								
	Price (Rs.)	Index	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
October	240	100	107	123	105	102	131	225	196	187	198
November	255	100	104	120	102	98	155	225	186	180	190
December	280	100	95	127	98	96	171	204	171	164	205
January	275	100	99	133	93	96	173	200	182	176	211
February	270	100	96	135	100	104	170	194	185	193	217
March	275	100	98	125	102	115	171	191	195	196	218
April	285	100	111	128	96	119	175	184	205	200	211
May	305	100	107	121	90	123	164	172	193	193	223
June	335	100	99	107	81	113	164	167	173	191	203
July	370	100	68	92	80	108	157	149	157	185	216
August	385	100	88	70	73	99	151	139	156	149	218
September	340	100	118	78	81	96	118	154	154	162	221
Annual Average	301	100	98	111	90	106	158	180	178	181	212

Appendix Table A 3.18 Indices of maximum monthwise prices of soybean for the period 1981-82 to 1990-91, Indore mandi, M.P.

Month	1981-82		Price Index								
	Price (Rs.)	Index	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
October	251	100	108	124	106	108	129	227	205	187	203
November	265	100	103	120	101	102	157	223	185	181	198
December	287	100	98	131	99	97	171	209	171	167	221
January	288	100	102	131	91	97	168	198	186	177	236
February	284	100	102	132	97	104	167	190	185	190	234
March	282	100	112	129	101	115	170	193	204	200	266
April	293	100	119	128	96	126	177	186	210	201	229
May	318	100	113	121	87	121	173	171	197	192	233
June	340	100	106	109	81	115	181	171	179	194	218
July	405	100	67	88	75	102	149	144	152	172	207
August	400	100	91	75	73	98	156	140	156	156	219
September	357	100	125	76	78	99	123	151	154	168	218
Annual Average	314	100	103	111	89	107	160	180	180	181	223

Appendix Table A 4.1 Percentage of production of gram to total pulses in India, Madhya Pradesh and Narsinghpur district

(Figures-Percentages)

Year	India	Madhya Pradesh	Narsinghpur
1971-72	45.99	48.79	61.95
1972-73	45.80	49.14	56.08
1973-74	40.96	50.92	55.88
1974-75	40.09	51.23	55.46
1975-76	45.09	48.27	51.28
1976-77	47.74	54.92	58.88
1977-78	45.18	44.37	47.30
1978-79	47.11	48.61	55.77
1979-80	39.16	60.91	64.38
1980-81	40.73	52.86	58.88
1981-82	40.34	55.07	49.52
1982-83	44.61	63.04	58.56
1983-84	36.85	52.74	61.74
1984-85	38.13	55.61	63.49
1985-86	43.32	59.66	58.72
1986-87	38.71	59.37	64.43
1987-88	33.08	58.61	62.59
1988-89	37.04	55.49	59.18
1989-90	32.80	56.97	63.83
1990-91	37.55	60.95	71.35
1991-92	35.73	60.34	64.43
1992-93	35.29	60.78	65.13
1993-94	34.87	61.24	65.16
1994-95	34.46	61.70	66.24
1995-96	34.05	62.12	66.25
1996-97	33.66	62.52	66.26
1997-98	33.27	62.94	66.87
1998-99	32.88	63.35	66.86
1999-2000	32.52	63.77	67.44
2000-2001	32.15	64.09	67.82

Appendix Table A 4.2 Percentage of production of soybean to total oilseeds in India, Madhya Pradesh and Indore district

(Figures-Percentages)

Year	India	Madhya Pradesh	Indore
1978-79	2.97	13.57	70.00
1979-80	3.20	22.84	76.47
1980-81	4.69	15.95	73.68
1981-82	2.90	28.21	86.49
1982-83	4.90	35.13	89.19
1983-84	4.81	39.02	92.31
1984-85	7.34	55.88	95.00
1985-86	9.42	58.55	97.06
1986-87	7.26	54.07	95.89
1987-88	7.10	47.64	93.75
1988-89	8.58	55.92	96.84
1989-90	10.67	63.00	98.60
1990-91	13.98	68.04	99.47
1991-92	11.50	63.75	99.32
1992-93	11.91	64.59	99.37
1993-94	12.29	65.30	100.00
1994-95	12.64	65.96	100.00
1995-96	12.96	66.52	100.00
1996-97	13.26	67.04	100.00
1997-98	13.54	67.47	100.47
1998-99	13.81	67.88	100.44
1999-2000	14.06	68.27	100.42
2000-2001	14.29	68.60	100.60