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Dr. P.K. Mishra
Prof. & Head

No. AERC/ Report/2005-06 Dated: 28.03.2006

To,

Dr. R.C. Ray,
Adviser,
Directorate of Economics & Statistics,
Department of Agriculture & Cooperation,
Ministry of Agriculture, Government of India,
AER Division, C-1, Hutments, Dalhousie Road,
NEW DELHI- 110 011

Dear sir,

Please find enclosed herewith a copy of the Draft Report alongwith its executive summary entitled **"Success Stories from Organic Farming : Do yield and / Returns Increase or Decrease on Organic Farms (A Study in Madhya Pradesh)** for perusal. Please suggest improvement etc. if need in its contents.

Please acknowledge the same.

Professor & Head

Study No. 94

SUCCESS STORIES FROM ORGANIC FARMING : DO YIELD AND / RETURNS INCREASE OR DECREASE ON ORGANIC FARMS A STUDY IN MADHYA PRADESH

A.M. MISHRA

AGRO - ECONOMIC RESEARCH CENTRE
FOR MADHYA PRADESH AND CHHATTISGARH
JNKVV, JABALPUR (M.P.)
MARCH, 2006

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EXECUTIVE SUMMARY

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MARCH, 2006

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S. J. SINGH	:	Technical Assistant
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COMPUTER TYPING

SIKANDAR KHAN

PREFACE

The Directorate of Economics and Statistics, Ministry of Agriculture, Government of India asked two Agro Economic Research Centres to conduct study titled ***"Success stories from organic farming : Do yield and/ returns increase or decrease on organic farms"*** This Centre took up this study for the State of Madhya Pradesh.

The study is based on field data collected from selected 150 farmers and secondary data related to organic farming. From the findings of the study highly significant observations were recorded in favour of organic farming.

Farmers are now realising the importance of organic farming as they have partly started to grow wheat, gram, lentil, soybean, coriander and vegetables by using organic inputs like FYM, NADEP, Vermi compost, Bio fertilisers etc. These crops were found on selected farms, partly organic and inorganic.

Productivity of organic crops on same field is increasing gradually. Productivity of organic and inorganic crops were compared. Although productivity of inorganic crops were higher than organic. The cost benefit ratio of selected organic and inorganic crops revealed that organic crops are more remunerative than inorganic crops.

The valuable suggestion drawn on the basis of results will be useful, to farmers, scientist, officers of State Agriculture Department of Madhya Pradesh etc.

I wish to express my deep sense of gratitude to the officials of the Directorate of Economics and Statistics, Department of Agriculture & Cooperation, Ministry of Agriculture, Government of India, New Delhi for assigned study to this Centre.

On behalf of the Centre, I express my deep sense of gratitude to Dr. D.P.Singh, Hon'ble Vice-Chancellor, Dr. V.S. Tomar, Director Research Services, Dr. C.B. Singh, Director Extension Services, Dr. J.S. Raghu, Dean, College of Agriculture and other officials of J.N. Krishi Vishwa Vidyalaya, Jabalpur for extending help and guidance at various stages in successful completion of this study of high importance.

I am very thankful to the states and districts level and other staff of the department of Agriculture, of Madhya Pradesh for providing not only secondary data but also helping in collection of field data from the selected farmers.

All the scientists and supporting staff members of Agro-Economic Research Centre and Department of Agricultural Economics & Farm Management deserve to be complemented for their untiring efforts in bringing this study to its perfect shape.

Dr. A.M. Mishra, Principal Scientist was the Officer In charge of the study. He planned the field work, tabulation scheme and submitted the report. He was ably assisted by Mr. S.J. Singh, Technical Assistant and Mr. C.K. Mishra, Junior Computer in the field work as well as in tabulation of data. Mr. Sikandar Khan did the Computer typing. Mr. C.K. Mishra also did the photocopy work. All of them deserve appreciation. I am also thankful to state and District level official and selected farmers.

I hope the findings and suggestions made in the study would be useful to the policy makers of the States and Govt. of India.

(P.K. Mishra)
Professor & Head

C O N T E N T

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CHAPTER – I

INTRODUCTION

Organic agriculture means sustainable incremental agriculture. The word sustainable agriculture refers to the successful management of resources of agriculture to meet changing human needs for maintaining quality of life and environment. Organic system of farming is a system, which qualifies to be ecologically sound and countable, socially adaptable and acceptable, economically viable by producing good quality and advocates plant respect and social justice, ensures minimum risk. Organic agriculture therefore means "conservation of living library of options for adopting to local and global change".

Organic farming system rely on ecologically based practices, such as cultural and biological pest management and virtually exclude the use of synthetic chemical in crop production and prohibit the use of antibiotics and hormones in livestock production. Organic agriculture is an environment friendly ecological production system that promotes and enhances biodiversity, biological cycles and biological activities.

1.1 Concept of organic farming

The concept of organic farming has been perceived differently by different people. To most of them, it implies the use of organic manures and natural methods of plant protection instead of using synthetic fertilizers and pesticides. It is by some as farming involving the integrated use of fertilizers and pesticides. It is regarded by some as farming involving the integrated use of fertilizers and organic manures as well as to chemical and natural inputs for plant protection. In either case of concept has been understood only partially.

Organic farming does not imply the simple replacement of synthetic fertilizers and other chemical inputs with organic inputs and biologically active formulations. Instead, it envisages a comprehensive management approach to improve the health of underlying productivity of the soil.

In a healthy soil the biotic and abiotic components covering organic matter including soil life, mineral particles, soil, air and water exist in a stage of dynamic equilibrium and regulate the ecosystem process in mutual harmony by complementing and supplementing

each other. The success of organic farming depend to a great extent on the efficiency of agronomic management adopted to stimulate and augment the underlying productivity of the soil resource.

1.2 Definition of Organic farming

Organic farming has been defined differently, but the description offered by Lampkin (1990) appears to be most the comprehensive one covering all essential features. As per this description, organic farming is a production system which avoids or largely excludes the use of synthetic compounded fertilizers, pesticides, growth regulators and livestock feed additives. To the maximum extent feasible, organic farming system relies on crop rotations, crop residues, animal manures, legumes, green manures, off farming organic wastes and aspect of biological pest control to maintain soil productivity and filth, to supply plant nutrient and the control insects, weeds and other pests. The concept of soil as living system that develops the activities of beneficial organism is central to this definition.

1.3 Objectives of organic farming

The objectives of organic farming are been concisely expressed in the standard document of the Internationals Federation of Agriculture Movement (IFOAM) as follows :-

1) To produce food of rich nutritional quality in sufficient quantity.
2) To work with natural systems rather than seeking to dominate them.
3) To encourage and enhance the biological cycles with in farming system involving micro-organisms, soil flora, plant and animals.
4) To maintain and increase the long term fertility of soils.
5) To use, as far as possible, renewable resources in locally organized agricultural systems.
6) To work as well as possible, with in a closed system with regard to organic matter and nutrient elements.
7) To avoid all forms of pollution that may result from agricultural fechniques.
8) To allow agricultural producers adequate return and satisfaction from their work including a safe working environment.
9) To consider the wider social and ecological impact of the farming system.

Table 1.1 Potential of crop residues in India

Crops	Residues yield (million tonnes/ year	Nutrient Content (%)			Nutrient potential ('000 tonnes)
		N	**P**	**K**	
Rice	236.2	0.62	0.09	1.15	1393.8
Wheat	105.5	0.44	0.08	0.98	588.3
Sorghum	62.3	0.52	0.10	0.97	216.2
Size	15.7	0.57	0.08	1.20	119.4
Pulses	15.6	0.30	0.06	0.96	111.6
barely	3.5	0.51	0.08	1.10	98.8
Sugarcane waste	103.4	0.45	0.09	1.16	270.7
Potato	42.4	0.51	0.08	0.85	63.9
Groundnut	1.10	1.62	0.12	1.23	277.3
Cotton stalks	4.50	0.23	0.05	0.38	99.3
Total	680.2				3239.3

Source : Jain et.al (1996)

Table 1.2 Arrange nutrient content of common farm residues

S. No.	Residues yield (million tonnes/ year	Nutrient Content (%)		
		N	**P**	**K**
1	FVM	0.80	0.41	0.74
2	Paddy Straw	1.59	1.34	3.37
3	Wheat straw	2.90	2.05	0.90
4	Water hyacinth compost	2.00	1.00	2.30
5	Sugarcane trash	2.73	1.81	1.31

Source : Rani Perumal (1994) Residual effect of manures in organic farming. National training on organic farming. Tamil Nadu Agricultural University, Coimbatore.

1.4 Current State of Organic farming

Recent years have witnessed very rapid growth in organic farming, particularly in Europe and United States, but also in many other regions of the world including china, Latin America and Africa. In the European union, certified and policy supported organic production accounted for just 100,000 ha. on 6300 holding in 1985, or less than 0.1% of total utilizable agricultural area (U.S.A.). By the end of 1998, this had increased to more than 2.8 in ha. on 113,000 holdings a 30 fold increase in 13 years (Lamp Statistics for 1993-1996).

Consumer demand for healthier food has been considered. One of the major factors influencing increased consumer for organic food (Honikel, 1998). This perception is probable reflected in the lower consumption of livestock products and the consumer most likely to pay organic food (Brombacher, 1992).

Among side the increase in the supply base, the market for organic produce has also grown. In Canada, the growth of the market for organic produce was approximately 25% per annum (Hill and Mucrae, 1992).

The Study titled "**Success stories from organic farming: Do yield and/ or returns increase or decrease on organic farms"** was assigned to two Agro-Economic Research Centres located at Jabalpur and Pune by the Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India during the year 2004-05.

1.5 Objectives of the Study

The broad objectives of the study are :

1) To examine the use of viable alternatives to inorganic fertilizers, chemical pesticides.
2) To study the rate of substitution of organic, bio pesticides V/s inorganic fertilizers, chemical pesticides.
3) To find out the most profitable relatively advantageous organic farming system over conventional farming.
4) To examine the certification norms of organic produce.
5) To study the performance and potential of organic produce in niche market (export).

1.6 Methodology

The study is based on both secondary and primary data. The secondary data were collected from the year 2000-01 from those villages which were declared by the State Govt. as organic villages. Primary data were collected from those districts which covered highest area under foodgrains, oilseeds and horticultural crops respectively. For foodgrains crops Vidisha district was selected. Similarly, for oilseeds and horticultural crops, Ujjain and Guna districts were selected respectively. The study is confined to the major crops specially grown by organic basis in the selected districts of the state.

1.6.1 Selection of blocks

Since the study was concerned with the success story of organic farming, two development blocks were selected from each district which showed good performance in respect to organic farming. In this way, six blocks were selected from three districts.

1.7 Sample Design

1.7.1 Selection of villages

From each block two bio-villages were selected on the basis of same criteria i.e. performance of organic farming (Table 1.3)

Table 1.3 List of three selected districts, blocks and villages.

S. No.	District	Block	Village
1	Vidisha	1 Vidisha	1 Palki 2 Jewajipur
		2 Ganjbasoda	1 Rajoda 2 Masudpur
2	Guna	1 Guna	1 Barodia 2 Mangwar
		2 Raghavgarh	1 Ramnagar 2 Meerpur
3	Ujjain	1 Ujjain	1 Dhawlarewani 2 Brajkhedi
		2 Ghatia	1 Jaithal 2 Jalwa

By this way a total of 12 villages were selected from 6 blocks of three districts

1.7.2 Selection of Farmers

From each selected block 25 farmers in different size of holding were selected who have adopted the use of organic inputs in cultivation of different crops. In such a way, 150 farmers were sampled from three selected districts. Survey was conducted by personal interview from the selected organic farmers in a prepared questionnaire.

1.8 Reference Year

Year 2003-04 was taken as reference year for farm level information.

1.9 Analytical Frame Work

Average, percentage and ranking statistical techniques were used to analyzed the collected data.

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CHAPTER - II

ORGANIC FARMING IN MADHYA PRADESH

In Madhya Pradesh organic farming practices are being implemented under the guidance and supervision of a team of experts comprising scientists, environmentalists, and food management personals in 1565 villages selected from 313 blocks of 48 districts in the State. Use of agro-chemicals in these selected villages for growing crops is strictly prohibited. Nutrients to the crops are provided through green manuring, composts, phospho composts, fermented preparations prepared from cow dung and urine etc.

Pests are being managed through use of neem and cow urine based fermented preparations. Most of the organic farmers in these villages are following the principles of diversity in crops, variability in farm operations and integration of crop production system with livestock maintenance/Crop wastes are being used as valuable feed to the livestock and livestock wastes like dung and urine are used as resources for providing nutrients as well as managing the pests problems.

The success of this programme is evident from the fact that these villages have become model for other. The message of growing crops through organic resources is spreading from village to villages through farmers contact programme. During the year 2004-05 five cultivators have been selected for Organic farming from each village of the state.

M.P. is endowed with varying climatic conditions, soils and diverse cropping pattern. Its land area has therefore been divided into 11 agro-climatic zones. Significant progress and development in agriculture have taken place in M.P. in the last couple of decades.

Foodgrain production has more than doubled. In food grain production it is only next to U.P. and Punjab. It contributes 7.7 per cent of total food grain production of India. M.P. by contributing 24 and 25 per cent of total pulses and oil seeds production in India occupies first position in the country.

2.1 Importance of Organic Farming

Conventional food production technologies are highly energy intensive and leads to the problems of soil and food contamination with agro-chemicals, ground water depletion and gradual decline in soil productivity. Consequently, farm profitability has declined considerably. This has also resulted in irreversible losses of certain natural resources like soil due to erosion and depletion in ground water. Remedial measures have to be initiated in the state with people participating approach under National Watershed Development programme to recharge ground water and prevent soil losses. Realizing the problems of decline in farm profits and quality of food produced through use of agro-chemicals, M.P. Govt. has launched a programme of bio farming.

To achieve the best result of the bio farming programme, Madhya Pradesh Govt through State Agriculture Department fixed the following organic farming programme components, its target and achievement in the year 2002-2003 (Table 2.1)

Table 2.1 Organic farming programme target & achievement for 2002-03

(Financial Unit in Lakh)

S. No.	Name of Component	Unit	Target & achievement for 2002-03			
			Target		Achievement	
			Phy.	**Fin.**	**Phy.**	**Fin.**
1	B.G.A. Production Unit	Nos	9	13.50	6	10.12
2	Subsidy on Culture, Production	Qtls.	10	1.00	12	0.40
3	Subsidy on Culture Distribution	Qtls.	200	2.00	31	0.30
4	Subsidy on Green Manure Seed Production	Qtls.	3000	15.00	312	1.40
5	Subsidy on Green Manure Seed Production	Qtls.	50000	250.00	22794	108.30
6	Nadep Phospho Compost	Nos	25000	50.00	15847	27.21
7	Training Programme	Nos	626	37.56	604	36.73
8	Vermi Composting	Nos	7000	35.00	11484	42.13
9	Divisional Workshop	Nos	14	7.00	14	12.23
10	State Level Workshop	Nos	2	1.00	0	0
11	Assistance to NGOs	Nos	0	5.94	0	0
12	Publicity & Extension	--	--	12.0	--	19.66
	Total		**--**	**430.00**	**--**	**258.48**
	G.O.I. share		**--**	**387.00**	**--**	**232.62**
	State Share		**--**	**43.00**	**--**	**25.85**
	Total		**--**	**430.00**	**--**	**258.48**

Source : Directorate of Agriculture M.P. Bhopal

2.2 Extent of Organic Farming

Organic and Sustainable farming was initiated in 2001-02 in Madhya Pradesh. In first year it was started in one village in each block of all 45 districts of M.P. In second year i.e. 2002-03 in addition to first village two villages were included in organic farming village. In 2003-04, 2 another villages were included in each block. In such a way 5 villages in each block i.e. 313 blocks of 48 districts of Madhya Pradesh were declared as bio village.

Components of Organic Farming

1. NADEP COMPOST :

This compost method was developed by Naryan Devrao Pandri Pandey. A brick structure measuring 10'x6'x3' is prepared with holes in the side walls to ensure adequate supply of air during composting. The brick tank is filled with farm wastes, soil and cow dung and water is added to maintain moisture between 60-75% . A tank is filled with soil, 16-18 qtls, farm wastes 14-16qtls, dung 1-1.2qtls. Water is added to moisture the material and upper layer is plastered with soil and dung mixture. After 75-90 days of composting, microbial culture of Azotobacter, Rhizobium and phosphate solubilizing bacteria are added into the mixture. Compost becomes ready for use within 110-120 days. One tank provide about 2.5-2.7 t of compost sufficient for one hectare land.

Another kind of nadep is known as BHU-NADEP .In this construction of tank by bricks are not required. Method of filling is same as above.

2. NADEP PHOSPHO COMPOST :

This is a method to prepare phosphorus enriched compost using farm wastes, rock phosphate and phosphate solubilizing bacteria. Insoluble phosphorus present in rock phosphate is transformed into soluble form through the action of certain specific micro organisms during the process of composting.

Compost is prepared using farm wastes, cow dung and soil as the quantity given for preparation of nadep compost .Rock phosphate is added to this mixture @ 12.5% w/w. This mixture is filled either in pit, NADEP tank or BHU-NADEP. This material is plastered with a mixture of dung and soil after adding sufficient water to moisten the decomposing mixture. The material is turned after 15 days and thereafter at an interval of 30 days. At each turning water is added to maintain sufficient moisture. Compost becomes ready within 3-4 months and contains N,1%, P2O5, 2-4% and K2O, 1-2%. One equal P2O5 basis this compost can substitute the use of phosphatic fertilizers in crops.

3. VERMI COMPOST :

Earthworms are used to prepare compost from farm and livestock wastes. Earthworms continuously feed upon the organic residues and produce casts. This casts is generally termed as vermi compost, Casts of earthworms are usually rich in nutrients and organic matter and therefore serves as a good source of manure for growing crops. Certain earthworms like Eisenia foetida, Perionyx excavatus and Eudrilus eugeniae are specifically suited for the preparation of vermicompost. Vermicompost contains N,1.0-1.5% P2O5, 0.2-1.0% and K2O. 1-2% depending upon the raw materials used.

4. BIO GAS SLURRY:

Biogas slurry is a good manure. Slurry is dried in solar drier. Dried slurry is directly applied in fields.

5. GREEN MANURES:

Several green manure crops provide sufficient organic matter and nitrogen for growing crops. Dhaincha and sunhamp are two most common green manure crops normally used as a source of nutrients and organic matter. They have potential to supply 60-90 kg nitrogen within a period ranging between 45-60 days. Green manuring also help in providing large amount of easily decomposable organic matter to the soil which accelerate the nutrient cycling processes and make available nutrients to the crops. One tones Dhaincha dry matter add N 26,2Kg, P 7.3Kg, K 17.8Kg, S 1.9 Kg, Ca 1.4 Kg ,Mg 1.6 Kg , Zn 25ppm,Fe105 ppm Mn 39 ppm, Cu 7ppm per hectare in soil.

6. BIO FERTILIZER:

Microorganismslike Azotobacter, Azospirillum, Rhizobium, Blue green algae and Phosphate solubilizing bacteria are being used as biofertiliser in different crops. These microorganisme promote plant growth through different process like nitrogen fixation phosphate solubilizer and production of plant growth substances. Blue green algae and Azola are been successfully used as biofertilizer in paddy.

7. BHABHUT AMRIT PANI:

This is a preparation made by mixing cow dung 10Kg with desi ghee 250gms and honey 500gms. This material is mixed with 200 liter of water and spread in the field after sowing a crop.

8. AMRIT SANJEEVANI :

This is fermented preparation made up of cow dung 60kg, urea 3kg, single super phosphate 3 kg. Murate of potash 1.0 kg. and ground nut cake 2 kg and water 200 liter. The mixture is fermented for two days in a container. This material is sprayed over the crop two-three times in one acre area.

9. MATKA KHAD

This is a preparation made by mixing 15 kg. cowdung, 15 kg. cow urine, 15 leter water and 250 gram gur in a MATKA. This mixture container should be covered by cloth or tat soil. After 4-5 days this material be mixed in 200 litrres water and sprayed on the crop in one acre area 15 days after showing and repeat after one week. In general 3 to 4 time spray is required but crop like sugarcane, Banana, require 8 time spray.

10. I.P.M. (INTEGRATED PEST MANAGEMENT)

In recent years, the use of pesticides in agriculture has become a controversial issue because of their potential adverse effect on public health and environment. More over, the effectiveness of pesticides is reported to be declining with time. A number of insects pests and diseases have developed resistance to pesticides that were being used to control than, with rising public concerns about economic and ecological externalities of the chemical pesticides, the emphasis of plant protection research and development. Strategies has gradually been suffering from chemical to non chemical approach. Among the non-chemical approaches, 1 PM has emerged as one of the important alternatives. It includes application of bio organism in consumption with chemical pesticides, agronomic practices and mechanical control. Empirical evidences from several studies have provided a broad indication that 1PM is as profitable as the chemical pesticides. These evidences, however,

are based on a limited number of observations collected from farmers identified for 1 PM demonstrations and issues concerning adoption, consumption and impact of 1 PM are yet to be investigated properly.

2.3 Provision of Subsidy for devel1opment of organic and sustainable farming in M.P.

Subsidy provision for the development of organic/ sustainable farming in all the bio village of M.P. The different components of organic farming i.e. Nadep phospho complex blue green algae green manure seed, trainers training and farmer's training for the development of organic farming in bio villages of Madhya Pradesh (Table 2.2)

Table 2.2 Subsidy for organic and sustainable agriculture to farmers in organic villages of M.P.

S. No.	Components	Subsidy	
1	NADEP PHOSPHO COMPOST	Rs. 200 or 75% of the total cost	
2	Blue Green Alage	Rs.1000 or 50% of mother culture of BGA per hectare/ per farmer	
3	Green Manure Seed	Rs.500 or 50% of total cost of Green Manure Seed per hectare per farm.	
4	Trainer's Training	Rs.2,500 for 2 days training of extension workers.	
		1) Per Scientist remuneration- Rs.200.00	Rs. 1,200.00
		2) Publication and other expenses	Rs. 1,300.00
		Total	Rs. 2,500.00
5	Farmer's Training	One day training of 50 farmers	Rs. 5,000.00
		Per farmer per day Rs. 50.00	Rs. 2,500.00
		Literature and stationary expenses	Rs. 400.00
		Management cost which include tents, carpets etc.	Rs. 1,500.00
		Scientist/Subject Mater specialist per scientist/SMS- Rs. 200	Rs. 600.00
		Total	Rs.15,000.00

Limitation of this project is that, the secondary data on cropwise area/production and yield etc. under organic farming at districts/ state level are not available. Like inorganic farming agriculture statistics were published by govt. of M.P. not available for organic farming. Therefore the picture of success story of organic farming in Madhya Pradesh has been described in chapter IV on the basis of primary data of selected farmers of selected districts.

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CHAPTER- III

PROFILE OF STATE AND SELECTED DISTRICTS

3.1 General

The present state of Madhya Pradesh came into existence on 1st November 2000 when a separate state of Chhattisgarh was carved out of the old Madhya Pradesh. The present state of M.P. is surrounded by five states namely; Uttar Pradesh, Rajasthan, Gujarat, Maharashtra and Chhattisgarh, and is nearly centrally located in the country. The state is interspersed with hills, plateaus, plains and rivers. The state lies between latitudes21°53' to 22°59' north and longitudes 76°47' to 78°44' east. The total geographical area of the state is now 307.56 thousand sq. kms. which is 9.4 per cent of the total geographical area of the country. The state has 9 revenue divisions, 48 districts, 272 tehsils, 313 community development blocks, 394 town/ cities and 55,392 villages.

3.2 Population

According to 2001 census, the total population of the state works out to 603.85 lakhs forming 5.88 per cent of the population of the country. Of this the male population is 314.57 lakhs (52.15 per cent of the total population) and female population, 289.28 lakhs (47.85 per cent of the total population).

The state is basically rural as 73.50 per cent of the population resides in villages. Conversely about one fourth (26.50 per cent) of the population is urban. The percentage of scheduled tribe population to total population works out to 20.27 per cent and similarly the percentage of scheduled caste population is 15.17 per cent. The decadal growth rate of population (1991-2001) works out to be 24.34 per cent as against 21.34 per cent for the country as a whole.

Of the total population, 42.75 per cent population is within the category of total workers and remaining 57.25 per cent as non worker. The non workers includes children and the old and infirm persons. The number of main workers is 31.66 per cent and marginal worker, 11.09 per cent. Of the total workers (25756485), 42.93 per cent are cultivators, 28.66 per cent agricultural labourers and remaining 28.41 per cent, other workers.

The density of population is far below for the state (196) persons per sq. km. as compared to the all India average of 324. The sex ratio (females per thousand males) is 920in the state Literacy in the matter of literacy, the state literacy percentage (64.05) has come up closer to All India average of 65.30 per cent. While in the matter of male literacy the state edged a bit better (76.50 per cent) than the country as a whole (75.85 per cent). In the case of female literacy it lagged bit behind (50.58 per cent) the nation (54.16 per cent). The literacy in urban population is 79.67 per cent, whereas, it is 58.10 per cent in rural population.

3.3 Operational holding

According to the Agricultural census 1995-96, an area of 1,64,99,925 hectares was operated by 65,61,235 farmers in the state. Nearly 21.65 per cent area of the state was operated by 60.45 per cent marginal & small farmers. On the other hand, 54.54 per cent land was operated by only 17.95 per cent larger group of farmers (medium & large farmers). The average size of holding of the state was 2.51 hectares.

3.4 Land Use Classification

The total geographical area of the state was 307.56 lakh hectares. Nearly half (47.54 per cent) of it was net area sown. The area under forest formed 27.89 per cent, about 5.00 per cent less than the desirable proportion of 33.00 per cent. The area not available for cultivation formed 10.76 per cent. Besides this, area under other uncultivated land excluding fallow land formed 4.60 per cent, culturable waste land, 3.94 per cent and fallow land, 5.27 per cent. These categories of land are prone to loss due to various kinds of erosions including run off. It is, therefore, suggested that high priority be given to the conservation of land and water resources of the state. The gross cropped area of the state was 181.81 lakh hectares with a cropping intensity of 124 per cent.

Of the gross cropped area, rabi crops occupied 40.99 per cent and kharif crops, 59.01 per cent. Similarly, food crops occupied 64.97 per cent and non food crops, 35.03 per cent area of the gross cropped area. The consumption of fertilizer in the state is about 48 kg. per hectare.

3.5 Irrigation

The net irrigated area of the state was 4494.3 thousand hectares. The main sources of irrigation were wells which contributed 41.79 per cent of the irrigated area. The next important sources of irrigation were tubewells and commanded 24.69 per cent of the irrigated area, followed by canals (16.65 per cent). Tanks contributed only 2.08 per cent, whereas, other sources such as stop dams and irrigation done by fitting pumps on rivers, rivulets and nallahs formed 14.79 per cent. The gross irrigated area of the state was 4631.0 thousand hectares with a irrigation intensity of 103.04 per cent.

3.6 Agricultural Implements

In the year 2002-03, the number of wooden plough in the state was 3218.10 thousands and iron plough were 527.51 thousand. The number of bullock carts was 1316.54 thousand, tractors, 218.05 thousands, electric pump 1158.51 thousand and oil engine 218.07 thousands.

3.7 Livestock and Poultry

The total livestock in the state numbered 313.50 lakhs. It comprised mainly of cattle (56.23 per cent), goat (19.83 per cent), buffaloes (19.68 per cent), sheep (2.34 per cent) and pigs (1.48 per cent). The number of poultry birds was 82.29 lakhs.

3.8 Cropping Pattern

The cropping pattern of the state was food crops oriented as this group of crops occupied 64.97 per cent of the gross cropped area. Among food crops the share of foodgrains was 62.74 per cent having only small proportions to crops like sugarcane, spices, fruits & vegetables. Among food crops 39.91 per cent area was occupied by cereals and 22.83 per cent by pulses. Among cereals, wheat occupied highest area (18.60 per cent) followed by paddy (9.25 per cent), maize (4.73 per cent) and Jowar (3.60 per cent). Similarly in the case of pulses, gram occupied 13.59 per cent area followed by urad (2.86 per cent) and lentil (2.57 per cent). Non food crops which occupied 35.03 per cent area of the gross cropped area mainly comprised of soybean which formed 23.05 per cent of the gross cropped area. While other oilseeds like rapeseed mustard (2.03 per cent), groundnut (1.14 per cent), cotton (3.08 per cent) and fodder (3.44 per cent) contributed to the rest non food crops area.

3.9 Production and Productivity of Principal Crops

The important cereals of the state were paddy, maize, jowar and wheat. The major pulses of the state were gram, arhar, lentil, urad and pea. Among oilseeds, soybean, rapeseed and mustard, groundnut and linseed were important.

The production of paddy in the state was 1032 thousand tonnes and the yield per hectare was 646 kg. M.P. ranks 14th position in India in the case of paddy production against ranks 1st position in maize production (1,494 thousand tonnes). In the case of jowar production (600 thousand tonnes), the position of M.P. is third. In the case of wheat production, the position of M.P. in the country is 5th M.P. state ranks seventh in the case of total cereals production. The production of total pulses in the state was highest (2,377 thousand tonnes). In the case of pulses production, the state ranks first position. In the case of total foodgrains production (10750 thousand tonnes), the state ranks 8th position in the country. Among oilseeds, the major oilseed crop was soybean having 2,674 thousand tonnes production. The state of M.P. ranks first in soybean production. In the case of total oilseeds production (3144 thousand tonnes), the position of state is first.

Among cereals, the yield of paddy, jowar, bajra, maize, wheat and barley were 646, 921, 744, 1,751, 1,520 and 1,257 kg./hectares respectively. The yield of gram, tur, urad, lentil and pea were 694, 614, 279, 387 and 401 kg./hectares respectively. Among oilseeds, the yield of rapeseed mustard was highest (650 kg./ha) followed by soybean (638 kg./ha) groundnut (619 kg./ha.), linseed (353 kg./ha) and sesamum (230 kg./ha).

3.10 Irrigated Crops

The most important irrigated crop of the state was wheat which occupied 52.65 per cent of the irrigated area under all the crops. Gram was another important irrigated crop occupying 23.08 per cent. Paddy occupied 4.81 per cent followed by cotton (3.73 per cent), fruits and vegetables (3.35 per cent), rapeseed mustard (2.73 per cent) and spices (2.35 per cent) of the irrigated area.

If we note the percentage of irrigated area under a crop to gross area under the crop, it would be noted that wheat was irrigated to the extent of 72.10 per cent and gram was irrigated to the extent of 43.26 per cent. Paddy and barley were irrigated to the extent of 13.25 and 41.16 per cent respectively. In oilseeds, rapeseed mustard was irrigated to the

extent of 34.18 per cent. Cotton was irrigated to the extent of 30.82 per cent. Some crops or crop groups although occupied smaller area were dependent on irrigation. Therefore, in such crops or crop groups the extent of irrigation was quite high. Such crop/ crop groups were sugarcane (99.56 per cent), spices (75.40 per cent), fruits and vegetables (80.86 per cent) and sunflower (62.5 per cent) (Table 3.1).

Table 3.1 Profile of Madhya Pradesh State (2001)

S. No.	Particulars	Unit				
1.	**Location or situation**		Latitudes 21°53' to 22°59' N Longitudes 76°47' to 78°44' E			
2.	Geographical area (2002-03)	'000 sq.km.	307.56			
3.	Number of Districts	No.	48			
4.	Number of Tehsils	No.	272			
5.	Number of Blocks	No.	313			
6.	Number of Villages	No.	55,392			
7.	Rainfall (Annual)	mm.	1,165			
			Number		Percentage to total population	
8.	**Total population** (2001 Census)	Lakh	603.85		100.00	
	(A) Male population	Lakh	314.57		52.15	
	(B) Female population		289.28		47.85	
	(C) Rural population	Lakh	443		73.50	
	(D) Urban population	Lakh	161		26.50	
	(E) Scheduled Castes population	Lakh	91.55		15.17	
	(F) Scheduled Tribes population	Lakh	122.33		20.27	
	Decadal growth rate(1991-2001)	Percentage	24.34		--	
9	**Classification of working population**	(2001 census)	Number		Percentage to total population	
	Total workers (main + marginal worker)		2,57,56,485		42.75	
	Main workers		1,90,77,568		31.66	
	Marginal worker		66,78,917		11.09	
					Percentage to total workers	
	Cultivator		1,10,58,500		42.93	
	Agricultural labour		73,80,878		28.66	
	(Other workers)		73,17,107		28.41	
10	**Density of population** (2001 census)	Per sq. km.	196			
11	Female/ Male **Sex Ratio**		920 / 1000			
12	**Percentage of Literacy** to total population (2001 census)	%	64.08			
13	Male Literacy Percentage	%	76.50			
14	Female Literacy Percentage	%	50.58			
15	Urban Literacy Percentage	%	79.67			
16	Rural Literacy Percentage	%	58.10			
17	**Classification of Holding**		**Number of holding**		**Size of holding** (Hect.)	
	A Marginal (below 1 hectare)		22,58,888	(34.43)	11,35,225	(6.88)
	B Small (1 -2 hectares)		17,07,388	(26.02)	24,37,021	(14.77)
	C Semi- medium (2 – 4 hectares)		14,17,050	(21.60)	39,29,120	(23.81)
	D Medium (4 -10 hectares)		9,71,335	(14.80)	57,87,622	(35.08)
	E Large (above 10 hectares)		2,06,574	(3.15)	32,10,937	(19.46)
	Total		65,61,235	(100.00)	1,64,99,925	(100.00)

Note : Figures in brackets denotes percentage to total

S. No	Particulars	Unit	Area	% to total geographical area
18	**Land Use Classification** (Year 2002-03)			
	A. Forest	Lakh Hect.	85.78	27.89
	B. Land not available for cultivation	"	33.07	10.76
	(i) Land put to non agricultural uses	"	18.90	6.15
	(ii) Barren and uncultivable land	"	14.17	4.61
	C. Other uncultivated land excluding fallow land	"	14.14	4.60
	(i) Permanent pastures and grazing land	"	13.95	4.54
	(ii) Land under misc. tree crops & groves	"	0.19	0.06
	D. Culturable Waste land	"	12.13	3.94
	E. Fallow land	"	16.22	5.27
	(i) Current Fallow	"	9.96	3.24
	(ii) Old Fallow	"	6.26	2.03
	F. Net area sown	"	146.21	47.54
	G. Area sown more than once	"	35.60	11.57
	H. Gross cropped area	"	181.81	59.11
	Total Geographical Area	"	307.56	100.00
19	**Cropping intensity**	(%)	124	

20	**Rabi Cropped Area** (Food crop + Non Food Crop)	Lakh Hect.	74.53	40.99%	Food 68.77	Non food 5.76
21	**Kharif Cropped Area** (Food crop + Non Food Crop)	Lakh Hect.	107.28	59.01%	49.36	57.92
	Total Food Crops				118.13	64.97
	Total Non Food Crops				63.68	35.03

22	Total Fertilizer Consumption	(Kg./ ha.)	48		
23	Area irrigated by different sources (2002-03)	Th. Hect.	Gross	Net	% to total Net irrigated area
	A. Canals	''	784.3	748.1	16.65
	B. Tanks	''	98.5	93.6	2.08
	C. Tubewells	''	1135.3	1109.8	24.69
	D. Wells	''	1941.1	1878.3	41.79
	E. Other Sources	''	671.8	664.5	14.79
24	Irrigated area	''	4631.0	4494.3	100.00
25	Area irrigated more than once	"	136.6		
26	Gross irrigated area	"	4631.0		
27	Irrigation intensity		103.04		
28	Number of Agricultural implements (2002-03)	Th. No. (1000)			
	(A) Plough i) Wooden plough ii) Iron plough		3218.10 527.51		
	(B) Bullock Carts		1316.54		
	(C) Electric Pump		1158.51		
	(D) Tractor		218.05		
	(E) Oil Engine		218.07		

29	Livestock (2002-03)	Number (in lakh)	%	
	Cattle (Cow, Bullock and Young stock)	"	176.28	(56.23)
	Buffaloes	"	61.69	(19.68)
	Sheep	"	7.35	(2.34)
	Goat	"	62.17	(19.83)
	Horse & Pony	"	0.53	(0.17)
	Mules	"	0.078	(0.02)
	Donkey	"	0.66	(0.21)
	Camel	"	0.083	(0.03)
	Pigs	,,	4.65	(1.48)
	Total Livestock	,,	313.50	(100.00)
30	Poultry (2002-03)		82.29	

31	Cropping Pattern and Production and Productivity of Principal Crops (2202-2003)					
	Crops	Area under crops ('000 ha.)	% to total cropped area	Production		Productivity (Kg./ ha.)
				('000 tonnes)	Position of M.P. in India	
	Paddy	1681.3	9.25	1032	14th	646
	Jowar	655.3	3.60	600	3rd	921
	Bajra	168.8	0.93	127	8th	744
	Maize	859.9	4.73	1494	1st	1751
	Kodo- kutki	381.0	2.09	78		200
	Wheat	3381.6	18.60	4923	5th	1520
	Barley	80.9	0.44	102		1257
	Other cereals & Millets	47.5	0.27	17		--
	Total Cereals	7256.30	39.91	8373	7th	1154
	Tur	303.50	1.67	188	5th	614
	Urad	521.00	2.86	146		279
	Gram	2470.60	13.59	1713	1st	694
	Lentil (Masoor)	467.00	2.57	181	2nd	387
	Pea	193.00	1.06	78		401
	Other pulses	196.50	1.08	71		--
	Total pulses	4151.60	22.83	2377	1st	575
	Total Foodgrain	11407.90	62.74	10750	8th	944
	Groundnut	208.10	1.14	131	7th	619
	Soybean	4190.50	23.05	2674	1st	638
	Sesamum	126.70	0.70	29		230
	Niger	103.30	0.57	18		169
	Rape and mustard	369.50	2.03	240	5th	650
	Linseed	142.40	0.78	50		353
	Other Oilseeds	22.6	0.13	2		--
	Total oilseed	5163.10	28.40	3144	1st	611
	Cotton	559.30	3.08	390	6th	351
	Sugarcane	68.90	0.38	208	11th	3991
	Other Fibers	6.60	0.04	-		-
	Fodder crop	625.50	3.44	-		-
	Spices	144.70	0.80	-		-
	Fruits	47.60	0.26	-		-
	Vegetables	144.20	0.79	-		-
	Others	13.50	0.07	-		-
	Total Cropped Area	18,181.3	100.00	-		-

Irrigated Crops (2002-2003)				
Crops	Irrigated area ("000 ha.)	% to total irrigated area	Cropped area ('000 ha.)	% of irrigation area to area under crops
Paddy	222.8	4.81	1681.3	13.25
Jowar	0.90	0.02	655.3	0.14
Maize	10.1	0.22	859.9	
Wheat	2438.2	52.65	3381.6	72.10
Barley	33.3	0.72	80.9	41.16
Other cereals & Millets	0.1	Neg.	597.3	0.02
Total cereals	2705.4	58.42	7256.30	37.28
Gram	1068.7	23.08	2470.60	43.26
Tur	3.0	0.06	303.50	0.99
Other pulses	136.0	2.94	1377.50	9.87
Total pulses	1207.7	26.08	4151.60	29.09
Total foodgrains	3913.1	84.50	11407.90	34.30
Sugarcane	68.6	1.48	68.90	99.56
Total spices	109.1	2.35	144.70	75.40
Total fruits & vegetables	155.1	3.35	191.80	80.86
Total food crops	4245.9	91.68	11813.3	35.94
Groundnut	16.9	0.36	208.10	8.12
Sesamum	Neg.	--	126.70	Neg.
Soybean	21.8	0.47	4190.50	0.52
Sunflower	1.5	0.03	2.40	62.5
Rapeseed & mustard	126.3	2.73	369.50	34.18
Linseed	3.2	0.07	142.40	2.25
Other oilseeds	0.9	0.02	123.5	0.73
Total oilseeds	170.6	3.68	5163.10	3.30
Cotton	172.4	3.73	559.30	30.82
Fodder crops	33.7	0.73	625.50	5.39
Other nonfood crops	8.4	0.18	20.1	41.79
Total nonfood crops	385.1	8.32	6368.00	6.05
Total	4631.0	100.00	18181.3	25.47

Agricultural Sustainability is dependent on the proper use of natural resources. Increasing population and growing consumption needs have made us to over exploit natural resources. The modern agriculture is the result of green revolution introduces new technologies, which enabled us to increase the production and productivity of major food crops, but at a very high cost to our environment. Use of chemicals as inputs in agriculture has created many problems.

A major initiative by Directorate of Agriculture Government of Madhya Pradesh has been taken up on the issues of improving farm productivity, new technologies for increasing use efficiency of farm resources adoption of organic practices of weed and pest management and certification and marketing of organic produce at national level. Organic and sustainable agricultural programmes were initiated in 2001-02 in every block of each district of Madhya Pradesh.

With a view to examine the performance of organic farming 3 districts viz. Guna, Vidisha and Ujjain have been selected. The general profile of the selected districts and different components of organic farming has been described in this chapter.

3.11 General Profile

Location : Vidisha district is located in Vindhya Plateau (Rice Wheat Zone) at Latitude 23^{o}20' to 24^{o}22'N and Longitude 77^{o}16' to 78^{o}18'E having 549 village panchayats, 7 tehsils, 7 development blocks and 1522 villages. Annual average rainfall in the district is 1200- 1400 mm. The total geographical area of the district was 7,371 sq.km.

Ujjain district is located in Malwa plateau, Agro- climatic region and crop zone of Madhya Pradesh at latitude 22^{o}43' to 23^{o}36'N and 75^{o}30'E longitude. There are 517 village panchayats, 7 tehsils 6 development blocks and 1092 villages in the district. Annual average rainfall in the district is 800 to 1200 mm.

Guna district is also located in Vindhya plateau at latitude 23^{o}53' to 25^{o} 07'N and at longitude 76^{o}48' to 78^{o}17E having 425 village panchayats, 3 tehsils and 6 development blocks and 1260 villages. Annual average rainfall in the district is 1200- 1400 mm. (Table 3.2).

Table 3.2 Location and general information of selected districts

S. No.	Particulars	Vidisha	Ujjain	Guna
1.	Location	Latitude 23°20' to 24°22' N Longitude 77°16' to 78°18'E	Latitude 22o43' to 23°36' N Longitude 75°00' to 76°30'E	Latitude 23° 53' to 25°07' N Longitude 76°48' to 78°17'E
2.	Geographical area- sq.km.	7371	6091	6307
3.	No. of village panchayat	549	517	425
4.	No. of Tehsils	07	7	3
5.	No. of blocks	07	6	6
6.	No. of villages	1,522	1,092	1260
7.	Rainfall (Annual) average	1,200- 1,400	800- 1200	1,200- 1,400
8.	Agro-climatic region & crop zone	Vindhya plateau	Malwa plateau	Vindhya plateau

3.12 Characteristics of Population

In Vidisha district, of the total population (1,214.9 thousand), 52.32 per cent was male and the remaining 46.68 per cent was female. The percentage of rural population was 78.57, while the urban population formed only 21.43 per cent. Scheduled castes and scheduled tribes population formed 19.85 and 4.88 per cent of the total population. The remaining population belonged to other castes.

The decadal growth rate (1991-2001) of population was 25.19 per cent and density of population per sq.km. was 165. The sex ratio (number of females per 1000 males) was 887. The percentage of total workers to total population of the district was 37.19 per cent. Cultivators, agricultural labourers and other workers formed 28.62, 22.24 and 49.14 per cent respectively of the total workers (451.8 thousands).

The literacy percentage of the district was 61.83. The percentage of literacy among urban population was higher (77.56 per cent) as compared to the rural population (57.33 per cent). Similarly the literacy percentage in male (74.23 per cent) was higher as compared to female (47.39 per cent).

In Ujjain district of the total population (1,710.9 thousand), 51.60 per cent was male and the remaining 48.40 per cent, female. The percentage of rural population was 61.27, while the urban population formed only 38.73 per cent. Scheduled castes and scheduled tribes population formed 24.72 and 3.11 per cent of the total population. The remaining population belonged to other castes.

The decadal growth rate (1991-2001) of population was 23.70 per cent and density of population per sq.km. was 280. The sex ratio (number of females per 1000 males) was 938. The percentage of total workers to total population of the district was 32.17. Cultivators, agricultural labourers and other workers formed 37.21, 21.25 and 41.05 per cent respectively of the total workers (550.4 thousands).

The literacy percentage of the district Ujjain was 70.90. The percentage of literacy among urban population was higher (80.90 per cent) as compared to the rural population (64.20 per cent). Similarly the literacy percentage in male (83.00 per cent) was higher as compared to female (57.90 per cent).

In Guna district of the total population (977.80 thousand), 52.91 was male and the remaining 47.09 per cent, female. The percentage of rural population was 75.58, while the urban population formed only 24.42 per cent. Scheduled castes and scheduled tribes population formed 15.70 and 14.66 of the total population. The remaining population belonged to other castes.

The decadal growth rate (1991-2001) of population was 30.19 per cent and density of population per sq.km. was 155. The sex ratio (number of females per 1000 males) was 890. The percentage of total workers to total population of the Guna district was 42.72. Cultivators, agricultural labourers and other workers formed 52.33, 25.40 and 22.27 per cent respectively of the total workers (417.7 thousands).

The literacy percentage to total population according to 2001 census of the Guna district was 57.92. The percentage of literacy among urban population was higher (62.48 per cent) as compared to the rural population (41.62 per cent). Similarly the literacy percentage in male (66.57 per cent) was higher as compared to female (33.43 per cent) (Table 3.3) (Landscape)

3.13 Land Use Pattern in Selected Districts

In Vidisha district of the total geographical area of 730.2 thousand hectares, 73.28 per cent was net area sown. Forest area occupied 14.86 per cent and land not available for cultivation was 6.37 per cent. Other uncultivated land excluding fallow land was 2.55 per cent. Of this land, maximum area 2.54 per cent was under permanent pastures and grazing-land. The area under culturable waste land was 2.12 per cent and fallow land formed 0.82 per cent. The gross cropped area of the district was 672.4 thousand hectares and net area sown was 535.1 thousand hectares (73.28 per cent). The cropping intensity was 125.66 per cent.

Table 3.3 Characteristics of population of selected districts

Unit – ('000 ha.)

S. No.	Particulars	Vidisha		Ujjain		Guna		Madhya Pradesh	
		Number	**(%)**	**Number**	**(%)**	**Number**	**(%)**	**Number**	**(%)**
1.	**Total population (No. in '000)** (2001 Census)	1214.9	100.00	1710.9	100.00	977.8	100.00	60252.7	100.00
	(A) Male population	647.84	53.32	882.9	51.60	517.4	52.91	31386.6	52.15
	(B) Female population	567.02	46.68	828.0	48.40	460.4	47.09	28866.2	47.85
	(C) Rural population	954.50	78.57	1048.2	61.27	739.0	75.58	44288.0	73.50
	(D) Urban population	260.4	21.43	662.7	38.73	238.8	24.42	15964.7	26.50
	(E) Scheduled Castes population	241.1	19.85	422.9	24.72	153.5	15.7	1955.0	15.17
	(F) Scheduled Tribes population	59.3	4.88	53.2	3.11	143.3	14.66	12233.0	20.27
	Decadal growth rate(1991-2001)	--	25.19		23.7		30.19		24.34
2.	**Classification of working population**								
	Total workers (main + marginal worker)	451.8	37.19	550.4	32.17	417.7	42.72	25756.5	42.75
	Main workers	346.2	28.50	502.2	29.35	303.1	31.00	19077.6	31.66
	Marginal worker	105.6	8.69	48.2	2.82	114.6	11.72	6678.9	11.09
	Cultivator	129.3	28.62	204.8	37.21	218.6	52.33	11058.5	42.93
	Agricultural labour	100.5	22.24	119.7	21.75	106.1	25.40	7380.9	28.66
	(Other workers)	122.0	49.14	225.9	41.04	93.0	22.27	7317.1	28.41
3.	**Density of population** (Per Sq.km.) (2001 census)	165		280			155	196	
4.	Female/ Male **Sex Ratio**	887		938		890	--	920	
5.	**Percentage of Literacy** to total population (2001 census)	608.1	61.83	1213.0	70.9	456.8	57.92		64.08
6.	Male Literacy Percentage	392.5	74.23	732.8	83.0	304.1	66.57		76.50
7.	Female Literacy Percentage	215.6	47.39	479.4	57.9	152.7	33.43		50.58
8.	Urban Literacy Percentage	169.6	77.56	536.1	80.9	149.2	62.48		79.67
9.	Rural Literacy Percentage	438.5	57.33	672.9	64.2	307.6	41.62		58.10

In Ujjain district the total geographical area was 609.90 thousand hectares. Of this 80.06 per cent was net area sown. Forest area is abnormally low i.e. 0.51 per cent and land not available for cultivation was 10.42 per cent. Other uncultivated land excluding fallow land was 6.71 per cent. Of this land, maximum area was under permanent pastures and grazing land i.e. 6.69 per cent. The area under culturable waste land was 1.75 per cent and fallow land formed 0.54 per cent. The gross cropped area and net area sown were 762.5 and 488.3 thousand hectares respectively. The cropping intensity was 156.15 per cent.

In Guna district the total geographical area was 630.8 thousand hectares. Of the total geographical area of 630.8 thousand hectares, 51.15 per cent was under net area sown. Forest occupied 16.00 per cent and land not available for cultivation was 15.19 per cent. Other uncultivated land excluding fallow land was 4.66 per cent. Of this land, hundred per cent was under permanent pastures and grazing land. The area under culturable waste land was 10.35 per cent and fallow land formed 2.65 per cent. The gross cropped area of the district was 410.9 thousand hectares and net area sown formed 322.7 thousand hectares. The cropping intensity of the district was 127.33 per cent (Table 3.4).

Table 3.4 Land use pattern in selected districts 2003-04 Unit – ('000 ha.)

Particulars	**Vidisha**		**Ujjain**		**Guna**		**Madhya Pradesh**	
	Area	% to total geographical area	Area	% to total geographical area	Area	% to total geographical area	Area	% to total geographical area
A. Forest	108.5	14.86	3.1	0.51	100.9	166.00	8683.1	28.23
B. Land not available for cultivation	46.5	6.37	63.6	10.42	95.8	15.19	3350.4	10.89
(i) Land put to non agricultural uses	36.8	5.04	57.6	9.44	34.3	5.44	1925.4	6.26
(ii) Barren and uncultivable land	9.7	1.33	6.0	0.98	61.5	9.75	1425.0	4.63
C. Other uncultivated land excluding fallow land	18.6	2.55	40.9	6.71	29.4	4.66	1379.4	4.49
(i) Permanent pastures and grazing land	18.5	2.54	40.8	6.69	29.4	4.66	1360.3	4.43
(ii) Land under misc. tree crops & groves	0.1	0.01	0.1	0.02	Neg.	--	19.1	0.06
D. Culturable Waste land	15.5	2.12	10.7	1.75	65.3	10.35	1177.5	3.83
E. Fallow land	6.0	0.82	3.3	0.54	16.7	2.65	1219.9	3.97
(i) Current Fallow	2.8	0.38	1.3	0.21	7.7	1.22	598.5	1.95
(ii) Old Fallow	3.2	0.44	2.0	0.33	9.0	1.43	621.4	2.02
F. Net area sown	535.1	73.28	488.3	80.07	322.7	51.15	14945.5	48.59
G. Area sown more than once	137.3	--	274.2	--	88.2	--	4842.8	--
H. Gross cropped area	672.4	--	762.5	--	410.9	--	19788.2	--
Total Geographical Area	730.2	100.00	609.9	100.00	630.8	100.00	30755.8	100.00
I. Cropping Intensity (%)	126.0		156.0		127.0		132.4	

3.14 Area irrigated by different sources

In Vidisha district the area under irrigation was 222.16 thousand hectares. Among the different sources of irrigation, tubewells were the most important and commanded 39.33 per cent of net irrigated area. Canals commanded 15.87 per cent followed by wells (14.29 per cent) and tanks (1.73 per cent). The area irrigated by other sources formed 28.78 per cent. The percentage of net irrigated area to net sown area was 41.52 per cent. The irrigation intensity of the district was 100 per cent.

Table 3.5.1 Irrigated area and percentage by different sources, Year 2003-04

(Unit-000hect)

S. No	Source		Vidisha	Ujjain	Guna	Madhya Pradesh
1	Canal	Gross	35,252 (15.87)	326 (0.16)	13,045 (11.07)	9,90,457 (17.15)
		Net	35,252 (15.87)	326 (0.16)	13,045 (11.09)	9,49,210 (16.86)
2	Tank	Gross	3,844 (1,73)	4,736 (2.31)	3,909 (3.32)	1,31,259 (2.27)
		Net	3,844 (1.73)	4,736 (2.31)	3,909 (3.33)	1,27,210 (2.26)
3	Tube well	Gross	87,377 (39.33)	1,28,913 (62.79)	42,276 (35.87)	15,34,791 (26.57)
		Net	87,377 (39.33)	1,28,541 (62.73)	42,276 (35.94)	15,01,130 (26.66)
4	Well	Gross	31,757 (14.29)	45,927 (22.37)	36,108 (30.63)	22,94,458 (39.73)
		Net	31,757 (14.29)	45,899 (22.40)	36,108 (30.70)	22,33,493 (39.66)
5	Other sources	Gross	63,929 (28.78)	25,399 (12.37)	22,528 (19.11)	8,25,105 (14.28)
		Net	63,929 (28.78)	25,399 (12.40)	22,282 (18.94)	8,19,838 (14.56)
Total		**Gross**	**2,22,159 (100.00)**	**2,05,301 (100.00)**	**1,17,866 (100.00)**	**57,76,070 (100.00)**
		Net	**2,22,159 (100.00)**	**2,04,901 (100.00)**	**1,17,620 (100.00)**	**56,30,881 (100.00)**

In Ujjain district the area under irrigation was 204.90 thousand hectares. Among the main sources of irrigation, tubewells and wells were the most important and contributed 62.73 and 22.40 per cent of net irrigated area respectively. The next important sources of irrigation were tanks and commanded 2.31 per cent of the area irrigated, followed by canals only 0.16 per cent. The area irrigated by other sources formed 12.40 per cent. The gross irrigated area of the district was 205.30 thousand hectares with a irrigation intensity of 100.20 per cent. The percentage of net irrigated area to net sown area was 41.96 per cent.

In Guna district the area under irrigation was 117.62 thousand hectares. Among the different sources of irrigation, tubewells were the most important and commanded 35.94 per cent of the net irrigated area. Wells commanded 30.70 per cent followed by canals (11.07 per cent) and tanks (3.33 per cent). The area irrigated by other sources formed 18.94 per cent. The percentage of net irrigated area to net sown area was 36.52 per cent. The irrigation intensity of the district was 100.21 per cent (Table 3.5.1)

3.15 Crop wise irrigated area

In Vidisha district among cereals crops group the most important irrigated crop was wheat which occupied 46.98 percent of the irrigated area. Gram was another important irrigated crop occupying 51.93 per cent. In Vidisha district food crops were 99.91 per cent of the irrigated area, whereas non-food, occupied only 0.09 per cent of the irrigated area.

In Ujjain district the most important irrigated crop was wheat which occupied 61.76 per cent of the irrigated area under all the crops. Gram was another important irrigated crop occupying 26.06 per cent. Other pulses were occupied only 0.15 per cent . Spices occupied 6.38 per cent followed by fruits and vegetable 3.31 per cent, linseed 0.39 per cent and rapeseed mustard 0.29 per cent of the irrigated area. Fodder crops occupied 1.41 per cent and other non food crops 0.15 per cent of the irrigated area.

In Guna district total irrigated area was 117.8 thousand hectares. The most important irrigated crop of the district was wheat which occupied 42.11 per cent of the irrigated area under all the crops. Spices were another important irrigated crop occupying 34.21 per cent. Gram occupied 21.73 per cent followed by fruits and vegetable 0.51 per cent, and rapeseed mustard 0.42 per cent of the irrigated area (Table 3.5.2).

Table 3.5.2 Cropwise irrigated area 2003 – 2004 (Unit-000hect)

S.No	Crops	Vidisha		Ujjain		Guna		Madhya Pradesh	
		Area	(%)	Area	(%)	Area	(%)	Area	(%)
1	Paddy	--	--	--	--	0.2	0.17	2,12.3	3.68
2	Jowar	--	--	--	--	--	--	0.7	0.01
3	Maize	Neg.	--	--	--	--	--	13.7	0.24
4	Ragi	--	--	--	--	--	--	--	--
5	Wheat	104.4	46.98	126.8	61.76	49.6	42.11	3,151.1	54.55
6	Barly	0.1	0.05	Neg.	--	Neg.	--	37.4	0.65
7	Other cereals & Millets	Neg.	--	0.1	0.05	0.1	0.08	0.3	0.001
8	**Total cereals**	104.5	47.03	126.9	61.81	49.9	42.36	3,415.5	59.13
9	Gram	96.4	43.38	53.5	26.06	25.6	21.73	1,234.6	21.37
10	Tur	--	--	--	--	--	--	3.5	0.06
11	Other pulses	19.0	8.55	0.3	0.15	0.4	0.34	166.3	2.88
12	**Total pulses**	115.4	51.93	53.8	26.21	26.0	22.07	1,404.4	24.31
13	**Total foodgrains**	219.9	98.96	180.7	88.02	75.9	64.43	4,820.0	83.45
14	Sugarcane	0.3	0.14	0.2	0.10	0.5	0.43	69.1	1.19
15	Spices	0.4	0.18	13.0	6.38	40.3	34.21	202.5	3.51
16	Fruits & Vegetable	1.4	0.63	6.8	3.31	0.6	0.51	173.8	3.01
17	Other foodcrops	--		--	--	--	--	--	
18	**Total food crops**	222.0	99.91	200.7	97.76	117.3	99.58	5,265.4	91.16
19	Groundnut	--	--	--	--	--		14.3	0.25
20	Sesamum	--	--	--	--	--	--	Neg.	--
21	Soybean	--	--	Neg.	--	--	--	16.2	0.28
22	Sunflower	--	--	--	--	--	--	1.3	0.02
23	Rape & Mustered	--	--	0.6	0.29	0.5	0.42	216.8	3.75
24	Linseed	--	--	0.8	0.39	Neg.	--	4.8	0.08
25	Other Oilseeds	--	--	Neg.	--	Neg.	--	1.6	0.03
26	**Total Oilseed**	Neg.	--	1.4	0.68	0.5	0.42	255.0	4.41
27	Cotton	--	--	Neg.	--	--	--	202.3	3.50
28	Fodder crops	0.2	--	2.9	1.41	Neg.	--	40.5	0.70
29	Other nonfood crops	Neg.	--	0.3	0.15	--	--	12.9	0.23
30	**Total non food crops**	0.2	0.09	4.6	2.24	0.5	0.42	510.7	8.84
31	**Total irrigated area**	222.2	100.0	205.3	100.00	117.8	100.00	5776.1	100.0

3.16 Irrigated crops

In Vidisha district wheat and gram were the crops irrigated to a large extent. Wheat was irrigated to the extent of 49.34 per cent followed by gram (46.73 per cent). Sugarcane, fruits and vegetables were the other crops irrigated to the extent of 100 per cent and 77.78 per cent respectively, but the area under these crops were not significant. Therefore, in such crop group the extent of irrigation was quite high.

In Ujjain district among the most important irrigated crop was wheat which occupied 61.76 percent of the irrigated area under all the crops. Gram was another important irrigated crop occupying 26.06 per cent. Wheat and gram were the crops irrigated to a large extent. Wheat was irrigated to the extent of 96.87 per cent followed by gram (44.25 per cent). Sugarcane and spices were other important crops which were irrigated to the extent of 100.00 per cent and 92.86 per cent respectively. Total fruits and vegetables were irrigated to the extent of 87.18 per cent. In Ujjain district linseed and rapeseed and mustard were irrigated to the extent of 72.73 per cent and 54.55 per cent by the area under crops respectively. Total fodder crops occupied irrigated area to the extent of 7.14 per cent.

In Guna district the most important irrigated crops were spices which occupied irrigated area to the extent of 80.44 per cent. Wheat and gram were the next important irrigated crops which contributed to the extent of 69.18 per cent and 38.44 per cent to the area under crops respectively (Table 3.5.3).

3.17 Cropping Pattern

Vidisha district was rabi crops dominated which covered 78.53 per cent of the gross cropped area. Food and non food crops covered 79.44 and 20.56 per cent respectively. Cereals and pulses dominated the cropping pattern. Oilseeds occupied 18.99 per cent area. Among other crops “fodder” occupied 1.56 per cent area. Among cereals, wheat was the major crop occupied 31.47 per cent of the gross cropped area. Among pulses gram occupied 30.69 per cent followed by arhar and other pulses occupied 13.81 of the gross cropped area. Soybean was major oilseed crop of the district occupied 18.61 per cent of the gross cropped area. The cropping pattern of the district was food crops oriented.

Table 3.5.3 Irrigated Crops 2003-2004 Unit – ('000 ha.)

Particulars	**Vidisha**			**Ujjain**			**Guna**			**Madhya Pradesh**		
Crops	Irrig. area	Cropped area	% of irrig. area to area under crop	Irrig. area	Cropped area	% of irrig. area to area under crop	Irrig. area	Cropped area	% of irrig. area to area under crop	Irrig. area	Cropped area	% of irrig. area to area under crop
Paddy	--	0.7	--	--	Neg.	--	0.2	1.0	20.0	212.3	1708.6	12.43
Jowar	--	10.6	--	--	52.9	--	--	42.6	--	0.7	771.9	0.09
Maize	--	5.4	--	--	15.6	--	--	21.7	--	13.7	898.6	1.52
Wheat	104.4	211.6	49.34	126.8	130.9	96.87	49.6	71.7	69.18	3,151.7	4079.0	77.27
Barley	0.1	0.4	25.00	Neg.	Neg.	--	Neg.	Neg.	--	37.7	84.3	44.72
Other cereals & Millets	Neg.	0.3	--	0.1	0.2	50.00	0.1	0.5	20.0	0.3	602.4	0.05
Total cereals	104.5	229.0	45.63	126.9	199.6	63.58	49.9	137.5	36.29	3,415.5	8144.8	41.93
Gram	96.4	206.3	46.73	53.5	120.9	44.25	25.6	66.6	38.44	1,234.6	2785.2	44.33
Tur	--	0.9	--	--	1.4	--	--	0.5	--	3.5	311.2	1.12
Other pulses	19.0	92.0	20.65	0.3	10.7	2.80	0.4	6.1	6.56	166.3	1479.1	11.24
Total pulses	115.4	299.2	38.7	53.8	133.0	40.45	26.0	73.2	35.52	1,404.4	4575.5	30.69
Total foodgrains	219.9	528.2	41.63	180.7	332.6	54.33	75.9	210.7	36.02	4,820.0	12720.3	37.89
Sugarcane	0.3	0.3	100.00	0.2	0.2	100.00	0.5	0.5	100.00	69.1	69.4	99.57
Total spices	0.4	3.8	10.53	13.0	14.0	92.86	40.3	50.1	80.44	202.5	239.5	84.55
Total fruits & vegetables	1.4	1.8	77.78	6.8	7.8	87.18	0.6	0.8	75.00	173.8	210.5	82.57
Total food crops	222.0	534.1	41.57	200.7	354.6	56.60	117.3	262.1	44.75	5,265.4	13239.7	39.77
Groundnut	--	1.2	--	--	0.3	--	--	0.1	--	14.3	214.4	6.67
Sesamum	--	0.2	--	--	0.2	--	--	0.9	--	Neg.	144.1	--
Soybean	--	125.1	--	--	364.0	--	--	123.0	--	16.2	4198.6	0.39
Sunflower	--	--	--	--	--	--	--	--	--	1.3	2.0	65.00
Rapeseed & mustard	--	0.7	--	0.6	1.1	54.55	0.5	0.9	55.56	216.8	535.5	40.49
Linseed	--	0.5	--	0.8	1.1	72.73	Neg.	0.4	--	4.8	143.4	3.35
Other oilseeds	--	--	--	Neg.	--	--	Neg.	0.5	--	1.6	117.9	1.36
Total oilseeds	Neg.	127.7	--	1.4	366.7	0.38	0.5	125.8	0.40	255.0	5355.9	4.76
Cotton	--	--	--	Neg.	Neg.	--	--	--	--	202.3	557.2	36.31
Fodder crops	0.2	10.5	1.90	2.9	40.6	7.14	Neg.	23.0	--	40.5	606.8	6.67
Other nonfood crops	Neg.	--	--	0.3	0.6	50.00	--	--	--	12.9	28.6	45.10
Total nonfood crops	0.2	138.2	0.14	4.6	407.9	1.13	0.5	148.8	0.34	510.7	6548.5	7.80
Total	222.2	672.3	33.05	205.3	762.5	26.92	117.8	410.9	28.67	5776.1	19788.2	29.19

The cropping pattern of the Ujjain district was non food crops oriented as this group of crops occupied 53.50 per cent of the gross cropped area. Among non food crops soybean crop was most important which occupied 47.74 per cent and food crops occupied 5.33 per cent of the gross cropped area. In Ujjain district non food and food crops covered 53.50 and 46.50 per cent respectively. Among cereals, wheat was the major cereal occupied 17.17 per cent of the total area. Among pulses, gram occupied 15.85 per cent and other pulses occupied 1.58 per cent of the gross cropped area.

Guna district was rabi crops dominated which covered 53.70 per cent of the gross cropped area. Food and non-food crops covered 63.78 and 36.22 per cent respectively. Oil seed occupied 30.62 per cent area. Among spices crop group which occupied 12.19 per cent. Among cereals, wheat was the major cereal occupied 17.45 per cent of the total area. Among pulses, gram occupied 16.21 per cent. Among oil seed crops group soybean was the major crop which occupied 29.93 per cent of the total cropped area. Total fodder crops was 5.60 per cent of the gross cropped area (Table 3.6).

3.18 Operational Holding

Vidisha district had 1,22,593 holdings with an area of 5,39,562 hectares. The average size of holdings was 4.40 hectares. Of the total number of holdings, 20.36 per cent were marginal, 22.46 per cent small, 23.78 per cent semi medium 23.73 per cent medium and 9.67 per cent large. Marginal and small holdings formed 48.82 per cent of the total number of holdings, but these occupied only 9.78 per cent of the area. On the other hand, big land holders (medium and large) formed 33.40 per cent of the total number of holdings but commanded comparatively larger percentage of area (74.73).

In Ujjain district according to census 1995-96, had 1,38,550 holding with an area of 5,33,348 hectares. The average size of holdings was 3.85 hectares. Of the total number of holdings 25.68 per cent were marginal, 21.10 per cent small, 23.15 per cent semi - medium, 22.83 per cent medium and 7.24 per cent large. Nearly 12.83 per cent area of the district was operated by 46.78 per cent of marginal and small farmers.

Table 3.6 Cropping pattern 2003-2004 (Unit-000hect)

S.No.	Crops	Vidisha		Ujjain		Guna		Madhya Pradesh	
		Area	**(%)**	**Area**	**(%)**	**Area**	**(%)**	**Area**	**(%)**
1	Paddy	0.7	0.10	Neg.	--	1.0	0.24	1708.6	8.63
2	Jowar	10.6	1.58	52.9	6.94	42.6	10.37	771.9	3.90
3	Bajra	--	--	Neg.	--	0.3	0.07	201.2	1.02
4	Maize	5.4	0.80	15.6	2.04	21.7	5.28	898.6	4.54
5	Ragi or Madhua	--	--	--	--	--	--	0.5	--
6	Wheat	211.6	31.47	130.9	17.17	71.7	17.45	4079.0	20.61
7	Barley	0.4	0.06	Neg.	--	Neg.	--	84.3	0.43
8	Other cereals &Millets	0.3	0.04	0.2	0.03	0.2	0.05	400.7	2.02
9	**Total Cereals**	229.0	**34.06**	**199.6**	**26.18**	**137.5**	**33.46**	**8144.8**	**41.16**
10	Gram	206.3	30.69	120.9	15.85	66.6	16.21	2785.2	14.08
11	Arhar	0.9	0.13	1.4	0.18	0.5	0.12	311.2	1.57
11	Other Pulses	92.0	13.68	10.7	1.40	6.1	1.48	1479.1	7.47
12	**Total Pulses**	299.2	**44.50**	**133.0**	**17.44**	**73.2**	**17.81**	**4575.5**	**23.12**
13	Total Foodgrains	528.2	78.57	332.6	43.62	210.7	51.27	12720.3	64.28
14	Sugarcane	0.3	0.04	0.2	0.03	0.5	0.12	69.4	0.35
15	**Total Spices**	3.8	**0.56**	**14.0**	**1.83**	**50.1**	**12.19**	**239.5**	**1.21**
16	**Total Fruits**	0.2	**0.03**	**0.3**	**0.04**	Neg.	**--**	**47.1**	**0.23**
17	**Total Vegetables**	1.6	**0.24**	**7.5**	**0.98**	**0.8**	**0.19**	**163.4**	**0.83**
18	Other Food crops	--	--	--	--	Neg.	--	Neg.	--
19	**Total Food crops**	534.1	**79.44**	**354.6**	**46.50**	**262.1**	**63.78**	**13239.7**	**66.91**
20	Groundnut	1.2	0.18	0.3	0.04	0.1	0.02	214.4	1.08
21	Caster	--	--	--	--	--	--	1.5	--
22	Sesamum	0.2	0.03	0.2	0.03	0.9	0.22	144.1	0.73
23	Soybean	125.1	18.61	364.0	47.74	123.0	29.93	4198.6	21.22
24	Rape seed and Mustard	0.7	0.10	1.1	0.14	0.9	0.22	535.5	2.71
25	Linseed	0.5	0.07	1.1	0.14	0.4	0.10	143.4	0.72
26	Coconut	--	--	--	--	--	--	Neg.	--
27	Niger.	Neg.	--	--	--	0.1	0.02	102.4	0.52
28	Safflower	--	--	Neg.	--	0.3	0.07	0.6	--
29	Sunflower	--	--	Neg.	--	Neg.	--	2.0	0.01
30	Other Oilseed	Neg.	--	Neg.	--	0.1	0.02	13.4	0.06
31	**Total Oilseed**	127.7	**18.99**	**366.7**	**48.09**	**125.8**	**30.62**	**5355.9**	**27.06**
32	Cotton	**--**	--	Neg.	--	--	--	557.2	2.81
33	Other Fibers	Neg.	--	Neg.	--	Neg.	--	6.5	0.03
34	Drugs	--	--	Neg.	--	--	--	16.0	0.08
35	Fodder crops	10.5	1.56	40.6	5.33	23.0	5.60	606.8	3.07
36	Other Nonfood crops	Neg.	--	0.6	0.08	--	--	6.2	0.03
37	**Total Nonfood crops**	138.2	**20.56**	**407.9**	**53.50**	**148.8**	**36.22**	**6548.5**	**33.09**
38	**Gross area sown**	**672.3**	**100.00**	**762.5**	**100.00**	**410.9**	**100.00**	**19788.2**	**100.00**
39	**Net area sown**	**535.0**	**--**	**488.3**	**--**	**322.7**	**--**	**14945.4**	**--**
40	**Double cropped area**	**137.3**	**--**	**274.2**	**--**	**88.2**	**--**	**4842.8**	**--**

Guna district had 2,28,753 holdings with an area of 6,38,329 hectares. The average size of holdings was 2.79 hectares. Of the total number of holdings 27.24 per cent were marginal, 26.73 per cent small, 24.13 semi- medium, 17.29 medium and 11.61 per cent large. Marginal and small holdings formed 53.97 per cent of the total number of holdings, but these occupied only 17.33 per cent of the area. On the other hand big land holders (medium and large) formed 17.95 per cent of the total number of holdings but commanded comparatively large percentage of area (54.54) Table 3.7).

Table 3.7 Classification of holding by size of farms Guna, Ujjain, Vidisha and all M.P.

S. No.	Size of holding	Vidisha		Ujjain		Guna		Madhya Pradesh	
		No. of holding	Area (hect)	No. of holding	Area (hect)	No. of holding	Area (hect)	No. of holding	Area (hect)
1	Marginal (below 1hect)	24,956 (20.36)	11,994 (2.22)	35,577 (25.68)	19,618 (3.68)	62,322 (27.24)	30,142 (4.72)	22,58,888 (34.43)	11,35,225 (6.88)
2	Small (1 to 2 hects)	27,536 (22.46)	40,772 (7.56)	29,239 (21.10)	48,795 (9.15)	61,134 (26.73)	80,846 (12.61)	17,07,388 (26.02)	24,37,021 (14.77)
3	Semi medium (2 to 4 hect)	29,150 (23.78)	83,588 (15.49)	32,078 (23.15)	91,213 (17.10)	55,200 (24.13)	1,42,986 (22.40)	14,17,050 (21.60)	39,29,120 (23.81)
4	Medium (4 to 10 hect)	29,097 (23.73)	1,81,357 (33.61)	31,627 (22.83)	197,276 (36.99)	39,548 (17.29)	2,23,297 (34.98)	9,71,335 (14.80)	57,87,622 (35.08)
5	Large (10 hect & above)	11,854 (9.67)	2,21,851 (41.12)	10,029 (7.24)	1,76,446 (33.09)	10,549 (11.61)	1,61,058 (25.23)	2,06,574 (3.15)	32,10,937 (19.46)
6	Total	1,22,593 (100.00)	5,39,562 (100.00)	1,38,550 (100.00)	5,33,348 (100.00)	2,28,753 (100.00)	6,38,329 (100.00)	65,61,235 (100.00)	1,64,99,925 (100.00)

Note :- Figures in bracket denotes percentage to total
Source : Agricultural Census 1995-96

3.19 Agricultural Implements and Machinery

In Vidisha district the different agricultural implements and machinery used by the farmers of the district were plough, bullock carts, tractors electric pump and oil engine. In 2003-04 the number of plough used by the farmers were wooden plough (42.90 thousand) and iron plough (6.50 thousand). The number of bullock carts and tractors were 18.90 thousand and 14.50 thousand respectively. The number of electric pumps and oil engine used by the farmers were 16.40 thousand and 24.80 thousand respectively.

In the year 2003-04, the number of wooden plough in the Ujjain district was 32.60 thousand and iron plough 9.60 thousand. The number of bullock carts and tractors used by the farmers in the district were 26.10 and 9.90 thousand respectively. Total number of electric pumps and oil engine used by the farmers were 75.10 thousand and 3.70 thousand respectively.

The different agricultural implements and machinery used by the farmers of the Guna district were iron plough/ wooden plough, bullock carts, tractors electric pumps and oil engine. In 2003-04 the number of plough used by the farmers were wooden plough (45.70 thousand) and iron plough (8.30 thousand). The number of bullock carts and tractors were 27.00 and 8.90 thousands respectively. Total number of electric pumps and oil engine used by the farmers were 41.40 thousand and 10.50 thousands (Table 3.8).

Table 3.8 Number of Agricultural implements, 2003-04

(Unit- '000 No.)

Particulars	Vidisha	Ujjain	Guna	Madhya Pradesh
	No.	No.	No.	No.
(A) Plough i) Wooden plough	42.9	32.6	45.7	3265.2
ii) Iron plough	6.5	9.6	8.3	5777.0
(B) Bullock Carts	18.9	26.1	27.0	1415.3
(C) Electric Pump	16.4	75.1	41.4	1411.6
(D) Tractor	14.5	9.9	8.9	243.2
(E) Oil Engine	24.8	3.7	10.5	348.3

Source : M.P. Agricultural Statistics, 2003-04

3.20 Live stock and poultry

In the year 2003-04 the total number of livestock in Vidisha district was 463.30 thousands. It comprised mainly of cattle (55.23 per cent), buffaloes (19.94), goat (22.04 per cent), Sheep (0.93 per cent) and pigs (1.23 per cent). Other livestock formed 1.56 per cent. Poultry birds also constituted significant (133.80 thousands) number in the district. Dairying has immense scope in the district.

In Ujjain district the total number of livestock was 591.90 thousand. It included cattle (43.82 per cent), goat (22.25 per cent), buffaloes (30.66 per cent), pigs (1.54 per cent), other livestock, formed 1.73 per cent. Poultry birds also constituted significant (11.10 thousands) number in the district. Dairying has immense scope in the district.

In Guna district the total number of livestock during the year 2003-04 was 627.70 thousand. Among livestock the cattle was constituted 54.29 per cent followed by buffaloes 26.37 goat 18.16 and pigs 0.88 per cent respectively. Other livestock formed 0.30 per cent. Poultry birds also constituted significant (215.80 thousands) number in the district (Table 3.9) .

Table 3.9 Number of live stock, poultry –Guna, Ujjain, Vidisha & MadhyaPradesh (No. in '000)

S. No.	Particulars	Vidisha		Ujjain		Guna		Madhya Pradesh	
		Number	(%)	Number	(%)	Number	(%)	Number	(%)
1	Cow & bullocks male over three years								
	(i) Used for breading only	1.5	0.32	2.2	0.37	3.9	0.62	145.2	0.42
	(ii) Used for work only	80.7	17.42	89.8	15.17	88.2	14.05	6457.3	18.67
	(iii) Other	1.2	0.26	--		17.6	2.81	188.4	0.54
	Total	**83.4**	**18.00**	**92.0**	**15.54**	**109.7**	**17.48**	**6790.9**	**19.63**
2	Cow for breeding only								
	(i) In milk	70.4	15.20	81.0	13.68	66.5	10.59	4006.3	11.58
	(ii)Dry & not calved	9.8	2.12	--	--	46.1	7.34	1178.4	3.41
	(iii)Females over three year used for work only			--	--	--	--	40.0	0.12
	(iv) Other	3.3	0.70	--	--	2.1	0.34	242.1	0.69
	Total	**83.5**	**18.02**	**81.0**	**13.68**	**114.7**	**18.27**	**5466.8**	**15.80**
3	Young stock	89.0	19.21	86.4	14.60	116.4	18.54	5685.6	16.44
	Total	**255.9**	**55.23**	**259.4**	**43.82**	**340.8**	**54.29**	**17943.3**	**51.87**
4	Buffaloes								
	(i) Used for breading only	2.8	0.60	1.6	0.27	1.9	0.30	77.9	0.22
	(ii) use for milk only	Neg.	--	--	--	0.5	0.08	183.7	0.53
	(ii) Others	0.7	0.15	--	--	0.2	0.03	33.3	0.10
	Total	**3.5**	**0.75**	**1.6**	**0.27**	**2.6**	0.41	**294.9**	**0.85**
5	In milk	40.3	8.70	98.5	16.64	52.3	**8.33**	3007.0	8.69
	Dry & not calved	4.7	1.01	--	--	30.2	4.81	605.6	1.75
	Used for work only	--	--	--	--	--	--	4.2	0.01
	Other	4.7	1.02	2.0	0.34	2.0	0.32	142.2	0.41
	Total	**49.7**	**10.73**	**100.5**	**16.98**	**84.5**	13.46	**3759.0**	**10.86**
6	Young stock	39.2	8.46	79.4	13.41	78.4	**12.49**	2972.9	8.59
	Total	**92.4**	**19.94**	**181.5**	**30.66**	**165.5**	26.37	**7026.8**	**20.31**
7	Sheep	4.3	0.93	7.3	1.23	1.2	**0.19**	570.4	1.65
	Goats	102.1	22.04	131.7	22.25	114.0	18.16	7530.7	21.77
	Horses & ponies	0.7	0.15	1.1	0.19	0.1	0.01	40.6	0.12
	Mules	0.3	0.06	0.2	0.03	Neg.	--	6.5	0.02
	Donkeys	1.9	0.42	1.5	0.25	0.6	0.10	38.6	0.11
	Camels	--	--	0.1	0.03	Neg.	--	7.8	0.03
	Pigs	5.7	1.23	9.1	1.54	5.5	0.88	1425.9	4.12
	Total	**463.3**	**100.00**	**591.9**	**100.00**	**627.7**	100.00	**34590.6**	**100.00**
	Poultry	133.8		111.1		215.8		10756.5	

CHAPTER IV
RESULTS AND DISCUSSION

As mentioned earlier 50 farmers in different size holding in each of the three districts viz. Vidisha, Ujjain and Guna were selected from organic villages to assess the success of organic farming in Madhya Pradesh. According to the objectives of the project data were collected from sample farmers and it has been analysed and presented in this chapter.

4.1 Details about size of farms and family in selected districts

In Vidisha district the total operated area was 281.50 hectares or an average size of 5.63 hectares. The average size in the marginal size group was 0.95 hectares. It increased to 2.07 hectares in the small size group and 22.93 hectares in large size group. The total population of the selected households was 275. Of this 109 (39.64 per cent) were males, 83 (30.18 per cent) were females and 83 (30.18 per cent) were children.

In Ujjain district the total operated area was 142.30 hectares or an average size of 2.85 hectares. The average size in the marginal size group was 0.88 hectares. It increased to 1.48 hectares in the small size group and 7.20 hectares in large size group. The total population of the selected households was 268. Of this 102 (38.06 per cent) were males, 93 (34.70 per cent) were females and 73 (27.24 per cent) were children. The average size of family at district level was 5.36. The average size of family was 4.79, 5.30, 5.33, 5.58, and 5.91 in marginal medium, large, small and semi-medium size groups respectively.

In Guna district the total operated area was 129.36 hectares or an average size of 2.59 hectares. The average size of operational holding in marginal size group was 0.65 hectares. It increased 1.58 hectares in the small size group and 10.33 hectares in large size group. The total population of the selected households was 363. Of this 125 (34.16 per cent) males, 105 (28.93 per cent) females and 134 (36.91 per cent) were children. The average size of family number of the district was 7.26. The average size of family number in marginal group was 5.14. It increased 7.13 in small size group and 10.43 in large size group (Table 4.1).

Table 4.1 Size of farm and family of sample farmers in selected districts of M.P.

Particulars	District Code	No. of farmers	Operated area (ha.)	Average size of farms (ha.)	Number of family members				Average size of family (ha.)
					Male	Female	Children	Total	
Marginal	V	12 (24.00)	11.40 (4.05)	0.95	34	21	19	74	6.16
	U	14 (28.00)	12.30 (8.64)	0.88	23	20	24	67	4.79
	G	14 (28.00)	9.12 (7.05)	0.65	19	16	37	72	5.14
Small	V	12 (24.00)	24.90 (8.85)	2.07	21	21	23	65	5.42
	U	12 (24.00)	17.80 (12.51)	1.48	25	23	19	67	5.58
	G	15 (30.00)	23.10 (17.86)	1.54	36	31	40	107	7.13
Semi- medium	V	11 (22.00)	38.60 (13.71)	3.51	20	17	22	59	5.36
	U	11 (22.00)	34.60 (24.32)	3.14	25	26	14	65	5.91
	G	11 (22.00)	37.20 (28.76)	3.38	38	25	27	90	8.18
Medium	V	9 (18.00)	69.00 (24.51)	7.67	16	14	16	46	5.11
	U	10 (20.00)	56.00 (39.35)	5.60	24	18	11	53	5.30
	G	7 (14.00)	28.94 (22.37)	4.13	24	23	26	73	10.43
Large	V	6 (12.00)	137.60 (48.88)	22.93	18	10	3	31	5.17
	U	3 (6.00)	21.60 (15.18)	7.20	5	6	5	16	5.33
	G	3 (6.00)	31.00 (23.96)	10.33	7	10	4	21	7.00
Total	V	50 (100.00)	281.50 (100.00)	5.63	109	83	83	275	5.50
	U	50 (100.00)	142.30 (100.00)	2.85	102	93	73	269	5.36
	G	50 (100.00)	129.36 (100.00)	2.59	124	105	134	363	7.26

4.2 Educational Status of sample farmers in selected district of Madhya Pradesh

In Vidisha district the total population of the selected households was 275. Of this 24 per cent were illiterate and 76 per cent literate. Among literate households 7.27 per cent were literate. The largest number of literate from primary to higher secondary was 57.09 per cent, 6.91 per cent graduate and 4.73 per cent post graduate respectively. Thus the literacy percentage was 76. It was noted that the literacy percentage of large and semi medium groups were 93.55 and 93.21 per cent respectively.

The total population of selected households of Ujjain district was 268. Of this 25 per cent was illiterate. Among literate population of selected households of the district 26.49 per cent were primary education followed by 19.78, 10.45 and 6.34 per cent middle, higher secondary and graduate respectively. The literacy percentage of selected households of Ujjain district was 76.10. Of the total households of Guna district of 34.44 per cent were illiterate. The largest number of literate households were educated upto primary. Not more than 11.29 per cent of the households were above level of graduate. Thus the literacy percentage of selected households was 65.56. Among different size group 80.95 highest literacy percentage was in large group and lowest 56.67 per cent in semi medium (Table 4.2).

Table 4.2: Educational status of sample farmers in selected districts of M.P.

Particulars	District Code	Illiterate	Literate	Primary	Middle	Higher Secondary	Graduate	Post-graduate	Total
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Marginal	V	31 (41.89)	9 (12.16)	17 (22.98)	14 (18.92)	2 (2.70)	1 (1.35)	-- --	74 (100.00)
	U	19 (28.36)	10 (14.93)	17 (25.37)	9 (13.43)	10 (14.93)	2 (2.98)	-- --	67 (100.00)
	G	23 (31.94)	7 (9.72)	30 (41.67)	10 (13.89)	2 (2.78)	-- --	-- --	72 (100.00)
Small	V	15 (23.08)	6 (9.23)	20 (30.77)	9 (13.85)	7 (10.77)	2 (3.07)	6 (9.23)	65 (100.00)
	U	19 (28.36)	7 (10.45)	25 (37.31)	12 (17.91)	3 (4.48)	1 (1.49)	-- --	67 (100.00)
	G	29 (27.10)	6 (5.61)	37 (34.58)	13 (12.15)	20 (18.69)	2 (1.87)	-- --	107 (100.00)
Semi- medium	V	4 (6.78)	3 (5.08)	23 (38.90)	11 (18.65)	11 (18.65)	4 (6.78)	3 (5.08)	59 (100.00)
	U	12 (18.46)	11 (16.92)	11 (16.92)	16 (24.62)	9 (13.85)	6 (9.23)	-- --	65 (100.00)
	G	39 (43.33)	10 (11.11)	27 (30.00)	9 (10.00)	5 (5.56)	-- --	-- --	90 (100.00)
Medium	V	14 (30.43)	1 (2.17)	11 (23.92)	5 (10.87)	9 (19.57)	5 (10.87)	1 (2.17)	46 (100.00)
	U	15 (28.30)	3 (5.66)	12 (22.64)	10 (18.86)	6 (11.32)	7 13.20	-- --	53 (100.00)
	G	30 (41.10)	- -	27 (36.99)	11 (15.06)	5 (6.85)	-- --	-- --	73 (100.00)
Large	V %	2 (6.45)	1 (3.23)	2 (6.45)	3 (9.68)	13 (41.94)	7 (22.58)	3 (9.67)	31 (100.00)
	U	2 (12.50)	1 (6.25)	6 (37.50)	6 (37.50)	-- --	1 (6.25)	-- --	16 (100.00)
	G	4 (19.05)	- -	6 (28.57)	4 (19.05)	5 (23.81)	2 (9.52)	-- --	21 (100.00)
Total	V	66 (24.00)	20 (7.27)	73 (26.55)	42 (15.27)	42 (15.27)	19 (6.19)	13 (4.73)	275 (100.00)
	U	67 (25.00)	32 (11.94)	71 (26.49)	53 (19.78)	28 (10.45)	17 (6.34)	-- --	268 (100.00)
	G	125 (34.44)	23 (6.34)	127 (34.98)	47 (12.95)	37 (10.19)	4 (1.10)	-- --	363 (100.00)

Figures in parenthesis denote percentage to total

4.3 Occupational Structure

In Vidisha district the total population of the selected households was 275. Of this 174 (63.27 per cent) were workers and 136 (36.73 per cent) non- workers. Among workers 86 (46.33 per cent) households had agriculture as occupation. Fifteen (8.62 per cent) had agriculture labour main occupation. The remaining seventy eight (44.83 per cent) had other workers (service, dairy and other non agriculture labour). The percentage of workers was highest in large size group followed by marginal, medium, small and semi medium size group.

In Ujjain district the total population of the selected households was 268. Of this 132 (49.25 per cent) were workers and 136 (50.75 per cent) non workers. Among workers 51 (38.64 per cent) had agriculture and 33 (25.00 per cent) agriculture labour. The other worker had contributed 48 (36.36 per cent). Agriculture labours had contributed more in Ujjain district than Vidisha district.

The percentage of workers was highest in the semi- medium size group (60.00 per cent) followed by large, small, medium, and marginal size groups.

In Guna district about 57.85 per cent of the total members of the sample households were workers. The percentage of workers was highest (71.43 per cent) in the large size group followed by semi medium (63.33 per cent), medium (60.27 per cent), small (54.21 per cent) and marginal (50.00 per cent). The percentage of agriculture labourers was highest in the medium size group (20.45 per cent) and lowest in marginal size group (Table 4.3).

4.4 Holding wise land use pattern of sample farms of selected district

In Vidisha district the total operated area of sample farmers was 281.50 hectares. Of this 90.55 per cent was owned area followed by 2.20 per cent follow land, 0.71 percent barren and 12.36 per cent leased in land respectively. Among all the size groups of the total operated area 83.09 per cent was irrigated. The percentage of irrigated area was highest in semi- medium size group (100.00 per cent) followed by medium (85.51 per cent), large (80.28 per cent), marginal (78.95 per cent) and small 67.07 per cent) respectively. None of the selected households leased out any area. Leased in area formed 12.36 per cent of the operated area in Vidisha district. Leased in area formed highest (86.20 per cent) in large size group followed by medium, small and marginal size groups.

Table 4.3 Occupational pattern of family members in selected districts of M.P.

Particulars	District Code	Total	Workers	Non worker	Agriculture	Agricultural labours	other workers
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Marginal	V	74 (100.00)	50 (67.57)	24 (32.43)	25 (50.00)	7 (14.00)	18 (36.00)
	U	67 (100.00)	26 (38.81)	41 (61.19)	9 (34.62)	8 (30.76)	9 (34.62)
	G	72 (100.00)	36 (50.00)	36 (50.00)	20 (55.56)	4 (11.11)	12 (33.33)
Small	V	65 (100.00)	38 (58.46)	27 (41.54)	13 (34.21)	8 (21.05)	17 (44.74)
	U	67 (100.00)	33 (49.25)	34 (50.75)	16 (48.49)	7 (21.21)	10 (30.30)
	G	107 (100.00)	58 (54.21)	49 (45.79)	41 (70.69)	-- --	17 (29.31)
Semi- medium	V	59 (100.00)	34 (57.63)	25 (42.37)	15 (44.12)	-- --	19 (55.88)
	U	65 (100.00)	39 (60.00)	26 (40.00)	14 (35.90)	10 (26.64)	15 (38.46)
	G	90 (100.00)	57 (63.33)	33 (36.67)	41 (71.93)	-- --	16 (28.07)
Medium	V	46 (100.00)	30 (65.22)	16 (34.78)	14 (46.67)	-- --	16 (53.33)
	U	53 (100.00)	26 (49.06)	27 (50.94)	10 (38.46)	8 (30.77)	8 (30.77)
	G	73 (100.00)	44 (60.27)	29 (39.73)	28 (63.64)	9 (20.45)	7 (15.91)
Large	V	31 (100.00)	22 (70.97)	9 (29.03)	14 (63.64)	-- --	8 (36.36)
	U	16 (100.00)	8 (50.00)	8 (50.00)	2 (25.00)	-- --	6 (75.00)
	G	21 (100.00)	15 (71.43)	6 (28.57)	14 (93.44)	-- --	1 (6.67)
Total	V	275 (100.00)	174 (63.27)	101 (36.73)	81 (46.55)	15 (8.62)	78 (44.83)
	U	268 (100.00)	132 (49.25)	136 (50.75)	51 (38.64)	33 (25.00)	48 (36.36)
	G	363 (100.00)	210 (57.85)	153 (42.15)	144 (68.57)	13 (6.19)	53 (25.24)

Figures in parenthesis denote percentage to total

In Ujjain district the operated area of the selected households was 142.30 hectares. The irrigated area to operated area was 85.52 per cent. The percentage of irrigated area to operated area was highest in marginal size group (98.37 per cent) and lowest in small size group (66.29 per cent). None of the selected farmers leased in any area. Leased out of the selected farmers was 1.41 per cent to the operated area.

In Guna district the total operated area of the selected farmers was 129.36 hectares. Of this 93.35 per cent was irrigated leased in area of selected farmers (Table 4.4).

Table 4.4 Details of land, selected farmers in selected districts of M.P.

(Unit – Area in hectares)

Particulars	District Code	Own land	Fallow land	Barren land	Leased in land	Leased out land	Total operated area	Irrigated area
		Area (%)	Area (%)	Area (%)	Area (%)	Area (%)	Area (%)	Area (%)
Marginal	V	9.80 (3.84)	-- --	-- --	1.60 --	-- --	11.40 (4.05)	9.00 (78.95)
	U	12.50 (7.87)	-- --	0.20 --	-- --	-- --	12.30 (8.64)	12.10 (98.37)
	G	7.92 (5.70)	-- --	-- --	1.20 --	-- --	9.12 (7.05)	9.12 (100.00)
Small	V	23.30 (9.14)	-- --	-- --	1.60 --	-- --	24.90 (8.85)	16.70 (67.07)
	U	18.20 (11.45)	-- --	-- --	-- --	0.40 --	17.80 (12.51)	11.80 (66.29)
	G	23.90 (17.20)	-- --	-- --	-- --	0.80 --	23.10 (17.86)	23.10 (100.00)
Semi-medium	V	38.60 (15.14)	-- --	-- --	-- --	-- --	38.60 (13.71)	38.60 (100.00)
	U	34.60 (21.77)	-- --	-- --	-- --	-- --	34.60 (24.32)	24.80 (71.68)
	G	37.20 (26.77)	-- --	-- --	-- --	-- --	37.20 (28.76)	34.60 (93.01)
Medium	V	70.20 (27.54)	1.80 --	1.0	1.60 --	-- --	69.00 (24.51)	59.00 (85.51)
	U	61.6 (38.77)	-- --	4.00 --	-- --	1.60 --	56.00 (39.35)	54.60 (97.50)
	G	33.94 (24.42)	-- --	5.00 --	-- --	-- --	28.94 (22.37)	28.94 (100.00)
Large	V	113.00 (44.34)	4.40 --	1.00 --	30.00 --	-- --	137.60 (48.88)	110.60 (80.38)
	U	32.00 (20.14)	-- --	10.40 --	-- --	-- --	21.60 (15.18)	18.40 (85.19)
	G	36.00 (25.91)	-- --	5.00 --	-- --	-- --	31.00 (23.96)	25.00 (80.65)
Total	V	254.90 (100.00)	6.20 (2.73)	2.00 (0.78)	34.80 --	-- --	281.50 (100.00)	233.90 (83.09)
	U	158.90 (100.00)	-- --	14.60 --	-- --	2.00 --	142.30 (100.00)	121.70 (85.52)
	G	138.96 (100.00)	-- --	10.00 --	1.20 --	0.80 --	129.36 (100.00)	120.76 (93.35)

Figures in parenthesis denote percentage to total

4.5 Livestocks on sample farms, selected districts

The livestock included miltch cows, buffaloes and draught animals (bullocks) and young stocks.

In Vidisha district the 50 selected households had 118 cows, 55 buffaloes, 16 bullocks and 81 young stock. It was observed that the number of bullock per household was higher on larger farms. The maximum number of miltch animals per forms was found 72.73

per cent in medium size group and the minimum percentage of miltch animals per farm was seen small size group (57.14). The maximum percentage of draught animal was found 13.51 per cent in large farms and the minimum were 10.71 per cent in marginal size group. It observed the highest percentage of young stock was located in 42.86 per cent in small size group followed by minimum percentage of young stock was located 24.33 per cent in large size group dairying has immense scope in the district.

In Ujjain district the selected households has 62 cows, 82 buffaloes, 64 bullocks and 74 young stocks. The bullocks per household was higher on semi medium farms and lower on larger farms. The maximum number of miltch animals per farms was found in semi medium farms (25.69 per cent) followed by marginal farms, (22.22 per cent) small (20.14 per cent), medium farms (16.67 per cent) and larger farms (15.28 per cent) respectively. It was observed that the number of young stocks per households was maximum in marginal farms (32.43 per cent) and minimum in larger farms(6.25 per cent).

In Guna district on the selected farms there were 46 bullocks, 58 miltch cows, 95 buffaloes and 98 young stocks. The number per households of these categories of livestock was higher on small farms followed by semi medium farms (73), medium (59), large (43) and marginal 41 (Table 4.5).

Table 4.5 Number of livestock of sample farmers in selected district in M.P.

Particulars	District Code	Bullock	Cow	Buffaloes	Young stock	Total
Marginal	V	6	23	13	14	56
	U	15	16	16	24	71
	G	4	11	11	15	41
Small	V	--	18	6	18	42
	U	13	10	19	18	60
	G	19	17	18	27	81
Semi- medium	V	--	25	10	19	54
	U	18	20	17	19	74
	G	14	16	19	24	73
Medium	V	--	26	6	12	44
	U	10	11	13	11	45
	G	7	8	25	19	59
Large	V	10	26	20	18	74
	U	8	5	17	2	32
	G	2	6	22	13	43
Total	V	16	118	55	81	270
	U	64	62	82	74	282
	G	46	58	95	98	297

4.6 Cropping pattern on sample farms, selected districts

The gross cropped area of the sample farms of Vidisha district was 459.09 hectares. The cropping pattern was cereals dominated which contributed 33.78 per cent. Among cereals wheat dominated which contributed 33.57 per cent. The total pulses crops contributed 27.33 per cent and oil seed 36.83 per cent. Among oil seeds crops soybean was contributed 36.70 per cent.

In Ujjain district the gross cropped area of sample farmers was 277.50 hectares. The cropping pattern was oilseeds dominated which contributed 47.85 per cent. Among oilseed soybean contributed highest percentage (47.71). Among cereals crop wheat contributed 36.22 per cent. Pulses contributed 11.24 per cent. Among pulses gram contributed 11.24 per cent.

In Guna district the gross cropped area of sample farms was 255.82 hectares. The cropping pattern was cereal dominated which contributed 22.40 per cent. Pulses contributed 3.66 per cent and oilseed 37.34 per cent. Spices contributed 23.30 per cent. Among spices coriander contributed 22.24 per cent. Sugarcane contributed 2.74 per cent. In Guna district besides Food crops and oilseeds, spices contributed 23.30 per cent (Table 4.6).

Table 4.6 Cropping pattern on sample farms, selected districts

Crops	Vidisha		Ujjain		Guna	
	Area	%	Area	%	Area	%
Wheat	154.10	33.57	100.50	36.22	45.70	17.86
Paddy	--	--	1.00	0.36	--	--
Maize	1.00	0.21	1.80	0.65	11.60	4.54
Total Cereals	155.10	33.78	103.30	37.23	57.30	22.40
Gram	78.43	17.08	29.40	10.59	8.86	--
Lentil	21.01	4.58	0.20	0.07	--	--
Urd	25.92	5.65	1.60	0.58	--	--
Moong	0.10	0.02	--	--	0.50	0.20
Total Pulses	125.46	27.33	31.20	11.24	9.36	3.66
Sugarcane	--	--	--	--	7.00	2.74
Fruits & Vegetables	6.50	1.42	5.00	1.80	19.82	7.75
Coriander	--	--	0.60	0.22	56.90	22.24
Other Spices	2.00	0.44	3.40	1.22	2.70	1.06
Total Spices	2.00	0.44	4.00	1.44	59.60	23.30
Total Food Crops	289.06	62.96	143.50	51.71	153.08	59.84
Groundnut	--	--	--	--	--	--
Soybean	168.50	36.70	132.40	47.71	94.72	37.03
Rapeseed	0.60	0.13	0.40	0.15	0.80	0.31
Total oilseeds	169.10	36.83	132.80	47.86	95.52	37.34
Other non food crops	0.93	0.21	1.20	0.43	7.22	2.82
Total non food crops	170.03	37.04	134.00	48.29	102.74	40.16
Total cropped area	459.09	100.00	277.50	100.00	255.82	100.00

4.7 Change in Area, Production and yield of organic crops

With a view to examine the performance of organic farming adoption of organic input use in major crops, area, production and yield of 3 years was collected from sample farmers w.e.f. 200102 to 2003-04. Change in 2003-04 over 2001-02 have been calculated in respect of area, production and yield of Major organic crops i.e. wheat, soybean and coriander.

4.7.1 Wheat- Area : Wheat is major cereal in selected districts which is grow by sample farmers in every size of farms by using organic input and in organic input but the change in organic area has been seen. In Vidisha district percentage of increase in area is 33.33, 22.61, 1.81, 22.39, and 18.18 respectively in marginal, small, semi- medium, medium and large size of farms overall increase in 2003-04 over2001-02 was 17.74 per cent. In Ujjain district over all increase was 15.64 per cent and in Guna district it was 36.38 per cent. Increase in respect of area under organic wheat was highest in Guna district.

4.7.2 Wheat Production : Production of organic wheat was increased due to increase in area under organic wheat in all the selected district and selected farms in every size group of farms. In Vidisha district production of organic wheat was increased 25.58 per cent in semi medium group and highest 69.23 per cent in marginal group over all increase in production was 47.62 per cent.

In Ujjain district highest change in organic wheat production was 191.00 per cent in marginal group and lowest in semi medium group 37.19 per cent. Over all increase in production of organic wheat in 2003-04 was 52.95 per cent over 2001-02.

In Guna district organic wheat production was increased highly more than 10 times in marginal group of sample farmers over all organic wheat production was increased in 2003-04 over 2001-02 during 3 years 158.30 per cent.

4.7.3 Wheat- yield: Productivity per hectare of organic wheat has increased gradually on all selected farms in 3 selected districts of M.P. In Vidisha district yield of organic wheat increased 7.98 per cent in medium group to 40.95 per cent on large size of farms. Over all yield was increased 25.38 per cent in 2003-04 over 2001-02.

In Ujjain district increase in yield was highly significant. It was observed that on medium size of sample farms 24.32 per cent increase and 48.08 per cent on marginal farms. Over all 32.22 per cent yield was increased over 2001-02 in 2003-04.

In Guna district yield of organic wheat was increased two times on marginal farms i.e. 206.33 per cent. The increase in organic yield was 28.14, 8383.48, 175.92 and 115.61 per cent respectively on small, semi- medium, medium and large size of farms. Over all increase was 89.69 per cent in 2003-04 over 2001-02 (Table 4.7).

4.8.1 Soybean- Area : Soybean is major oilseed commercial crop of Madhya Pradesh. It is sown in kharif season and rabi also. Area under soybean using organic input has increased in 3 selected districts and each category of farms. In Vidisha district increase in area under organic soybean was highest 26.67 per cent in small group of farms and lowest 4.32 per cent in semi medium size of farms. Over all increase in organic area of soybean was 16.42 per cent in 2003-04 over 2001-02.

In Ujjain district due to low cost organic input area under organic soybean increased with high speed. It increased about 50.00 per cent in each size group of selected farms. Over all area under organic soybean increased 44.17 per cent in 2003-04 over 2001-02.

In Guna district organic soybean area increased about 3 times in all categories of selected farms and in the district as a whole i.e. 254.98 per cent in 2003-04 in comparison to 2001-02.

4.8.2 Soybean- Production- Increase in production of organic soybean is mostly due increase in area organic soybean. In Vidisha district increase in production was revealed in all categories of selected farms. Percentage increase was highest 49.59 per cent in large group and lowest 21.08 per cent in semi medium size of farms. Over all increase was 41.36 per cent in 2003-04 over 2001-02.

In Ujjain district increase in organic production was highly significant over all percentage increase was 39.66 per cent in 2003-04 over 2001-02.

In Guna district increase in organic production of soybean was about 3 times due to increase in organic area under soybean. Highest increase was observed in semi- medium category that was more than ten times. Over all increase in organic soybean production was 302.02 per cent in 2003-04 over 2001-02.

4.8.3 Soybean- yield : Productivity of organic soybean was not increased in comparison to increase in area and production. But it was increasing gradually as organic input like FYM compost or vermi compost resist in soil and affect the productivity in next crop season. In Vidisha district yield of organic soybean increased in all size of selected farms about 20.00 per cent in 2003-04 over 2001-02.

Table 4.7 Change in area, production and yield of organic Wheat crop on selected farms in selected district, M.P.

(Unit – Area, hectares, Production in quintals, yield- kgs./ha.)

Particulars		Marginal			Small			semi medium			Medium			Large			Total		
		2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change
Area	V	4.20	5.60	33.33	11.50	14.10	22.61	13.85	14.10	1.81	19.20	23.50	22.39	22.00	26.00	18.18	70.75	83.30	17.74
	U	5.00	7.50	50.70	5.00	6.00	20.00	11.20	11.80	5.36	9.40	10.40	10.64	2.00	2.00	--	32.60	37.70	15.64
	G	0.78	3.10	297.44	6.80	9.00	32.35	8.50	14.20	67.05	8.10	8.50	4.94	5.20	5.20	--	29.33	40.00	36.38
Produc-tion	V	65.00	110.00	69.23	172.00	281.00	63.37	215.00	270.00	25.58	320.00	425.00	32.81	287.00	478.00	66.55	1059.50	1564.00	47.62
	U	86.00	191.00	122.09	75.00	118.00	57.33	199.00	273.00	37.19	182.50	251.00	37.53	25.00	35.00	40.00	567.50	868.00	52.95
	G	8.50	103.50	1117.65	158.00	268.00	69.62	123.00	377.00	206.50	77.00	223.00	189.61	58.00	125.00	115.52	424.50	1096.50	158.30
Yield	V	1559	1964	25.98	1496	1993	33.20	1552	1915	23.39	1667	1800	7.98	1304	1838	40.95	14.97	18.77	25.38
	U	1720	2547	48.08	1500	1967	31.13	1777	2314	30.22	1941	2413	24.32	1250	1750	40.00	1741	2302	32.22
	G	1090	3339	206.33	2324	2978	28.14	1447	2655	83.48	951	2624	175.92	1115	2404	115.61	1445	2741	89.69

V, U and G indicates Vidisha, U= Ujjain, G= Guna

In Ujjain district productivity increase in organic soybean was about 10.00 per cent in all categories of selected farms in 2003-04 over 2001-02.

In Guna district increase in organic soybean productivity was revealed 65.50 per cent on large of farms that were highest among all the selected farms. Over all 13.22 per cent increase in productivity was observed in 2003-04 over 2001-02 (Table 4.8).

4.9.1 Coriander – Area - Coriander is major spice horticultural crop grown using organic input as well as in organic input. Guna district is know for coriander. Sample farmers of Guna district had keen interest in use of organic input for growing coriander. area under organic coriander increased more than 6 times on marginal selected farms on small, semi medium, medium and large size of farms increase was 129.09, 119.44, 50.00 per cent in 2003-04 over 2001-02. Over all increase in organic area under coriander was 120.16per cent in 2003-04 over 2001-02.

4.9.2 Coriander- Production : In Guna district production of organic coriander was increased due to increase in area and organic coriander. It was 884.62 per cent on marginal farms. 88.46 per cent on small, 180.88 per cent on semi medium 156.72 per cent on medium and 108.33 per cent on large size of sample farms. In the district 151.96 per cent increase in organic coriander was observed in 2003-04 over 2001-02.

4.9.3 Coriander- Productivity- Productivity of organic coriander was increased but not in proportion to increase in area and production yield was increased 31.30 per cent, on marginal size of sample farms. on small farms yield was decreased17.70 per cent in 2003-04 over2001-02. On semi medium, medium and large size of farms yield was increased 27.30, 16.97 and 38.89 per cent respectively in 2003-04 over 2001-02 over all 14.47 per cent increase in yield of organic coriander was observed in 2003-04 over 2001-02 (Table 4.9).

4.10.1 Gram- Area- Gram is an important pulse crop. during collection of primary data from sample farmers it was observed that they had keen interest in growing gram by using organic inputs. In Vidisha district sample farmers had adopted organic farming in gram cultivation but there was no change in area of organic gram on marginal and small farms. It was increased in Semi medium, medium and large size of farms, 17.65, 68.33 and 118.75 per cent respectively in 2003-04 over 2001-02. Over all 67.74 per increased was revealed in 2003-04 over 2001-02. In Ujjain district organic gram was sown in 2003-04. In Guna district the same situation in respect of organic gram was observed in marginal, small, semi medium

Table 4.8 Change in area, production and yield of organic Soybean crop on selected farms in selected district, M.P.

(Unit – Area, hectares, Production in quintals, yield- kgs./ha.)

Particulars		Marginal			Small			semi medium			Medium			Large			Total		
		2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change
Area	V	4.50	5.20	15.55	7.50	9.50	26.67	16.20	16.90	4.32	19.60	21.10	7.65	20.80	26.00	25.00	67.60	78.70	16.42
	U	6.60	10.10	53.03	8.20	12.40	51.22	15.40	20.30	31.81	19.80	30.20	52.53	6.60	8.60	30.30	56.60	81.60	44.17
	G	1.48	6.02	306.76	7.60	18.00	136.84	2.80	25.80	821.43	5.00	18.30	266.00	4.00	6.00	50.00	20.88	74.12	254.98
Produc-tion	V	42.50	56.50	32.94	92.00	133.00	44.56	185.00	224.00	21.08	210.00	281.00	33.81	244.00	365.00	49.59	749.50	1059.50	41.36
	U	84.00	146.00	73.81	124.00	225.00	81.45	180.00	269.00	49.44	297.00	461.00	14.11	83.00	124.00	45.78	768.00	1222.00	39.66
	G	19.00	96.50	407.89	104.80	246.50	137.00	27.00	305.00	1129.63	56.00	245	337.50	40.00	104.00	160.00	248.00	997.00	302.02
Yield	V	944	1086	15.04	1227	1400	14.10	1142	1325	16.02	1071	1322	23.43	1177	1404	19.28	1109	1346	21.37
	U	1272	1446	13.68	1512	1815	20.04	1169	1325	13.34	1500	1526	1.73	1257	1407	11.93	1357	1498	10.39
	G	1284	1602	24.77	1368	1369	0.07	964	1182	22.61	1120	1339	19.55	1050	1733	65.50	1188	1345	13.22

V, U and G indicates Vidisha, U= Ujjain, G= Guna

Table 4.9 Change in area, production and yield of organic Coriander crop on selected farms in selected district, M.P.

(Unit – Area, hectares, Production in quintals, yield- kgs./ha.)

Particulars		Marginal			Small			semi medium			Medium			Large			Total		
		2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change
Area	V	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	G	0.60	4.50	650.00	5.50	12.60	129.09	6.80	15.00	120.59	7.20	15.80	119.44	5.20	7.80	50.00	25.30	55.70	120.16
Produc-tion	V	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	G	6.50	64.00	884.62	78.00	147.00	88.46	68.00	191.00	180.88	67.00	172.00	156.72	48.00	100.00	108.33	267.50	674.00	151.96
Yield	V	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	G	1083	1422	31.30	1418	1167	-17.70	1000	1273	27.30	931.00	1089	16.97	923	1282	38.89	1057	1210	14.47

V, U and G indicates Vidisha, U= Ujjain, G= Gu

and medium size of farms. Only on large size of sample farms 55.55 per cent increase was noted in 2003-04 over 2001-02 over 68.33 per increase was observed.

4.10.2 Gram- Production: Production of organic gram was observed in marginal group due increase in productivity in Vidisha district. Increase in production was revealed 30.00, 83.22, and 154.54 per cent in semi medium, Medium, and large size of farms respectively in 2003-04 over 2001-02 over increase was 87.08 per cent. In Ujjain district organic gram was sown in 2003-04. In Guna district Production of organic gram was 125.00 per higher in comparison to 2001-02. Over of production of organic gram was increased 135.94 per cent in 2003-04 over 2001-02 in Guna district.

4.10.3 Gram- Yileld: In Vidisha district yield of organic gram was increased marginal size of farms 16.67 per cent. It was 10.54 per cent increase in Semi medium size of farms. Increase in yield was revealed 8.82 per cent and 16.35 per cent in medium and large size of farms respectively. Over all increase was noted 11.55 per cent in Vidisha district. In Ujjain district yield per hectare was not compared as it was grown first time in 2003-04. In Guna district yield of organic gram was increased 124.97 per cent in large size of farms in 2003-04 over 2001-02. Over increase in productivity of organic gram was raveled 40.16 per cent (Table 4.10).

4.11 Yield variation in major organic and in organic crops

4.11.1 Wheat :

Productivity variability of organic wheat and in organic showed that in organic productivity is higher than organic in select 3 districts i.e. Vidisha, Ujjain and Guna as well as different group of farm size. In Vidisha district organic wheat productivity was 8.20 per cent higher in marginal group and 15.01 per cent higher in large size of farms. Over all there was 12.63 per cent variation between organic and in organic wheat.

In Ujjain district productivity variability of organic and in organic wheat was remarkable as organic wheat productivity was higher than in organic in marginal size of farms. In small size of farms in organic wheat productivity was 41.23 per cent higher over all variation was 6.99 per cent higher than organic.

Table 4.10 Change in area, production and yield of organic Gram crop on selected farms in selected district, M.P.

(Unit – Area, hectares, Production in quintals, yield- kgs./ha.)

Particulars		Marginal			Small			semi medium			Medium			Large			Total		
		2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change
Area	V	0.80	0.80	--	--	1.00	--	3.40	4.00	17.67	12.00	20.20	68.33	3.20	7.00	118.75	18.60	31.20	67.74
	U	--	0.20	--	--	1.60	--	--	--	--	--	--	--	--	2.00	--	--	3.80	--
	G	--	0.30	--	--	0.40	--	--	2.76	--	--	0.60	--	3.60	2.00	55.55	3.60	6.06	68.33
Produc-tion	V	6.00	7.00	16.67	--	9.00	--	30.00	39.00	30.00	155.00	284.00	83.22	55.00	140.00	154.54	240.00	449.00	87.08
	U	--	6.00	--	--	24.00	--	--	--	--	--	--	--	--	16.00	--	--	46.00	--
	G	--	4.00	--	--	7.00	--	--	21.00	--	--	4.50	--	32.00	40.00	125.00	32.00	75.50	135.94
							--												
Yield	V	750	875	16.67	--	900	--	882	975	10.54	1292	1406	8.82	1719	2000	16.35	1290	1439	11.55
	U	--	1000	--	--	1500	--	--	--	--	--	--	--	--	800	--	--	1211	--
	G	--	1333	--	--	1750	--	--	761	--	----	750	--	889	2000	124.97	889	1246	40.16

V, U and G indicates Vidisha, U= Ujjain, G= Guna

In Guna district the variation between organic and in organic wheat was maximum in medium size group 42.91 per cent higher than organic. Over all in organic productivity variability was higher than organic (10.07 per cent). The productivity variability between organic and in organic wheat showed that organic productivity is less than in organic.

4.11.2 Gram : Gram is important pulse crop among pulses. Productivity of in organic gram was 61.82 per cent higher than organic in Vidisha district on marginal size of selected households. On small size of farms in organic gram productivity was 72.77 per cent higher than in organic on Medium and large size of farms productivity of in organic gram was less than organic 18.28 per cent and 31.45 per cent respectively. Over all productivity of organic and in organic gram differ marginally 0.44 per cent higher than organic crop of gram in Vidisha district.

In Ujjain district productivity of inorganic gram was higher than organic in marginal and large size of farms 30.00 per cent and 60.12 per cent respectively. On small size of farms inorganic gram productivity was 16.00 per cent less than organic. Over all in organic productivity of gram was 33.36 per cent higher than organic.

4.11.3 Lentil : Among three selected districts of Madhya Pradesh organic and in organic lentil was grown in Vidisha district on Medium size of farms considerably. Productivity of in organic lentil is higher than organic 8.64 per cent. In Ujjain and Guna districts productivity of organic and in organic lentil is not comparable.

4.11.4 Soybean : Data collected from sample farmers reveal that soybean was grown using organic input as well as in organic input in selected3 districts on each size of farms. It was observed that productivity of in organic soybean was higher than organic in every size group of farms varying 5.81 per cent to 56.05 per cent except medium and large farms of Ujjain district where in organic soybean productivity was less than organic 18.85 per cent and 36.04 per cent respectively. It was less in Guna district at large farm 17.95 per cent. Over all farms in Vidisha and Guna in organic productivity was higher 22.43 per cent and 11.89 per cent respectively than organic but it was 16.02 per cent less in Ujjain district.

4.11.5 Maize - Maize crop was grown organic and in organic in Ujjain and Guna district. Productivity of Organic and in organic was comparable on all selected farms which reveal that in Ujjain district productivity of in organic maize was 20.46 per cent less than organic where as in Guna district in organic productivity of maize was 23.79 per cent higher than organic.

4.11.6 Coriander : Coriander is important spice horticultural crop. It is rabi commercial crop grown using organic and in organic input. In Guna district Coriander was grown on each size of farms using organic input. Only on large size of farms in organic coriander was grown which productivity was 22.00 per cent less than organic coriander (Table 4.11).

4.12 Cost of Cultivation of organic and in organic crops

On the basis of data collected from the sample farmers in selected district of Madhya Pradesh, cost of cultivation per hectare of wheat, gram, soybean and coriander crops (organic and in organic) has been calculated.

4.12.1 Wheat : Cost of cultivation of organic wheat per hectare in Vidisha district was Rs.9,217.00. Of this, operational cost was 55.99 per cent and material cost was 41.00 per cent per hectare. Among different components of input in organic wheat seed was most important sharing 16.27 per cent of total cost followed by weeding of the organic wheat was next important component costing Rs. 1321.00 per hectare (14.33 per cent) Total value of organic wheat per hectare was Rs. hectare (14.33 per cent) total value of organic wheat per hectare was Rs. 15,959.00. The cost benefit ration of organic wheat was 1: 1.73.

Cost of cultivation of in organic wheat per hectare was Rs.10,295.53. Of the total cost of cultivation, operational cost was Rs.5,059.15 per hectare (49.14 per cent) and material cost was Rs.5236.38 per hectare (50.86 per cent). Total value of in organic wheat was Rs.16,412.00 per ha. The cost benefit ratio of inorganic wheat was 1: 1.59.

The comparison of cost benefit ratio of organic and in organic wheat in Vidisha district was observed that organic wheat was more profitable than in organic.

In Ujjain district cost of cultivation of organic wheat was Rs. 8,550.58 per hectare. Operational cost per hectare was Rs.4684.00 and material cost was Rs.3,866.58 seed and land preparation was very important component of input cost 18.49 per cent and 13.99 per cent of the total cost of cultivation of organic wheat in Ujjain district. The total value of production per hectare was Rs.19,469.00. The cost benefit ratio of organic wheat was 1:2.27.

In organic wheat the cost of cultivation per hectare was higher than organic per hectare cost of in organic wheat was Rs.9865.09. The value of in organic wheat was Rs.20,939.00 per hectare. Cost benefit ratio of in organic wheat was 1:2.20. It was observed that organic wheat was more profitable than inorganic.

Table 4.11 Variation in productivity per hectare of major organic and inorganic crops on selected farms in selected district, M.P., year 2003-04

Farm Size	Districts	Wheat			Gram			Lentil			Soybean			Maize			Coriander		
		Organic	Inorganic	% variation	Organic	Inorganic	% variation	Organic	Inorganic	% variation	Organic	Inorganic	% variation	Organic	Inorganic	% variation	Organic	Inorganic	% variation
Marginal	V	1964	2125	8.20	8.75	1416	61.82	---	---	---	1086	1250	15.10	---	---	---	---	---	---
	U	2547	2531	- 0.63	1000	1300	30.00	---	1500	--	1446	1666	15.21	--	2500	---	---	---	---
	G	3339	--	--	1333	--	--	---	---	---	1602	2500	56.05	1500	---	---	1422	---	---
Small	V	1993	2195	10.13	900	1555	72.77	500	--		1400	1578	12.71	--	---	---	---	---	---
	U	1967	2778	41.23	1500	1260	- 16.00	---	---	---	1815	2500	37.74	41.25	---	---	---	---	---
	G	2978	--	--	1750	--	--	---	---	---	1369	2000	46.09	1600	2500	56.25	1167	---	---
Semi-medium	V	1915	2125	10.96	975	1158	18.76	625	--	--	1325	1800	35.84	--	---	---	---	---	---
	U	2314	2314	0.00	--	1551	--	---	---	---	1325	1402	5.81	2000	---	---	---	---	---
	G	2655	2727	2.71	761	--	--	---	---	---	1182	1300	9.98	2162	---	---	1273	---	---
Medium	V	1800	1970	9.44	1406	1149	- 18.28	833	905	864	1332	1584	18.91	--	---	---	---	---	---
	U	2413	2500	3.60	--	1554	--	---	---	---	1526	1269	16.85	1500	---	---	---	---	---
	G	2624	3750	42.91	750	--	--	---	---	---	1339	1583	18.22	1844	1818	1.41	1089	---	---
Large	V	1838	2114	15.01	2000	1371	- 31.45	--	1375	--	1404	1678	1951	--	---	---	---	---	---
	U	1750	2300	31.42	800	1281	60.12	---	---	---	1407	900	- 36.05	--	---	---	---	---	---
	G	2404	2737	13.85	2000	--	--	---	---	---	1733	1422	17.95	1600	---	---	1282	1000	- 22.00
Total	V	1877	2114	12.63	1350	1356	0.44	708	1070	51.13	1346	1648	22.43	--	---	---	---	---	---
	U	2302	2463	6.99	1211	1615	33.36	--	1500	--	1498	1258	- 16.02	3143	2500	20.46			
	G	2741	3017	10.07	1246	--	--	--	--	--	1345	1505	11.89	1824	2258	23.79	1210	1000	- 17.36

In Guna district the total cost of cultivation of organic wheat was Rs.9,772.50 per hectare. Of this total cost operational cost was Rs.5263.25 per hectare and material cost was Rs.4509.25 per hectare. In Guna district seed, weeding and value of organic input was important as its share was 15.35, 12.92 and 12.23 per cent of total cost respectively. The value of total production of organic wheat was Rs.23,290 per hectare. The cost benefit ratio was 1:2.38.

Per hectare cost of cultivation of in organic wheat was Rs.10,223.00 per hectare in Ujjain district. Percentage of operational cost was 49.86 and material cost was 50.14 per cent. Among different components of cost value of chemical fertilisers was 20.59 per cent of total cost. The value of production per hectare was Rs.24,064 of in organic wheat in Guna district. It was revealed that cost benefit ratio of in organic wheat 1: 2.35.

On the basis of comparison between cost of cultivation per hectare as well as value of product per hectare of organic and in organic wheat in 3 selected districts of Madhya Pradesh organic wheat was found more remunerative than in organic (Table 4.12).

4.12.2 Soybean

Cost of cultivation per hectare of organic soybean was compared with in organic soybean as reported by sample farmers of selected districts.

In Vidisha district cost of cultivation per ha. of organic soybean was Rs.7675.52. Of the total cost of cultivation per hectare it was revealed that operational cost was higher than material cost Rs.4569.55 (59.53 per cent). Among component of cost seed was major item costing 26.06 per cent of total cost followed by Land preparation Rs.1406.50 (18.32 per cent) cost of organic compost was Rs.786.00 per hectare (10.24 per cent) Total value of production of organic soybean was Rs.13,793.00 per hectare. The cost benefit ratio was 1: 1.79.

Cost of cultivation of in organic soybean per hectare was Rs.9,997.00 of the total cost Rs.51.86 (51.88 per cent) per hectare was operational cost and 48.12 per cent was material cost. Among different components of cost value of seed and chemical fertilisers was important sharing 20.00 per cent and 17.88 per cent respectively. The value of in organic soybean produce was Rs.17,307.00 per hectare. The cost benefit ratio of in organic soybean was 1: 1.73 in Vidisha district. It was observed that organic soybean was more profitable than inorganic.

Table 4.12 Comparative picture of cost of cultivation per hectare of Wheat organic and inorganic on sample farms in selected district- M.P.

(Rs. per hectare)

S No.	Particulars	Vidisha		Ujjain		Guna		Total Average	
		Organic	Inorganic	Organic	Inorganic	Organic	Inorganic	Organic	Inorganic
A	**Operational Cost**								
1	Land preparation	1152.00 (12.50)	1253.00 (12.17)	1196.29 (13.99)	1216.56 (12.33)	1195.50 (12.23)	1204.00	1181.26	1224.52
2	Organic compost application	122.00 (1032)	-	120.69 (1.41)	-	132.00 (1.35)	-	124.89 (1.36)	-
3	Chemical fertiliser application	-	112.23 (1.09)	-	113.06 (1.15)	-	118.42 (1.16)	-	114.57 (1.13)
4	Sowing	594.00 (6.45)	685.00 (6.65)	534.51 (6.25)	669.98 (6.79)	603.50 (6.18)	650.00 (6.36)	577.33 (6.29)	668.32 (6.60)
5	Organic plant protection application	34.00 (0.37)	-	38.67 (0.45)	-	37.00 (0.38)	-	36.55 (0.41)	--
6	Chemical plant Protection application	-	15.00 (0.15)	-	12.64 (0.13)	-	16.49 (0.16)	-	14.71 (0.14)
7	Irrigation	99.88 (1.08)	110.00 (1.07)	68.30 (0.80)	149.50 (1.52)	150.00 (1.53)	102.00 (1.00)	106.06 (1.15)	120.50 (1.19)
8	Intercultural	-	-	-	-	-	-	-	-
9	Weeding	1321.00 (14.33)	1085.00 (10.54)	828.91 (9.69)	989.15 (10.03	1262.87 (12.92)	1050.00 (10.27)	1137.59 (12.39)	1041.38 (10.28)
10	Harvesting	750.00 (8.14)	731.00 (7.10)	729.44 (8.53)	730.00 (7.40)	799.88 (8.19)	805.26 (7.88)	759.77 (8.28)	755.42 (7.46)
11	Threshing	718.21 (7.79)	750.00 (7.28)	705.22 (8.25)	706.00 (7.16)	720.00 (7.37)	750.00 (7.34)	714.47 (7.78)	735.33 (7.26)
12	Transportation	235.00 (2.55)	230.00 (2.23)	252.00 (2.95)	250.00 (2.53)	230.00 (2.35)	225.00 (2.20)	239.00 (2.60)	235.00 (2.33)
13	Others	134.91 (1.46)	87.92 (0.86)	209.97 (2.46)	107.20 (1.08)	132.50 (1.36)	175.83 (1.71)	159.12 (1.73)	123.65 (1.22)
TOTAL		**5161.00 (55.99)**	**5059.15 (49.14)**	**4684.00 (54.78)**	**4944.09 (50.12)**	**5263.25 (53..86)**	**5097.00 (49.86)**	**5036.08 (54.86**	**5033.41 (49.70)**
B	Material cost								
1	Seed	1500.00 (16.27)	1512.00 (14.69)	1581.17 (18.49)	1519.61 (15.40)	1500.00 (15.35)	1512.00 (14.79)	1527.05 (16.63)	1514.53 (14.95)
2	Organic compost	1345.00 (14.59)	-	1095.49 (12.81)	-	1447.50 (14.81)	-	1295.99 (14.12)	-
3	Organic plant Protection Medicines	255.00 (2.77)	-	235.00 (2.75)	-	234.25 (2.40)	-	241.41 (2.63)	-
4	Chemical plant protection medicines	-	146.00 (1.43)	-	159.19 (1.61)	-	158.00 (1.55)	-	154.39 (1.52)
5	Chemical fertilisers	-	2305.00 (22.38)	-	2110.92 (21.40)	-	2105.00 (20.59)	-	2173.64 (21.46)
6	Irrigation charges	868.24 (9.43)	1204.00 (11.69)	749.33 (8.76)	997.00 (10.11)	1200.00 (12.28)	1240.00 (12.12)	939.19 (10.23)	1147.00 (11.33)
7	Others	87.76 (0.95)	69.38 (0.67)	205.59 (2.41)	134.28 (1.36)	127.50 (1.30)	111.00 (1.09)	140.28 (1.53)	104.88 (1.04)
TOTAL		**4056.00 (44.01)**	**5236.38 (50.86)**	**3866.58 (45.22)**	**4921.00 (49.88)**	**4509.25 (46.14)**	**5126.00 (50.14)**	**4143.94 (45.14)**	**5094.46 (50.30)**
TOTAL (A+B)		**9217.00 (100.00)**	**10295.53 (100.00)**	**8550.58 (100.00)**	**9865.09 (100.00)**	**9772.50 (100.00)**	**10223.00 (100.00)**	**9180.02 (100.00)**	**10127.87 (100.00)**
Value of main product value of By product		12580.00 3379.00	14166.00 2246.00	15344.00 4125.00	16505.00 4434.00	18358.00 4932.00	20217.00 3847.00	15427.33 4145.33	16962.66 3509.00
Total value of product		15959.00	16412.00	19469.00	20939.00	23290.00	24064.00	19572..66	20471.66
Cost Benefit Ratio		1:1.73	1:1.59	1:2.27	1:2.20	1:2.38	1:2.35	1:2.13	1:2.02
Quantity of main product (Qtls. per ha.)		18.77	21.14	23.20	24.63	27.41	30.17	23.07	25.31

In Ujjain district organic soybean was more remunerative than in organic. As the cost of production per hectare of organic soybean was Rs.8,099.23 and Rs.9,804.22 per hectare of inorganic soybean. Among different components of inputs operational cost was Rs.4812.96 per hectare (59.42 per cent) and Rs.3286.27 (40.58 per cent) material cost of organic soybean. The picture inorganic soybean the cost of cultivation per hectare, value of seed and chemical fertilisers was higher sharing 20.48 per cent and 18.27 per cent respectively followed by land preparation 16.38 per cent.

The value of organic soybean per hectare was Rs.15,330.00. The cost benefit ratio was 1: 1.89. The value of inorganic soybean per hectare was Rs.13,588.00. The cost benefit ratio was 1: 1.38. It was revealed that in Ujjain district organic soybean was more profitable than inorganic.

In Guna district per hectare cost of cultivation of organic soybean was Rs.8490.10. Of the total cost operational cost was Rs.50,185, 59.11 per cent per hectare and material cost was Rs.347.45, 40.89 per cent per hectare. The value of organic soybean was Rs.14,096 per hectare. The cost benefit ratio was 1: 1.66.

Cost of cultivation of in organic soybean was Rs.10,052.48 per hectare 18.40 per cent cost was higher than organic soybean. Of the total cost Rs.5101.48 per hectare was operational cost (50.75 per cent) and Rs.4951.00 (49.25 per cent) was material cost. Among components of cost value of seed, chemical fertiliser and land preparation were important i.e. 20.39, 18.06 and 15.74 per cent of total cost respectively. The value inorganic soybean production was Rs.15,425 per hectare. The cost benefit ratio was 1: 1.53. It was observed that organic soybean was more remunerative than inorganic in Guna district (Table 4.13).

4.12.3 Coriander

Coriander, the most important commercial crop grown using organic input as well as in organic input. In Madhya Pradesh coriander is sown in Guna district at larger extent.

The cost of cultivation of organic coriander was Rs.11,343.08 per hectare. Of the total cost, operational cost was Rs.6904.61 (60.87 per cent) and material cost was Rs.4438.47 (39.13 per cent). among operational cost land preparation, operation, organic compost, weeding and seed was constituted 18.45, 15,73, 17.72 and 12.72 per cent of total cost respectively. The value of total organic coriander was Rs.21,952 per hectare. The cost benefit ratio was 1: 1.94.

Table 4.13 Comparative picture of cost of cultivation per hectare of Soybean organic and inorganic on sample farms in selected district- M.P.

(Rs. per hectare)

S No.	Particulars	Vidisha		Ujjain		Guna		Total Average	
		Organic	Inorganic	Organic	Inorganic	Organic	Inorganic	Organic	Inorganic
A	**Operational Cost**								
1	Land preparation	1406.50 (18.32)	1620.00 (16.20)	1579.66 (19.50)	1606.00 (16.38)	1587.49 (18.70)	1581.77 (15.74)	1524.55 (18.85)	1602.59 (16.05)
2	Organic compost application	79.45 (1.04)	-	89.77 (1.11)	-	85.00 (1.00)	-	84.74 (1.05)	-
3	Chemical fertiliser application	-	120.00 (1.20)	-	95.00 (0.97)	-	100.00 (0.99)	-	105.00 (1.05)
4	Sowing	455.00 (5.93)	501.00 (5.02)	543.66 (6.71)	544.00 (5.55)	575.00 (6.77)	548.00 (5.45)	524.55 (6.48)	531.00 (5.32)
5	Organic plant protection application	28.00 (0.36)	-	27.88 (0.34)	-	37.00 (0.44)	-	30.96 (0.38)	-
6	Chemical plant Protection application	-	143.35 (1.43)	-	103.32 (1.05)	-	150.00 (1.49)	-	132.36 (1.33)
7	Irrigation	-	-	-	-	-	-	-	-
8	Interculture	365.00 (4.76)	350.00 (3.50)	379.55 (4.69)	373.00 (3.80)	356.00 (4.19)	360.00 (3.58)	366.85 (4.54)	361.00 (3.61)
9	Weeding	614.43 (8.01)	730.00 (7.30)	633.27 (7.82)	635.00 (6.48)	648.00 (7.63)	649.00 (6.46)	631.90 (7.81)	671.33 (6.72)
10	Harvesting	598.72 (7.80)	600.00 (6.00)	595.59 (7.35)	596.00 (6.09)	652.00 (7.68)	654.00 (6.51)	615.44 (7.61)	616.67 (6.18)
11	Threshing	716.00 (9.33)	716.00 (7.16)	721.20 (8.91)	725.00 (7.39)	804.42 (9.47)	795.00 (7.91)	747.17 (9.24)	745.33 (7.47)
12	Transportation	226.00 (2.94)	225.00 (2.25)	241.76 (2.99)	250.00 (2.55)	240.00 (2.83)	252.00 (2.50)	235.92 (2.92)	242.33 (2.43)
13	Others	80.45 (1.04)	180.65 (1.82)	0.62 (Neg)	-	33.73 (0.40)	11.71 (0.12)	38.26 (0.47)	96.18 (0.96)
TOTAL		**4569.55 (59.53)**	**5186.00 (51.88)**	**4812.96 (59.42)**	**4927.32 (50.26)**	**5018.65 (59.11)**	**5101.48 (50.75)**	**4800.38 (59.35)**	**5103.79 (51.12**
B	Material cost								
1	Seed	2000.00 (26.06)	2000.00 (20.00)	1999.51 (24.69)	2007.87 (20.48)	2000.00 (23.56)	2050.00 (20.39)	1999.84 (24.73)	2019.29 (20.23)
2	Organic compost	786.00 (10.24)	-	898.28 (11.09)	-	1103.00 (12.99)	-	929.09 (11.48)	-
3	Organic plant Protection Medicines	245.38 (3.20)	-	235.29 (2.91)	-	215.00 (2.53)	-	231.89 (2.87)	-
4	Chemical plant protection medicines	-	896.00 (8.96)	-	905.00 (9.23)	-	950.00 (9.45)	-	917.00 (9.19)
5	Chemical fertilisers	-	1788.00 (17.88)	-	1791.33 (18.27)	-	1815.20 (18.06)	-	1798.11 (18.01)
6	Irrigation charges	-	-	-	-	-	-	-	-
7	Others	74.59 (0.97)	127.00 (1.28)	153.19 (1.89)	172.70 (1.76)	153.45 (1.81)	135.80 (1.35)	127.07 (1.57)	145.17 (1.45)
TOTAL		**3105.97 (40.47)**	**4811.00 (48.12)**	**3286.27 (40.58)**	**4876.90 (49.74)**	**3471.45 (40.89)**	**4951.00 (49.25)**	**3287.90 (40.65)**	**4879.57 (48.88)**
TOTAL (A+B)		**7675.52 (100.00)**	**9997.00 (100.00)**	**8099.23 (100.00)**	**9804.22 (100.00)**	**8490.10 (100.00)**	**10052.48 (100.00)**	**8088.28 (100.00**	**9983.36 (100.00)**
Value of main product		13793.00	17307.00	15330.00	13588.00	14096.00	15425.00	14406.33	15440.00
Value of By Product		-	-	-	-	-	-	-	-
Total value of product		13,793.00	17,307.00	15,330.00	13,588.00	14,096.00	15,425.00	14,406.33	15,440.00
Cost Benefit Ratio		1:1.79	1:1.73	1:1.89	1:1.38	1:1.66	1:1.53	1:1.78	1:1.55
Quantity of main product (Qtls. per ha.)		13.46	16.48	14.98	12.58	13.45	15.05	13.96	14.70

The cost of cultivation of inorganic coriander was Rs.14,390.00 per hectare. Operational cost was Rs.7135.00 (49.58 per cent) per hectare and material cost was Rs.7,255.00 (50.42 per cent) per hectare. Value of Chemical input i.e. plant protection

medicines and chemical fertilisers were 32.52 per cent in inorganic coriander. The value of inorganic coriander per hectare was Rs.22,000.00. The cost benefit ratio was 1: 1.53.

It was observed that organic coriander was more remunerative than inorganic (Table 4.14).

Table 4.14 Comparative picture of cost of cultivation per hectare of coriander organic and inorganic on sample farms in selected district- M.P.

(Rs. per hectare)

S. No.	Particulars	Vidisha		Ujjain		Guna	
		Organic	Inorganic	Organic	Inorganic	Organic	Inorganic
A	**Operational Cost**						
1	Land preparation	--	--	--	--	2092.91 (918.45)	2100.00 (14.59)
2	Organic compost application	--	--	--	--	94.25 (0.83)	--
3	Chemical fertiliser application	--	--	--	--	-	100.00 (0.70)
4	Sowing	--	--	--	--	640.25 (5.64)	661.00 (4.59)
5	Organic plant protection application	--	--	--	--	35.46 0.31	-
6	Chemical plant Protection application	--	--	--	--	-	40.00 (0.28)
7	Irrigation	--	--	--	--	37.25 (0.33)	83.00 (0.58)
8	Interculture	--	--	--	--	--	--
9	Weeding	--	--	--	--	2009.87 (17.72)	2100.00 (14.59)
10	Harvesting	--	--	--	--	1062.39 (9.37)	1105.00 (7.68)
11	Threshing	--	--	--	--	665.17 (5.86)	671.00 (4.66)
12	Transportation	--	--	--	--	267.06 (2.36)	275.00 (1.91)
13	Others	--	--	--	--	-	-
TOTAL						**6904.61 (60.87)**	**7135.00 (49.58)**
B	**Material cost**						
1	Seed	--	--	--	--	1442.73 (12.72)	1500.00 (10.42)
2	Organic compost	--	--	--	--	1783.90 (15.73)	-
3	Organic plant Protection Medicines	--	--	--	--	289.05 (2.55)	-
4	Chemical plant protection medicines	--	--	--	--	--	575.25 (4.00)
5	Chemical fertilisers	--	--	--	--	--	4103.00 (28.52)
6	Irrigation charges	--	--	--	--	720.83 (6.35)	814.25 (5.66)
7	Others	--	--	--	--	201.96 (1.78)	262.50 (1.82)
TOTAL		--	--	--	--	**4438.47 (39.13)**	**7255.00 (50.42)**
TOTAL (A+B)		--	--	--	--	**11343.08 (100.00)**	**14390.00 (100.00)**
Value of main product value of By product		--	--	--	--	21,952.00	22,000.00
Total value of product		--	--	--	--	21,952.00	22,000.00
Cost Benefit Ratio		--	--	--	--	1 : 1.94	1: 1.53
Quantity of main product (Qtls. per ha.)		--	--	--	--	12.10	10.00

4.13 Utilization of production

4.13.1 Wheat

The utilization pattern of organic and inorganic wheat in different districts under different size group of holdings is given table 4.15. On an average irrespective of size groups the total production of organic wheat in Vidisha and Guna district was higher as compared to inorganic wheat, but for Vidisha district, reverse trend was noted. Out of the total production 18.09, 28.11 and 42.45 per cent of the organic wheat was hold for family consumption, in Vidisha, Ujjain and Guna district respectively. While, in case of inorganic wheat very negligible quantity was hold for family consumption revealing that farmer awareness regarding the use of organic products is increase irrespective of size groups. More than 50 per cent of the produce of organic wheat so marketed by the producers and very little quantity was kept for other purposes. Similarly quantity retained for seed as a percentage of total production was higher in case of organic wheat as compared to inorganic wheat. The extent of marketable surplus was about 90.00 per cent in case of inorganic wheat. On different size group of holdings the percentage quantity retained for family consumption of organic wheat decreases with increase in size of holding in different districts. While in case of inorganic wheat very little quantity was kept for home consumption by marginal and small farmers of Vidisha district and non of the farmer of inorganic wheat producer of other districts, in other size group of holding kept the inorganic wheat for home consumption. The percentage quantity retained for seed in case of organic wheat was more or less identical irrespective of size groups except in medium size group, but wide variation was observed in percentage quantity retained for seed in different districts among different size group of farmers in case organic wheat. It is also interesting to note that the percentage quantity retained for seed was higher for organic wheat as compared to inorganic wheat irrespective of districts and size groups.

The results show that the organic wheat producer irrespective of size groups and districts hold much more production for household use as a part of food and nutritional security and further higher percentage of produce hold for seed among organic producer as compared to inorganic produce reflected towards their strategy of increasing area under organic wheat production (Table 4.15).

Table 4.15 Utilization of Organic and inorganic wheat production per farm by size groups

(Unit – Quintals)

Size of farm	Districts	Organic					Inorganic				
		Total Production (Quintals)	Home Consumption	Retained for seed	Sale	Other	Total Production	Home Consumption	Retained for Seed	Sale	Other
Marginal	V	8.33 (100.00)	5.00 (60.02)	0.42 (5.04)	2.66 (31.91)	0.25 (3.00)	5.67 (100.00)	0.25 (4.41)	0.67 (1.18)	4.42 (77.95)	0.33 (5.82)
	U	13.64 (100.00)	4.14 (30.35)	1.17 (8.58)	8.23 (60.34)	0.10 (0.73)	5.79 (100.00)	0.14 (2.41)	0.36 (6.22)	4.93 (85.15)	0.36 (6.22)
	G	7.39 (100.00)	3.89 (52.64)	0.79 (10.69)	2.71 (36.67)	-	-	-	-	-	-
Small	V	23.42 (100.00)	4.58 (19.55)	1.25 (5.34)	17.38 (74.21)	0.21 (0.90)	8.42 (100.00)	0.43 (5.11)	0.33 (3.92)	7.08 (84.08)	0.58 (6.89)
	U	7.87 (100.00)	4.20 (53.37)	1.13 (14.36)	2.54 (32.27)	-	6.66 (100.00)	-	0.33 (4.95)	6.00 (90.09)	0.33 (4.96)
	G	22.33 (100.00)	11.08 (49.62)	1.83 (8.20)	9.42 (42.18)	-	-	-	-	-	-
Semi-medium	V	24.55 (100.00)	5.91 (24.07)	1.64 (6.68)	16.73 (68.15)	0.27 (1.10)	7.73 (100.00)	-	-	7.27 (94.05)	0.46 (5.95)
	U	24.82 (100.00)	5.55 (22.36)	3.18 (12.81)	15.82 (63.74)	0.27 (1.09)	25.36 (100.00)	-	1.09 (4.30)	23.36 (92.11)	0.91 (3.59)
	G	34.27 (100.00)	14.91 (43.51)	2.73 (7.97)	16.63 (48.52)	-	5.45 (100.00)	-	0.45 (8.26)	4.55 (83.48)	0.45 (8.26)
Medium	V	36.11 (100.00)	5.78 (16.01)	4.44 (12.30)	24.78 (68.62)	1.11 (3.07)	37.22 (100.00)	-	-	36.11 (97.02)	1.11 (2.98)
	U	35.86 (100.00)	6.86 (19.13)	4.43 (12.35)	24.28 (67.71)	0.29 (0.81)	119.29 (100.00)	-	2.14 (1.80)	115.00 (96.40)	2.15 (1.80)
	G	22.30 (100.00)	8.70 (39.01)	1.60 (7.17)	12.00 (53.82)	-	6.00 (100.00)	-	-	5.50 (91.67)	0.50 (8.33)
Large	V	79.67 (100.00)	5.17 (6.49)	5.00 (6.27)	68.17 (85.57)	1.31 (1.67)	148.00 (100.00)	-	3.67 (2.48)	141.83 (95.83)	2.50 (1.69)
	U	11.67 (100.00)	4.67 (40.02)	2.00 (17.14)	5.00 (42.84)	-	84.00 (100.00)	-	6.67 (7.94)	70.67 (84.13)	6.66 (7.93)
	G	41.67 (100.00)	9.00 (21.60)	3.67 (8.81)	29.00 (69.59)	-	17.33 (100.00)	-	-	15.67 (90.42)	1.66 (9.58)
Total	V	29.08 (100.00)	5.26 (18.09)	2.16 (7.43)	21.13 (72.66)	0.53 (1.82)	29.54 (100.00)	0.16 (0.54)	0.68 (2.30)	27.88 (94.38)	0.82 (2.78)
	U	17.36 (100.00)	4.88 (28.11)	2.11 (12.15)	10.24 (58.99)	0.13 (0.75)	30.94 (100.00)	0.04 (0.13)	1.14 (3.68)	28.66 (92.63)	1.10 (3.56)
	G	21.93 (100.00)	9.31 (42.45)	1.80 (8.21)	10.82 (49.34)	-	3.44 (100.00)	-	0.10 (2.91)	3.04 (88.37)	0.30 (8.72)

Figures in the parentheses represent the percentage

4.13.2 Soybean

Soybean is a major commercial oilseed crop. This crop grown in both conditions i.e. using organic input and inorganic input.

The production of organic soybean is Vidisha district it was noted that out of total production of 18.79 quintals per farm 7.56 per cent was utilised for seed and 0.37 per cent for other purposes. There was no relationship of seed per farm and size group. It was observed the quantity of organic soybean retained for seed varied from 4.51 per cent to 10.71 per cent in different size group of farms. Remaining quantity of organic soybean 88.54 per cent to 95.49 per cent was marketed in various size groups. While in case of inorganic soybean out of total production of 32.90 quintals per farm 2.30 per cent was utilised for seed and 97.63 per cent was sold in market in Vidisha district. Quantity retained for seed purpose varied from 1.28 per cent to 11.20 per cent irrespective of different size group of farms.

In Ujjain district as regard the utilisation pattern of organic soybean, out the total production of 24.44 quintals per farm 2.93 per cent was utilised for seed, 86.45 per cent was marketed and 1.56 per cent for other purpose. The percentage of use on seed varied from 10.20 per cent to 15.25 per cent in various size group of farms. There was no relationship between percentage of marketed surplus and size group of farms.

In case of inorganic soybean 12.78 quintals per farm 5.56 per cent was retained for seed and remaining 94.4 per cent was marketed in Ujjain district. The percentage of quantity retained for seed in case of inorganic soybean was 4.28 per cent to 11.22 per cent in different size groups. It was observed the percentage quantity retained for sale was increasing irrespective of size group i.e. 88.78 per cent to 95.72 per cent.

On an average irrespective of size groups the total production of organic soybean in Guna district was higher as compared to inorganic soybean. Out of the total production 19.94 quintals per farm 8.88 per cent and 91.12 per cent for seed and marketed of organic soybean. The percentage quantity retained for organic soybean was 6.89 per cent to 11.47 per cent in different size group. The marketed quantity percentage varied from 88.53 per cent to 93.11 per cent in case organic soybean in various size group in Guna district.

It was noted that out of total production of inorganic soybean 6.20 quintals per farm 9.35 per cent was utilised for seed and 90.65 per cent was sold. The percentage of quantity retained for seed varied from 4.69 per cent to 13.17 per cent in different size group. While percentage of marketed inorganic soybean varied from 84.83 per cent to 95.31 per cent in irrespective size group of farms in Guna district (Table 4.16).

Table 4.16 Utilization of Organic and inorganic production of soybean per farm by size groups

(Unit – Qtls.)

Size of farm	Districts	Organic					Inorganic				
		Total Production (Quintals)	Home Consumption	Retained for seed	Sale	Other	Total Production	Home Consumption	Retained for Seed	Sale	Other
Marginal	V	4.71 (100.00)	--	0.42 (8.92)	4.17 (88.54)	0.12 (2.54)	2.50 (100.00)	--	0.25 (10.00)	2.25 (90.00)	--
	U	10.43 (100.00)	--	1.17 (11.22)	9.09 (87.15)	0.17 (1.63)	2.14 (100.00)	--	0.24 (11.22)	1.90 (88.78)	--
	G	6.89 (100.00)	--	0.79 (11.47)	6.10 (88.53)	--	1.79 (100.00)	--	0.14 (7.82)	1.65 (92.18)	--
Small	V	11.08 (100.00)	--	0.50 (4.51)	10.58 (95.49)	--	11.83 (100.00)	--	0.42 (3.55)	11.41 (96.45)	--
	U	18.75 (100.00)	--	2.17 (11.57)	16.58 (88.43)	--	3.33 (100.00)	--	0.25 (7.51)	3.08 (92.49)	--
	G	16.43 (100.00)	--	1.57 (9.56)	14.86 (90.44)	--	1.07 (100.00)	--	0.07 (6.54)	1.00 (93.46)	--
Semi-medium	V	20.36 (100.00)	--	2.18 (10.71)	18.18 (89.29)	--	4.91 (100.00)	--	0.55 (11.20)	4.36 (88.80)	--
	U	24.46 (100.00)	--	3.73 (15.25)	20.00 (81.77)	0.73 (2.98)	14.09 (100.00)	--	0.91 (6.46)	13.18 (93.54)	--
	G	27.72 (100.00)	--	1.91 (6.89)	25.81 (93.11)	--	5.91 (100.00)	--	0.91 (15.40)	5.00 (84.60)	--
Medium	V	17.89 (100.00)	--	1.22 (6.82)	16.67 (93.18)	--	27.11 (100.00)	--	1.11 (4.09)	26.00 (95.91)	--
	U	46.19 (100.00)	--	4.70 (10.20)	40.50 (87.85)	0.90 (1.95)	29.70 (100.00)	--	1.40 (4.71)	28.30 (95.29)	--
	G	35.00 (100.00)	--	3.29 (9.40)	31.71 (90.60)	--	10.86 (100.00)	--	1.43 (13.17)	9.43 (86.83)	--
Large	V	60.83 (100.00)	--	4.17 (6.86)	56.33 92.60	0.33 (0.54)	195.83 (100.00)	--	2.50 (1.28)	193.33 (98.72)	--
	U	40.33 (100.00)	--	5.33 (13.22)	35.00 (86.78)	--	39.00 (100.00)	--	1.67 (4.28)	37.33 95.72)	--
	G	34.67 (100.00)	--	3.33 (9.60)	31.34 (90.40)	--	42.67 (100.00)	--	2.00 (4.69)	40.67 (95.61	--
Total	V	18.79 (100.00)	--	1.42 (7.56)	17.30 (92.07)	0.07 (0.37)	32.90 (100.00)	--	0.78 (2.37)	32.12 (97.63	--
	U	24.44 (100.00)	--	2.93 (11.99)	21.13 (86.45)	0.38 (1.56)	12.78 (100.00)	--	0.71 (5.56)	1207 (94.44)	--
	G	19.94 (100.00)	--	1.77 (8.88)	18.17 (91.12)	--	6.20 (100.00)	--	0.58 (9.35)	5.62 (90.65)	--

Figures in the parentheses represent the percentage

4.13.3 Coriander

Utilisation of organic and inorganic coriander production in Guna district under different size group of holdings is given table 4.17.

It is clearly evident from the table that out of the total organic coriander production o333f 13.48 quintals per farm, 0.89 per cent was utilised for home consumption and 95.25

per cent was marketed. Another 3.86 per cent was utilised for seed. It was noted that the percentage of quantity of seed varied from 3.00 to 6.35 per cent irrespective of different size group of holdings. The disposal pattern for home consumption showed that percentage varied from 0.14 to 1.53. The percentage of quantity of marketed increased with the increase of farm size except on medium size farms. But in the case of inorganic coriander which was taken by only large size farmers among sample farmers. The total inorganic coriander production of 4.00 quintals per farm, 2.50 per cent was utilised for home consumption and 5.75 per cent was retained for seed. Another 91.75 per cent was sold (Table 4.17).

Table 4.17 Utilization of Organic and inorganic Coriander production per farm by size groups in Guna district (M.P.)

(Unit – Quintals)

Size of farm	Districts	Organic					Inorganic				
		Total Production (Quintals)	Home Consumption	Retained for seed	Sale	Other	Total Production	Home Consumption	Retained for Seed	Sale	Other
Marginal	V	--	--	--	--	--	--	--	--	--	--
	U	--	--	--	--	--	--	--	--	--	--
	G	4.57 (100.00)	0.07 (1.53)	0.29 (6.35)	4.21 (92.12)	--	--	--	--	--	--
Small	V	--	--	--	--	--	--	--	--	--	--
	U	--	--	--	--	--	--	--	--	--	--
	G	9.80 (100.00)	0.07 (0.71)	0.40 (4.08)	9.33 (95.21)	--	--	--	--	--	--
Semi-medium	V	--	--	--	--	--	--	--	--	--	--
	U	--	--	--	--	--	--	--	--	--	--
	G	17.36 (100.00)	0.14 (0.81)	0.58 (3.34)	16.64 (5.85)	--	--	--	--	--	--
Medium	V	--	--	--	--	--	--	--	--	--	--
	U	--	--	--	--	--	--	--	--	--	--
	G	24.57 (100.00)	0.20 (0.81)	0.93 (3.79)	23.44 (95.40)	--	--	--	--	--	--
Large	V	--	--	--	--	--	--	--	--	--	--
	U	--	--	--	--	--	--	--	--	--	--
	G	33.33 (100.00)	0.23 (0.69)	1.00 (3.00)	32.10 (96.21)	--	4.00 (100.00)	0.10 (2.50)	0.23 (5.75)	3.67 (91.75)	--
Total	V	--	--	--	--	--	--	--	--	--	--
	U	--	--	--	--	--	--	--	--	--	--
	G	13.48 (100.00)	0.12 (0.89)	0.52 (3.86)	12.84 (95.25)	--	0.24 (100.00)	0.01 (4.16)	0.02 (8.34)	0.21 (87.50)	--

Figures in the parentheses represent the percentage

4.14 Awareness about organic farming

With a view to know the harmful impact of chemical fertilisers, use of insecticide and pesticides as in organic input some questions were asked from the sample farmers as parameter to assess the attraction towards organic farming.

At first use of inorganic input is harmful for atmosphere was asked. In Vidisha district 96.00 per cent sample farmers replied in alternative only 4.00 per cent were unaware who replied negative. In Ujjain district 84.00 per cent farmers replied yes in organic input use in harmful for atmosphere and human health 16.00 per cent sample farmers replied in negative. In Guna district 92.00 per cent were known to harmfulness of the use of inorganic input like insecticides, pesticides, weedicides and fertilisers. Only 8.00 per cent farmers were unknown.

Second question was asked about use of organic produce. More than 90.00 per cent sample farmers replied that organic produce is beneficial and tested for human health in each 3 selected district. A few farms about 8.00 per cent were unaware of good or bad affect of organic and inorganic produce.

Third question was related to soil texture and fertility due to use of chemical fertilisers, pesticides and insecticides. In Vidisha districts 96.00 per cent farmers replied in affirmative means these chemicals reduce the soil texture and fertility only 8.00 per cent replied negative. In Ujjain district 96.00 per cent were know the bad effect of these chemical inputs for detoriation of soil fertility and its texture, only 4.00 per cent were unaware. In Guna district 98.00 per cent replied yes and only 2.00 per cent no.

Fourth question was asked related to price received for organic and inorganic produce. All selected farmers of Vidisha and Ujjain districts replied that they do not get the price of organic produce higher than inorganic. In Guna district 3 out of 50 farmers replied positive.

Lastly knowledge about quality test of agricultural produce for export was asked. In Vidisha district 34.00 per cent replied in affirmative and 66.00 per cent negative. In Ujjain only 24.00 per cent were known and 76.00 per cent sample farmers were unaware. In Guna district only 4.00 per cent sample farms replied affirmative but majority of farmers 96.00 per cent were unknown about quality test of agricultural produce for export (Table 4.18).

Table 4.18 Awareness of selected farmers about organic farming in selected district, M.P.

S. No	Particulars	Districts	Marginal		Small		Semi-medium		Medium		Large		Total	
			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
1	Do you know that use of inorganic input is harmful for atmosphere ?	V	12	--	10	2	11	--	9	--	6	--	48	2
		U	12	2	9	3	10	1	8	2	3	--	42	8
		G	13	1	14	1	10	1	6	1	3	-	46	4
2	Do you know that use of organic produce is beneficial for health ?	V	12	--	11	1	11	--	8	1	6	--	48	2
		U	14	--	10	2	10	1	9	1	3	--	46	4
		G	14	--	15	--	11	--	7	--	3	--	50	--
3	Do you know that use of chemical fertilisers, pesticides and insecticides reduce soil texture and fertility ?	V	12	--	11	1	11	--	8	1	6	--	48	2
		U	12	--	12	--	10	1	10	--	3	--	49	1
		G	12	2	14	1	10	1	7	--	3	--	46	4
4	Do you get the price of organic produce higher than inorganic ?	V	--	12	--	12	--	11	--	9	--	6	--	50
		U	--	12	--	14	--	11	--	10	--	3	--	50
		G	1	13	--	15	1	10	--	7	1	2	3	47
5	Do you know that quality test is done for export of agril produce ?	V	1	11	4	8	3	8	4	5	5	1	17	33
		U	1	12	3	9	2	10	8	2	2	1	12	38
		G	1	13	--	15	1	10	--	7	--	3	2	48

4.15 Problems of Organic Farming

Farm level problems of organic farming were asked by the sample farmers. It was observed that major problems of the farmers were :

1. Non availability of sufficient organic input.
2. Less production of organic crops than inorganic.
3. Market price of organic produce is not more than inorganic.
4. Lack of knowledge regarding organic farming.

In Vidisha district among selected farmers 76.00 per cent reported that non availability of organic input like vermi culture, Vermi compost, organic plant protection medicines etc. are the major problem of organic farming. In Ujjain district first problem as reported by sample farmers was price of organic produce was not higher than inorganic. The same problem of less price of organic crop produce was first problem in Guna district. In Ujjain and Guna district non availability of organic input in sufficient quantity was second problem as 70.00 and 68 per cent farmers reported respectively. In Vidisha district price of organic was not more than inorganic was second problem less production of organic crop was the third problem in selected 3 districts viz. Vidisha, Ujjain and Guna as 40.00, 36.00 and 30.00 per cent sample farmers reported respectively. Lack of knowledge regarding organic farming was the fourth problem in each selected district (Table 4.19).

Table 4.19 Problems of organic farming in selected district, M.P.

S. No	Particulars	Districts	Marginal Small				Semi-medium		Medium		Large		Total	
1	Non availability of sufficient organic input.	V	10	I	8	I	7	II	7	I	6	I	38	76.00 I
		U	12	II	7	II	6	II	8	II	2	II	35	70.00 II
		G	13	II	12	II	4	I	2	II	3	I	34	68.00 II
2	Less production of organic crops than inorganic.	V	2	II	4	III	6	III	6	II	2	III	20	40.00 III
		U	3	IV	5	III	4	III	4	II	2	II	18	36.00 III
		G	2	III	4	III	4	I	3	III	2	II	15	30.00 IV
3	Price of organic produce is not more than inorganic.	V	10	I	6	II	8	I	6	II	3	II	33	66.00 II
		U	14	I	12	I	11	I	11	I	3	I	50	100.00 I
		G	14	I	15	I	6	I	5	I	3	I	43	86.00 I
4	No knowledge of organic farming.	V	1	III	3	IV	-	-	1	III	-	-	5	10.00 IV
		U	5	III	3	IV	4	III	4	II	-	-	16	32.00 IV
		G	2	III	2	IV	1	II	2	II	-	-	7	14 IV
5	Any other	V	-	-	-	-	-	-	-	-	-	-	-	-
		U	-	-	-	-	-	-	-	-	-	-	-	-
		G	-	-	-	-	-	-	-	-	-	-	-	-

4.16 Suggestions of sample farmers

For extension of organic farming in Madhya Pradesh farmer's suggestions were asked. sample farmers suggested according their opinions as follows :

1) Separate market of organic input and produce should be established. In Vidisha district 50.00 per cent farmers, 34.00 per cent in Ujjain and 42.00 per cent farmers in Guna district told their first suggestion of separate organic market establishment.

2) Price of organic produce should be higher than inorganic produce. This opinion was suggested by 46.00, 62.00 and 56.00 per cent farmers respectively in Vidisha, Ujjain and Guna district.

3) Certificate of organic farmers should be issued by Govt. agency. This opinion was suggested by 16.00, 32.00 and 28.00 per cent of sample farmers in Vidisha, Ujjain and Guna district respectively.

4) Quality testing lab should be established at block level. Such suggestion was provided by 16.00 per cent sample farmers of Vidisha district, 26.00 per cent of Ujjain district and 24.00 per cent of Guna district.

5) Minimum support Price of organic produce should be fixed. This suggestion was expressed by 44.00 per cent farmers in Vidisha district, 34.00 per cent in Ujjain district and 26.00 per cent sample farmers of Guna district.

6) More number of training, demonstration and subsidy on organic input should be provided - In Vidisha district 14.00 per cent farmers suggested in Ujjain district 40.00 per cent and in Guna district 46.00 per cent sample farmers suggested to organize more training of organic farming, demonstrations of organic crops should be shown and subsidy should be provided for organic input.

7) Green manuring should be encouraged : In Vidisha, Ujjain and Guna 36.00 per cent, 28.00 per cent and 18.00 per cent sample farmers expressed their opinion in favour of green manuring respectively.

8) Number of livestock should be increased : Livestock is the fundamental requirement of organic farming. In Vidisha, Ujjain and Guna 30.00, 28.00 and 10.00 per cent farmers respectively suggested to increase number of livestock.

9) Any other - In Vidisha district only 10.00 per cent farms suggested other measures to extent organic farming like marketing and processing unit of organic product should be established at 5 villages unit level or at growth centre (Table 4.20).

Table 4.20 Suggestions regarding extension of organic farming by selected farmers in selected district- M.P.

S. No	Particulars	Districts	Marginal		Small		Semi-medium		Medium		Large		Total	
			Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank
1	Separate market of organic input and produce should be established	V	8	-	6	-	4	-	5	-	2	-	25	50.00
		U	3	-	2	-	5	-	4	-	3	-	17	34.00
		G	2	-	6	-	8	-	3	-	2	-	21	42.00
2	Price of organic produce should be higher than inorganic produce.	V	5	-	6	-	4	-	6	-	2	-	23	46.00
		U	8	-	7	-	6	-	7	-	3	-	31	62.00
		G	8	-	5	-	7	-	5	-	3	-	28	56.00
3	Certificate of organic farmer should be issued by government agency.	V	2	-	2	-	3	-	-	-	-	-	8	16.00
		U	3	-	5	-	2	-	4	-	2	-	16	32.00
		G	3	-	4	-	3	-	2	-	2	-	14	28.00
4	Quality testing lab should be established at block level.	V	-	-	2	-	2	-	1	-	3	-	8	16.00
		U	3	-	4	-	2	-	3	-	1	-	13	26.00
		G	2	-	3	-	4	-	2	-	1	-	12	24.00
5	Minimum Support Price of Organic produce should be fixed.	V	5	-	6	-	5	-	4	-	2	-	22	44.00
		U	3	-	4	-	6	-	3	-	1	-	17	34.00
		G	4	-	2	-	4	-	1	-	2	-	13	26.00
6	More number of training, demonstra-tions and subsidy on organic input should be provided.	V	2	-	-	-	3	-	1	-	1	-	7	14.00
		U	5	-	6	-	4	-	3	-	2	-	20	40.00
		G	2	-	6	-	7	-	5	-	3	-	23	46.00
7	Green manuring should be encouraged	V	3	-	6	-	6	-	1	-	2	-	18	36.00
		U	4	-	2	-	3	-	2	-	3	-	14	28.00
		G	2	-	1	-	3	-	1	-	2	-	9	18.00
8	Number of livestock should be increased through govt. help.	V	-	-	1	-	2	-	1	-	1	-	5	10.00
		U	4	-	5	-	2	-	2	-	2	-	15	30.00
		G	3	-	4	-	2	-	3	-	2	-	14	28.00
9	Any other	V	-	-	1	-	2	-	1	-	1	-	5	10.00
		U	-	-	-	-	-	-	-	-	-	-	-	-
		G	-	-	-	-	-	-	-	-	-	-	-	-

4.17 Technical participation

Training of organic farming, organic crop demonstration and knowledge to prepare organic input like NADEP/ Vermi compost was questioned from sample farmers.

In Vidisha district only 22.00 per cent of sample farmers had got training of organic farming and remaining 78.00 per cent farmers had got no training of organic farming.

In Ujjain district only 6.00 per cent of sample farmer got training of organic farming and 94.00 per cent were without training. In Guna district 24.00 per cent of sample farmers were organic farming trained and 76.00 per cent were without training.

Observation of demonstration of organic crop was questioned from selected farmers. In Vidisha district 38.00 per cent of sample farmers replied affirmative and 62.00 per cent replied in negative. In Ujjain district 28.00 per cent replied affirmative and 72.00 per cent replied in negative. In Guna district 38.00 of sample farmers replied in affirmative and 72.00 per cent replied in negative. Knowledge the method to prepare organic input like NADEP / Vermi compost was asked from the sample farmers.

In Vidisha district 80.00 per cent of sample farmers replied yes and 20.00 per cent replied no. In Ujjain district 68.00 per cent replied yes and 32.00 per cent replied no. In Guna district 82.00 per cent of selected farmers had knowledge to prepare organic input like NADEP/ Vermi compost and 18.00 per cent of sample farmers had no knowledge the method of preparation of organic input like NADEP of Vermi compost (Table 4.21).

Table 4.21 Technical participation of sample farmers in selected district, M.P.

S. No	Particulars	Districts	Marginal		Small		Semi-medium		Medium		Large		Total			
			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes		No	
													No	%	No	%
1	Have you got training of organic farming?	V	1	11	1	11	2	9	2	7	5	1	11	22	39	78
		U	2	12	-	12	-	11	1	9	-	3	3	6	47	94
		G	3	11	4	11	1	10	3	4	1	2	12	24	38	76
2	Have you seen demonstration of organic crops?	V	1	11	4	8	5	6	4	5	5	1	19	38	31	62
		U	3	11	4	8	3	8	3	7	1	2	14	28	36	72
		G	5	9	5	10	4	7	2	5	2	1	18	36	32	64
3	Do you know the method to prepare organic input like NADEP/ Vermi compost.	V	9	3	8	4	10	11	7	2	6	-	40	80	10	20
		U	10	4	9	3	10	1	2	8	3	-	34	68	16	32
		G	11	3	12	3	9	2	6	1	3	-	41	82	9	18

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CHAPTER- V

SUMMARY CONCLUSIONS AND SUGGESTIONS

5.1 Introduction

The Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India assigned a study titled "Success Stories from organic farming : Do yield and/ or returns increase on organic farm" to two Agro Economic Research Centre, Jabalpur and Pune. This centre was asked to conduct the study in Madhya Pradesh.

5.1.1 Objectives

The specific objectives of the study are as follows :

1) To examine the use of viable alternatives to inorganic fertilizers, chemical pesticides.
2) To study the rate of substitution of organic, bio pesticides V/s inorganic fertilizers, chemical pesticides.
3) To find out the most profitable relatively advantageous organic farming system over conventional farming.
4) To examine the certification norms of organic produce.
5) To study the performance and potential of organic produce in niche market (export).

5.1.2 Methodology

The study is based on both secondary and primary data. The secondary data were collected from the year 2000-01 from those villages which were declared by the State Govt. as organic villages. Primary data were collected from those districts which covered highest area under foodgrains, oilseeds and horticultural crops respectively. For foodgrains crops Vidisha district was selected. Similarly, for oilseeds and horticultural crops, Ujjain and Guna districts were selected respectively. The study is confined to the major crops specially grown by organic basis in the selected districts of the state.

From each selected block 25 farmers in different size of holding were selected who have adopted the use of organic input in cultivation of different crops. In such a way, 150 farmers were sampled from three selected districts. Survey was conducted by personal interview from the selected organic farmers in a prepared questionnaire.

5.2 Organic Farming in M.P.

5.2.1 In Madhya Pradesh organic farming practices are being implemented under the guidance and supervision of a team of experts comprising scientists, environmentalists, and food management personals in 1565 villages selected from 313 blocks of 48 districts in the State. Use of agro-chemicals in these selected villages for growing crops is strictly prohibited. Nutrients to the crops are provided through green manuring, composts, phosphocomposts, fermented preparations prepared from cow dung and urine etc.

The success of this programme is evident from the fact that these villages have become model for other. The message of growing crops through organic resources is spreading from village to villages through farmers contact programme. During the year 2004-05 five cultivators have been selected for Organic farming from each village of the state.

5.2.2 Organic and Sustainable farming was initiated in 2001-02 in Madhya Pradesh. In first year it was started in one village in each block of all 45 districts of M.P. In second year i.e. 2002-03 in addition to first village two villages were included in organic farming village. In 2003-04, 2 another villages were included in each block. In such a way 5 villages in each block i.e. 313 blocks of 48 districts of Madhya Pradesh were declared as bio village.

5.2.3 Input components of organic farming are as follows :

1. NADEP Compost
2. NADEP Phospho Compost
3. Varmi Compost
4. Bio Gas Slurry
5. Green Mannure
6. Bio Fertilisers
7. Bhabhut Amrit Pani
8. Amrit Sanjevani
9. Matka Khad
10. I.P.M. (Integrated Pest Management)

5.3 Profile of state and selected districts

5.3.1 The total geographical area of Madhya Pradesh was 307.56 thousand sq.km. sharing 9.40 per cent of the country. According to 2001 census. The total population of the state was 603.85 lakhs forming 5.88 per cent population of the country. The state in basically rural as 73.50 per cent of the population resides in villages. Percentage of scheduled caste and scheduled tribes was 15.17 and 20.27 per cent respectively. Percentage of workers was 42.75 per cent and 47.25 per cent were non- worker.

Of the total geographical area 47.54 per cent was net area sown and cropping intensity was 124.00 per cent. Among different crops sown in the state 64.97 per cent was food crops and 53.03 per cent was non- food crops. The consumption of fertiliser in the state was about 48 kg. per hectare. Productivity of paddy, jowar, bajra, maize, wheat and barley were 646, 921, 744,1751, 1520 and 1257 kg./ hectares respectively. The net irrigated area of the state was 4,494.3 thousands hectares. The main sources of irrigation were wells which contributed 47.79 per cent of irrigated area followed by tubewells (24.69 per cent), canals (16.65 per cent) and other sources such as rivers, nalls (14.79 per cent) respectively of the irrigated area. The gross irrigated area of the state was 4631.0 thousand hectare with a irrigation intensity of 103.04 per cent.

5.3.2 Selected district for study viz. Vidisha, Ujjain and Guna, Vidisha and Guna districts are located in Vindhya Plateau (Rice wheat zone) Vidisha district is famous for growing wheat and pulses where as Guna is famous for coriander crop. Ujjain district is famous for soybean. Wheat, Soybean and Coriander crops were mainly analysed as organic and inorganic in the selected districts.

In Vidisha district rural and urban population was 78.57 per cent and 21.43 per cent respectively. Sex ratio was 887 (number of females per thousand males) percentage of total workers to total population of the district was 37.19. Literacy percentage of district was 61.83. In Ujjain district the percentage of rural population was 61.27, while urban population formed only 38.73 per cent. The sex ratio (number of females per thousand males) was 938. The literacy percentage of the district was 70.90 and the percentage of literacy among urban population was 80.90 per cent as compared to rural population (64.20 per cent).

In Guna district percentage of rural population was 75.58, while the urban population formed only 24.42 per cent. The sex ratio (number of females per thousand males) was 890. The percentage of total workers to total population was 42.72. The literacy percentage to total population according to 2001 census of the Guna district was 57.92. The literacy percentage among urban population was higher (62.48 per cent) as compared to rural population (42.62 per cent).

Irrigation status in Vidisha district was 41.52 per cent of Net area sown. In Ujjain district percentage of net irrigated area to net sown area was 41.96 and in Guna district 36.44 per cent.

In Vidisha district the different agricultural implements and machinery used by the farmers of the district were plough, bullock carts, tractors electric pump and oil engine. In 2003-04 the number of plough used by the farmers were wooden plough (42.90 thousand) and iron plough (6.50 thousand). The number of bullock carts and tractors were 18.90 thousand and 14.50 thousand respectively. The number of electric pumps and oil engine used by the farmers were 16.40 thousand and 24.80 thousand respectively.

In the year 2003-04, the number of wooden plough in the Ujjain district was 32.60 thousand and iron plough 9.60 thousand. The number of bullock carts and tractors used by the farmers in the district were 26.10 and 9.90 thousand respectively. Total number of electric pumps and oil engine used by the farmers were 75.10 thousand and 3.70 thousand respectively.

The different agricultural implements and machinery used by the farmers of the Guna district were iron plough/ wooden plough, bullock carts, tractors electric pumps and oil engine. In 2003-04 the number of plough used by the farmers were wooden plough (45.70 thousand) and iron plough (8.30 thousand). The number of bullock carts and tractors were 27.00 and 8.90 thousands respectively. Total number of electric pumps and oil engine used by the farmers were 41.40 thousand and 10.50 thousands.

In the year 2003-04 the total number of livestock in Vidisha district was 463.30 thousands. It comprised mainly of cattle (55.23 per cent), buffaloes (19.94), goat (22.04 per cent), Sheep (0.93 per cent) and pigs (1.23 per cent). Other livestock formed 1.56 per cent. Poultry birds also constituted significant (133.80 thousands) number in the district. Dairying has immense scope in the district.

In Ujjain district the total number of livestock was 591.90 thousand. It included cattle (43.82 per cent), goat (22.25 per cent), buffaloes (30.66 per cent), pigs (1.54 per cent), other livestock, formed 1.73 per cent. Poultry birds also constituted significant (11.10 thousands) number in the district. Dairying has immense scope in the district.

In Guna district the total number of livestock during the year 2003-04 was 627.70 thousand. Among livestock the cattle was constituted 54.29 per cent followed by buffaloes 26.37 goat 18.16 and pigs 0.88 per cent respectively. Other livestock formed 0.30 per cent. Poultry birds also constituted significant (215.80 thousands) number in the district.

5.4 Organic farming at farm level

5.4.1 It is important to mention here that during the survey of sample farmers purely organic farm was not reported by any farmer in any selected district of Madhya Pradesh. Sample farmers reported their specific crop under using organic input like FYM, NADEP Compost, Varmi Compost, Tricodma etc. and partly using inorganic i.e. chemical fertilisers, insecticides and pesticides. To examin the success of organic farming productivity of organic and in organic wheat, gram, soybean and coriander crops has been analysed. It was reported by the sample farmers that using organic input in particular field for last three years productivity of the crop was increasing gradually. The charge in productivity of organic wheat, gram, soybean and coriander has been analysed. Increasing trend was observed in all the organic crops productivity all the selected three district in each size of farms (Table 5.1).

Table 5.1 Change in productivity of organic crops

District	Wheat			Gram			Soybean			Coriander		
	2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change
Vidisha	1497	1877	25.38	1290	1439	11.55	1109	1346	21.27	--	--	--
Ujjain	1741	2302	32.22	--	1211	--	1357	1498	1039	--	--	--
Guna	1445	2741	89.69	889	1246	40.16	1188	1345	13.22	1057	1210	14.47
Total	1561	2307	47.79	1090	1290	19.00	1218	1396	14.61	1057	1210	14.47

Comparison between organic and inorganic productivity per hectare in selected crops it was revealed that yield inorganic crops were mostly higher than organic crops in all the selected district but if we see the ratio of organic and inorganic input used, the ratio of organic input was quite low. It means if per hectare use of organic input is increased definitely per hectare yield will be not less than inorganic on the basis of cost benefit ratio of

major crops grown using organic input and in organic input major crop wheat, gram and coriander was analysed in both conditions. It was observed that organic wheat, gram and coriander crops were more profitable than in organic. Cost of cultivation per hectare was lower in organic than in organic in wheat, gram and coriander.

Use of organic input was important component among inputs per hectare. Value of inorganic input like chemical fertilisers, insecticide and pesticides was higher than organic plant protection medicine (Table 5.2).

Table 5.2 Cost benefit ratio of organic and inorganic major crops

S. No	Particulars	Crop	Vidisha		Ujjain		Guna		Total (Average)	
			Organic	Inorganic	Organic	Inorganic	Organic	Inorganic	Organic	Inorganic
1	Cost of cultivation (Per ha.- Rs.)	Wheat	9,217.00	10,295.53	8,550.58	9,865.09	9,772.50	10,223.00	9,180.02	10,127.87
		Soybean	7,675.52	9,997.00	8,099.23	9,804.22	8,490.10	10,052.40	8,088.28	9,983.36
		Coriander	--	--	--	--	11,34.08	14,390.00	11,34.08	14,390.00
2	Value of Production (Per ha. Rs.)	Wheat	15959.0	16,412.00	19469.00	20939.00	23290.0	24064.00	19,572.66	20,411.66
		Soybean	13793.0	17307.00	15330.00	13388.00	14,096.0	15,425.00	14,406.33	15,440.00
		Coriander	--	--	--	--	21,952.0	22,000.00	21,952.0	22,000.00
3	Net Return (Per ha. Rs.)	Wheat	6,742.00	6,117.00	10918.42	11073.91	13,517.5	13,841.00	10,392.64	10,283.79
		Soybean	6,117.48	7,310.00	7,230.77	3,583.78	5,605.90	5,372.60	6,318.05	5,466.64
		Coriander	--	--	--	--	10,609.0	7,610.00	10,609.0	7,610.00
4	Cost benefit ratio	Wheat	1: 1.73	1: 1.59	1: 2.27	1: 2.20	1: 2.38	1: 2.35	1: 2.13	1: 2.02
		Soybean	1: 1.79	1: 1.73	1: 1.89	1: 1.38	1: 1.66	1: 1.53	1: 1.78	1: 1.55
		Coriander	--	--	--	--	1: 1.94	1: 1.53	1: 1.94	1: 1.53

5.4.2 Problems of Organic farming

As reported by the selected farmers in 3 district of Madhya Pradesh major problem in extension of organic farming is non availability of organic input like FYM, NADEP Compost, Vermi Compost, Vermi Culture and other plant protection medicines in sufficient quantity. Secondly, there is no difference in price between organic produce and inorganic produce in the market.

5.4.3 Farmer's awareness

It was noticed that farmer are well acquainted with the importance of consumable foodgrains, vegetables and oilseed produced by using organic inputs. It is true that in organic crops by using sufficient chemical fertilisers, insecticides and pesticides provide more production, but the taste and quality of the produce is inferior in comparison to organic produce.

On the basis of data and results drawn after analysis that the viable alternative uses to inorganic chemical fertilizers and plant protection were DAP, Urea, Murate of potash, zinc, Sulphur and recommended pesticide in the “selected crops. The alternative fertilizers and chemical pesticides used by the farmers were NADEP Compost, NADEP Phospho Compost, Vermi Compost, Bio Gas Slurry, Green Manures, Bio fertilizers, Bhabhut Amrit Pani, Amrit Sanjavani, Matka Khad, Integrated Pest Management (IPM) Cow Urine and Neem etc.

The rate of substitution of organic manure, bio pesticides against chemical fertilizer and plant protection revealed a slow growth rate of 25.86 per cent under wheat, 59.51 per cent soybean and 120.16 per cent under coriander respectively. It is also observed that the complete procedure for cultivating crops organically was not implemented although their is a specific guideline issued by the Deputy Director of Agriculture Vidisha. In which its registration to ultimate harvesting and threshing should be monitor.

It is observed from the result that the crops grown organically are profitable as compare to the inorganic crops as the B.C. ratio of organic group for wheat, soybean and coriander are 1: 2.13, 1: 1.78 and 1: 1.94 respectively. Against inorganic crops wheat, soybean and coriander are 1: 2.02, 1: 1.55 and 1: 1.53 respectively.

The most profitable organic farming system observed in the study area are as below:

Soybean (Rs.6,117.48)	-	Wheat in Vidisha district (Rs. 6,742.00)
Soybean (Rs.7,230.77)	-	Wheat in Ujjain district (Rs.10,918.42)
Soybean (Rs.5,605.90)	-	Coriander in Guna district (Rs.13,517.90)

5.4.4 Certification norms of organic produce

5.4.4.1 Process of Organic Produce Registration

In Madhya Pradesh area under organic farming is increasing gradually. With a view to protect farmer’s interest regarding fair price of organic produce, it is necessary to manage the registration of organic produce.

Standardization of Indian organic produce/ commodities on the basis of International standard are in process. Delay in this process is possible. Under such circumstances, it is necessary in the interest of farmers to register the organic produce in Madhya Pradesh so that

our organic produce may be certified resulting organic produce may be pure and its marketing may be managed.

5.4.4.2 Responsibility of registration

For registration of organic produce "Gram Sabha" of organic village will be responsible on priority with immediate effect.

Senior Agricultural Development Officer will superwise the organic crops sown.

Change in area under organic crop it is necessary to care previous crops grown on the plot and chemical inputs used. According to International standard three years period is necessary to remove the residual effect of chemical fertilizer and chemical insecticide pesticides. Therefore, this criteria must be followed for growing organic crops.

5.4.4.3 Categories of Registration

Looking farmers attraction towards organic farming following categories are decided according to period of change in crops.

I year - Registration certificate category – 'C'
II year - Registration certificate category – 'B'
III year- Registration certificate category – 'A'

5.4.4.4 Basic norms of organic farming

The farmer, desirous to adopt organic farming will have to follow following norms L-

A. Prohibited use / activity

i) Use of any type of chemical fertilisers, plant protection measures, insecticides pesticides and weedicides are prohibited.

ii) Seed produced by genetic engineering will not be used.

iii) Crop residues should not be burned after harvesting.

B. Recommendations of Organic Farming

i) Resistance varieties should be used.

ii) Crop rotation must be followed.

iii) To improve the soil fertility use of organic compost prepared by dung, slurry of bio gas, NADEP Compost, Phospho Compost, Vermi Compost etc. should be used.

iv) Use of Matka Khad, Bhabhoot, Amrit Pani and Amrit sanjeevani should be used.

v) Organic Medicines should be used in seed treatment.

vi) For plant protection cow urine and rotten matha should be used.

vii) Protection of crops from insects pests neem products should be used.

5.4.4.5 Conditions of Contract for Organic Farming

i) Farmer will be responsible for growing the organic crop only partly or fully on the particular number of plot in rabi kharif and zaid every year.

ii) He will not use any type of in organic fertilisers or plant protection measures.

iii) He will follow the crop pattern advised by the agril. department.

iv) He will not use the sprayer used for organic crops in use of inorganic sprayer.

v) In case of partly sown organic crop in the same plot he will maintain the distance of 3 metres so that effect of inorganic chemicals may not affect the organic crop.

vi) For registration Rs.25.00 per hectare must be deposited along with application from in Gramsabha.

vii) Last of application for registration will be 15th May for kharif crop, 30th Sept. for rabi crop and 15th February for zaid crop.

viii) Organic produce must be used for seed. Product of organic crop in first year should be used for seed purpose in second year.

ix) After harvesting any type of adulteration is prohibited.

x) Chemicals should not be used in storage of organic product.

xi) Registered farmer will have to apply in different crop reasons for registration of different crops with fee, but his previous registration number will not be changed.

xii) Applicant organic farmer will follow the advice of senior Agricultural Development Officer at any cost.

5.4.4.6 Registration System

1) Farmer will submit the application in prescribed proforma alongwith loan record book in two copies before gram sabha. One copy of this application will be forwarded to Senior Agricultural Development Officer with recommendation of Agricultural Society of Gram Sabha.

2) Separate registration as per proforma III will be prepared by permanent agril. society of gram sabha. In this register each applicant farmer's detail will be mentioned in one page. Entries will be made after receipt of application for registration. This will be certified by R.A.E.O.

3) Senior Agricultural Development Officer will certify the registration of organic farming at block level in proforma IV.

5.4.4.7 Supervisions

Agricultural Society of Gram Sabha will visit the organic crop monthly and record the comments in register of organic farming registration.

5.4.4.8 Role of S.A.D.O.

1) After crop sowing inspection will be done by S.A.D.O.

2) During inspection certification of conditions of organic farming will be verified.

3) During inspection of organic crop presence of the members of Agricultural Development Society will be essential.

4) S.A.D.O. will try to prove that the farmer has not applied any type of inorganic inputs from other sources.

5) S.A.D.O.'s comment will be recorded in the registration register of R.A.E.O.

6) Organic compost, medicines used by the farmer will be recorded in R.A.E.O. registration.

7) Follow the direction of S.A.D.O. will be essential.

8) agricultural Society and S.A.D.O. will not be responsible for certification in case of norms of organic farming not adopted by the farmer.

9) Inspection comment will be recorded in farmer's account.

5.4.4.9 Crop Harvesting Experiment

1) Crop of organic farming will be harvested according to fixed norms by S.A.D.O. At the time of harvesting presence of any member of Agricultural society is essential.

2) In prescribed format result of organic crop harvesting will be recorded and after threshing quantity of produce will be recorded.

3) Crop cutting experiment's result and real production quantity will be informed by agricultural society of gram sabha to the S.A.D.O.

4) S.A.D.O. will record the figures of organic farming in registration schedule of the farmers.

5.4.4.10 Certificate of Organic Farming

On the basis of inspection S.A.D.O. will recorded the farmer for issue of certificate in proforma V. than Agricultural Society of Gram Sabha will issue the certificate of organic product.

1) Recommendations of TASK FORCE constituted by the Central Govt. for organic product norms will be followed for export certification of organic product will be done by authorized agencies, institutions.

2) Information about organic farmers will be available on website.

3) Authorised export agencies will be free to purchase the produce as per international norms.

4) Price of organic produce will be fixed by

It is observed from the results to explored the potential of organic produce in the light of export market that both inorganic and organic produce were purchase by the buyer/ traders/ purchasing agencies on the same rate without discriminating or considering the quality of inorganic and organic produce. This has lead to discourage the organic cultivation in future. Therefore, the farmers growing crops organically must get higher price for their produce or some other incentives from government to compensate the losses as the MSP declared for these crops with considering the above parameters.

5.5 Suggestions and Policy Implications

The concept of organic farming is not new increasing demand of foodgrains and other agricultural commodities use of chemical fertilisers, insecticides, pesticides and weedicides were applied with new technology to improve agricultural production. Due to mechanisation of agriculture number of livestock is decreasing rapidly. Such situation is becoming dangerous for human health and atmosphere under such circumstances organic farming is highly appreciated and recommended but agricultural production should not decrease.

For extension of organic farming following suggestions are provided :

1) Separate market for organic input and produce should be established.

2) Price of organic product should be higher than inorganic.

3) Govt. agency or agriculture department should issue certificate of organic farmer to encourage organic farming.

4) Organic input based on livestock dung and crop residue should be prepared at farm level through NADEP/ Vermi Compost etc. FYM should be well utilised as organic input.

5) Minimum support Price of organic produce should be fixed by the govt.

6) Training of organic farming and demonstration of organic crops should be provided at village level.

7) Organic fertilisers, plant protection medicines should be popularised.

8) Subsidy on organic input should be provided to the farmers.

.....

ANNEXUTRE – I

Producers / Consumers and purchasing instituttions

APPLICATION FORM

To,

The Chairman,
Agricultural Society, Gram Sabha,
Village _ _ _ _ _ _ _ _ _ _ _ _ _ _ —

Sub : Regarding registration of Organic Farming.

I,.....S/o, W/o ..... Village..... farmer. I want to grow organic crops during kharif / Rabi / Zaid in year..... the following crop.

Season	Name of the crop	Khasra No. Area (ha.)	Crop to be grown area (ha.)
1.	2.	3.	4.

I shall not use any type of inorganic fertiliser and plant protection medicines and fully adopt the organic system. I am agree will the terms and conditions of the agree (Agreement bound enclosed) Please register my name.

Date :

Signature of the farmer

Name

Development Block

ANNEXURE - II

AGREEMENT

Year : .....

I, Farmer Shri Smt.....

Father / Husband.....Village.....

Block .....District.....resident.

i) Farmer will be responsible for growing the organic crop only partly or fully on the particular number of plot in rabi kharif and zaid every year.

ii) He will not use any type of in organic fertilisers or plant protection measures.

iii) He will follow the crop pattern advised by the agril. department.

iv) He will not use the sprayer used for organic crops in use of inorganic sprayer.

v) In case of partly sown organic crop in the same plot he will maintain the distance of 3 metres so that effect of inorganic chemicals may not affect the organic crop.

vi) For registration Rs.25.00 per hectare must be deposited along with application from in Gramsabha.

vii) Last of application for registration will be 15th May for kharif crop, 30th Sept. for rabi crop and 15th February for zaid crop.

viii) Organic produce must be used for seed. Product of organic crop in first year should be used for seed purpose in second year.

ix) After harvesting any type of adulteration is prohibited.

x) Chemicals should not be used in storage of organic product.

xi) Registered farmer will have to apply in different crop reasons for registration of different crops with fee, but his previous registration number will not be changed.

xii) Applicant organic farmer will follow the advice of senior Agricultural Development Officer at any cost.

Signature farmer

Signature of witness :

1. Name :.....

Gram Sabha- Gram

2.

ANNEXURE - III

Recommendation of Agricultural Society of Gram sabha

No. O.F./ Dated :

Shri .....Father/ Husband..... Village .....Block.....Page No. in register of organic farming of Gramsabha.....mentioned at S.No..... His name has registered for organic farming.

Signature

Chair man, Agricultural Society
Gram Sabha, Gram.....

Copy to :- S.A.D.O Block ..... for necessary action.

Signature

Chair man, Agricultural Society
Gram Sabha, Gram.....

CERTIFICATION NORMS OF ORGANIC PRODUCE

Process of Organic Produce Registration

In Madhya Pradesh area under organic farming is increasing gradually. With a view to protect farmer's interest regarding fair price of organic produce, it is necessary to manage the registration of organic produce.

Standardization of Indian organic produce/ commodities on the basis of International standard are in process. Delay in this process is possible. Under such circumstances, it is necessary in the interest of farmers to register the organic produce in Madhya Pradesh so that our organic produce may be certified resulting organic produce may be pure and its marketing may be managed.

Responsibility of registration

For registration of organic produce "Gram Sabha" of organic village will be responsible on priority with immediate effect.

Senior Agricultural Development Officer will superwise the organic crops sown.

Change in area under organic crop it is necessary to care previous crops grown on the plot and chemical inputs used. According to International standard three years period is necessary to remove the residual effect of chemical fertilizer and chemical insecticide pesticides. Therefore, this criteria must be followed for growing organic crops.

Categories of Registration

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v) Organic Medicines should be used in seed treatment.

vi) For plant protection cow urine and rotten matha should be used.

vii) Protection of crops from insects pests neem products should be used.

Conditions of Contract for Organic Farming

i) Farmer will be responsible for growing the organic crop only partly or fully on the particular number of plot in rabi kharif and zaid every year.

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iii) He will follow the crop pattern advised by the agril. department.

iv) He will not use the sprayer used for organic crops in use of inorganic sprayer.

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Registration System

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2) Separate registration as per proforma III will be prepared by permanent agril. society of gram sabha. In this register each applicant farmer's detail will be mentioned in one page. Entries will be made after receipt of application for registration. This will be certified by R.A.E.O.

3) Senior Agricultural Development Officer will certify the registration of organic farming at block level in proforma IV.

Supervisions

Agricultural Society of Gram Sabha will visit the organic crop monthly and record the comments in register of organic farming registration.

Role of S.A.D.O.

1) After crop sowing inspection will be done by S.A.D.O.

2) During inspection certification of conditions of organic farming will be verified.

3) During inspection of organic crop presence of the members of Agricultural Development Society will be essential.

4) S.A.D.O. will try to prove that the farmer has not applied any type of inorganic inputs from other sources.

5) S.A.D.O.'s comment will be recorded in the registration register of R.A.E.O.

6) Organic compost, medicines used by the farmer will be recorded in R.A.E.O. registration.

7) Follow the direction of S.A.D.O. will be essential.

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Crop Harvesting Experiment

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2) In prescribed format result of organic crop harvesting will be recorded and after threshing quantity of produce will be recorded.

3) Crop cutting experiment's result and real production quantity will be informed by agricultural society of gram sabha to the S.A.D.O.

4) S.A.D.O. will record the figures of organic farming in registration schedule of the farmers.

Certificate of Organic Farming

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2) Information about organic farmers will be available on website.

3) Authorised export agencies will be free to purchase the produce as per international norms.

4) Price of organic produce will be fixed by

Producers / Consumers and purchasing instituttions

Proforma –I

APPLICATION FORM

To,

The Chairman,
Agricultural Society, Gram Sabha,
Village _ _ _ _ _ _ _ _ _ _ _ _ _ _ —

Sub : Regarding registration of Organic Farming.

I,.....S/o, W/o ..... Village..... farmer. I want to grow organic crops during kharif / Rabi / Zaid in year..... the following crop.

Season	Name of the crop	Khasra No. Area (ha.)	Crop to be grown area (ha.)
1.	2.	3.	4.

I shall not use any type of inorganic fertiliser and plant protection medicines and fully adopt the organic system. I am agree will the terms and conditions of the agree (Agreement bound enclosed) Please register my name.

Date :

Signature of the farmer

Name

Development Block

AGREEMENT

Schedule - II

Year : .....

I, Farmer Shri Smt.....

Father / Husband.....Village.....

Block .....District.....resident.

i) Farmer will be responsible for growing the organic crop only partly or fully on the particular number of plot in rabi kharif and zaid every year.

ii) He will not use any type of in organic fertilisers or plant protection measures.

iii) He will follow the crop pattern advised by the agril. department.

iv) He will not use the sprayer used for organic crops in use of inorganic sprayer.

v) In case of partly sown organic crop in the same plot he will maintain the distance of 3 metres so that effect of inorganic chemicals may not affect the organic crop.

vi) For registration Rs.25.00 per hectare must be deposited along with application from in Gramsabha.

vii) Last of application for registration will be 15th May for kharif crop, 30th Sept. for rabi crop and 15th February for zaid crop.

viii) Organic produce must be used for seed. Product of organic crop in first year should be used for seed purpose in second year.

ix) After harvesting any type of adulteration is prohibited.

x) Chemicals should not be used in storage of organic product.

xi) Registered farmer will have to apply in different crop reasons for registration of different crops with fee, but his previous registration number will not be changed.

xii) Applicant organic farmer will follow the advice of senior Agricultural Development Officer at any cost.

Signature farmer

Signature of witness :

1. Name :.....

Gram Sabha- Gram

2.

Recommendation of Agricultural Society of Gram sabha

No. O.F./ Dated :

Shri .....Father/ Husband..... Village .....Block.....Page No. in register of organic farming of Gramsabha.....mentioned at S.No..... His name has registered for organic farming.

Signature

Chair man, Agricultural Society
Gram Sabha, Gram.....

Copy to :- S.A.D.O Block ..... for necessary action.

Signature

Chair man, Agricultural Society
Gram Sabha, Gram.....

EXECUTIVE SUMMARY

SUCCESS STORIES FROM ORGANIC FARMING : DO YIELD AND / RETURNS INCREASE OR DECREASE ON ORGANIC FARMS A STUDY IN MADHYA PRADESH

1. Introduction

In Madhya Pradesh organic farming practices are being implemented under the guidance and supervision of a team of experts comprising scientists, environmentalists, and food management personals in 1565 villages selected from 313 blocks of 48 districts in the State. Use of agro-chemicals in these selected villages for growing crops is strictly prohibited. Nutrients to the crops are provided through green manuring, composts, phospho composts, fermented preparations prepared from cow dung and urine etc.

The Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India assigned a study titled "Success Stories from organic farming : Do yield and/ or returns increase on organic farm" to two Agro Economic Research Centre, Jabalpur and Pune. This centre was asked to conduct the study in Madhya Pradesh.

2. Objectives

The specific objectives of the study are as follows :

1) To examine the use of viable alternatives to inorganic fertilizers, chemical pesticides.
2) To study the rate of substitution of organic, bio pesticides V/s inorganic fertilizers, chemical pesticides.
3) To find out the most profitable relatively advantageous organic farming system over conventional farming.
4) To examine the certification norms of organic produce.
5) To study the performance and potential of organic produce in niche market (export).

3. Methodology

The study is based on both secondary and primary data. The secondary data were collected from the year 2000-01 from those villages which were declared by the State Govt. as organic villages. Primary data were collected from those districts which covered highest area under foodgrains, oilseeds and horticultural crops respectively. For foodgrains crops Vidisha district was selected. Similarly, for oilseeds and horticultural crops, Ujjain and Guna

districts were selected respectively. The study is confined to the major crops specially grown by organic basis in the selected districts of the state.

From each selected block 25 farmers in different size of holding were selected who have adopted the use of organic input in cultivation of different crops. In such a way, 150 farmers were sampled from three selected districts. Survey was conducted by personal interview from the selected organic farmers in a prepared questionnaire.

4. Main Findings

1. In Madhya Pradesh organic farming practices are being implemented under the guidance and supervision of a team of experts comprising scientists, environmentalists, and food management personals in 1565 villages selected from 313 blocks of 48 districts in the State. Use of agro-chemicals in these selected villages for growing crops is strictly prohibited. Nutrients to the crops are provided through green manuring, composts, phosphocomposts, fermented preparations prepared from cow dung and urine etc.

The success of this programme is evident from the fact that these villages have become model for other. The message of growing crops through organic resources is spreading from village to villages through farmers contact programme. During the year 2004-05 five cultivators have been selected for Organic farming from each village of the state.

2. Organic and Sustainable farming was initiated in 2001-02 in Madhya Pradesh. In first year it was started in one village in each block of all 45 districts of M.P. In second year i.e. 2002-03 in addition to first village two villages were included in organic farming village. In 2003-04, 2 another villages were included in each block. In such a way 5 villages in each block i.e. 313 blocks of 48 districts of Madhya Pradesh were declared as bio village.

3. Input components of organic farming are as follows :

1. NADEP Compost
2. NADEP Phospho Compost
3. Varmi Compost
4. Bio Gas Slurry
5. Green Mannure
6. Bio Fertilisers
7. Bhabhut Amrit Pani
8. Amrit Sanjevani
9. Matka Khad
10. I.P.M. (Integrated Pest Management)

4. The total geographical area of Madhya Pradesh was 307.56 thousand sq.km. sharing 9.40 per cent of the country. According to 2001 census. The total population of the state was 603.85 lakhs forming 5.88 per cent population of the country. The state in basically rural as 73.50 per cent of the population resides in villages. Percentage of scheduled caste and scheduled tribes was 15.17 and 20.27 per cent respectively. Percentage of workers was 42.75 per cent and 47.25 per cent were non- worker.

Of the total geographical area 47.54 per cent was net area sown and cropping intensity was 124.00 per cent. Among different crops sown in the state 64.97 per cent was food crops and 53.03 per cent was non- food crops. The consumption of fertiliser in the state was about 48 kg. per hectare. Productivity of paddy, jowar, bajra, maize, wheat and barley were 646, 921, 744,1751, 1520 and 1257 kg./ hectares respectively. The net irrigated area of the state was 4,494.3 thousands hectares. The main sources of irrigation were wells which contributed 47.79 per cent of irrigated area followed by tubewells (24.69 per cent), canals (16.65 per cent) and other sources such as rivers, nalls (14.79 per cent) respectively of the irrigated area. The gross irrigated area of the state was 4631.0 thousand hectare with a irrigation intensity of 103.04 per cent.

5. Selected district for study viz. Vidisha, Ujjain and Guna, Vidisha and Guna districts are located in Vindhya Plateau (Rice wheat zone) Vidisha district is famous for growing wheat and pulses where as Guna is famous for coriander crop. Ujjain district is famous for soybean. Wheat, Soybean and Coriander crops were mainly analysed as organic and inorganic in the selected districts.

In Vidisha district rural and urban population was 78.57 per cent and 21.43 per cent respectively. Sex ratio was 887 (number of females per thousand males) percentage of total workers to total population of the district was 37.19. Literacy percentage of district was 61.83. In Ujjain district the percentage of rural population was 61.27, while urban population formed only 38.73 per cent. The sex ratio (number of females per thousand males) was 938. The literacy percentage of the district was 70.90 and the percentage of literacy among urban population was 80.90 per cent as compared to rural population (64.20 per cent).

In Guna district percentage of rural population was 75.58, while the urban population formed only 24.42 per cent. The sex ratio (number of females per thousand males) was 890. The percentage of total workers to total population was 42.72. The literacy percentage to

total population according to 2001 census of the Guna district was 57.92. The literacy percentage among urban population was higher (62.48 per cent) as compared to rural population (42.62 per cent).

Irrigation status in Vidisha district was 41.52 per cent of Net area sown. In Ujjain district percentage of net irrigated area to net sown area was 41.96 and in Guna district 36.44 per cent.

In Vidisha district the different agricultural implements and machinery used by the farmers of the district were plough, bullock carts, tractors electric pump and oil engine. In 2003-04 the number of plough used by the farmers were wooden plough (42.90 thousand) and iron plough (6.50 thousand). The number of bullock carts and tractors were 18.90 thousand and 14.50 thousand respectively. The number of electric pumps and oil engine used by the farmers were 16.40 thousand and 24.80 thousand respectively.

In the year 2003-04, the number of wooden plough in the Ujjain district was 32.60 thousand and iron plough 9.60 thousand. The number of bullock carts and tractors used by the farmers in the district were 26.10 and 9.90 thousand respectively. Total number of electric pumps and oil engine used by the farmers were 75.10 thousand and 3.70 thousand respectively.

The different agricultural implements and machinery used by the farmers of the Guna district were iron plough/ wooden plough, bullock carts, tractors electric pumps and oil engine. In 2003-04 the number of plough used by the farmers were wooden plough (45.70 thousand) and iron plough (8.30 thousand). The number of bullock carts and tractors were 27.00 and 8.90 thousands respectively. Total number of electric pumps and oil engine used by the farmers were 41.40 thousand and 10.50 thousands.

In the year 2003-04 the total number of livestock in Vidisha district was 463.30 thousands. It comprised mainly of cattle (55.23 per cent), buffaloes (19.94), goat (22.04 per cent), Sheep (0.93 per cent) and pigs (1.23 per cent). Other livestock formed 1.56 per cent. Poultry birds also constituted significant (133.80 thousands) number in the district. Dairying has immense scope in the district.

In Ujjain district the total number of livestock was 591.90 thousand. It included cattle (43.82 per cent), goat (22.25 per cent), buffaloes (30.66 per cent), pigs (1.54 per cent), other

livestock, formed 1.73 per cent. Poultry birds also constituted significant (11.10 thousands) number in the district. Dairying has immense scope in the district.

In Guna district the total number of livestock during the year 2003-04 was 627.70 thousand. Among livestock the cattle was constituted 54.29 per cent followed by buffaloes 26.37 goat 18.16 and pigs 0.88 per cent respectively. Other livestock formed 0.30 per cent. Poultry birds also constituted significant (215.80 thousands) number in the district.

6. It is important to mention here that during the survey of sample farmers purely organic farm was not reported by any farmer in any selected district of Madhya Pradesh. Sample farmers reported their specific crop under using organic input like FYM, NADEP Compost, Varmi Compost, Tricodma etc. and partly using inorganic i.e. chemical fertilisers, insecticides and pesticides. To examin the success of organic farming productivity of organic and in organic wheat, gram, soybean and coriander crops has been analysed. It was reported by the sample farmers that using organic input in particular field for last three years productivity of the crop was increasing gradually. The charge in productivity of organic wheat, gram, soybean and coriander has been analysed. Increasing trend was observed in all the organic crops productivity all the selected three district in each size of farms (Table 5.1).

Table 5.1 Change in productivity of organic crops

District	Wheat			Gram			Soybean			Coriander		
	2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change	2001-02	2003-04	% change
Vidisha	1497	1877	25.38	1290	1439	11.55	1109	1346	21.27	--	--	--
Ujjain	1741	2302	32.22	--	1211	--	1357	1498	1039	--	--	--
Guna	1445	2741	89.69	889	1246	40.16	1188	1345	13.22	1057	1210	14.47
Total	1561	2307	47.79	1090	1290	19.00	1218	1396	14.61	1057	1210	14.47

Comparison between organic and inorganic productivity per hectare in selected crops it was revealed that yield inorganic crops were mostly higher than organic crops in all the selected district but if we see the ratio of organic and inorganic input used, the ratio of organic input was quite low. It means if per hectare use of organic input is increased definitely per hectare yield will be not less than inorganic on the basis of cost benefit ratio of major crops grown using organic input and in organic input major crop wheat, gram and coriander was analysed in both conditions. It was observed that organic wheat, gram and coriander crops were more profitable than in organic. Cost of cultivation per hectare was lower in organic than in organic in wheat, gram and coriander.

Use of organic input was important component among inputs per hectare. Value of inorganic input like chemical fertilisers, insecticide and pesticides was higher than organic plant protection medicine (Table 5.2).

Table 5.2 Cost benefit ratio of organic and inorganic major crops

S. No	Particulars	Crop	Vidisha		Ujjain		Guna		Total (Average)	
			Organic	Inorganic	Organic	Inorganic	Organic	Inorganic	Organic	Inorganic
1	Cost of cultivation (Per ha.- Rs.)	Wheat	9,217.00	10,295.53	8,550.58	9,865.09	9,772.50	10,223.00	9,180.02	10,127.87
		Soybean	7,675.52	9,997.00	8,099.23	9,804.22	8,490.10	10,052.40	8,088.28	9,983.36
		Coriander	--	--	--	--	11,34.08	14,390.00	11,34.08	14,390.00
2	Value of Production (Per ha. Rs.)	Wheat	15959.0	16,412.00	19469.00	20939.00	23290.0	24064.00	19,572.66	20,411.66
		Soybean	13793.0	17307.00	15330.00	13388.00	14,096.0	15,425.00	14,406.33	15,440.00
		Coriander	--	--	--	--	21,952.0	22,000.00	21,952.0	22,000.00
3	Net Return (Per ha. Rs.)	Wheat	6,742.00	6,117.00	10918.42	11073.91	13,517.5	13,841.00	10,392.64	10,283.79
		Soybean	6,117.48	7,310.00	7,230.77	3,583.78	5,605.90	5,372.60	6,318.05	5,466.64
		Coriander	--	--	--	--	10,609.0	7,610.00	10,609.0	7,610.00
4	Cost benefit ratio	Wheat	1: 1.73	1: 1.59	1: 2.27	1: 2.20	1: 2.38	1: 2.35	1: 2.13	1: 2.02
		Soybean	1: 1.79	1: 1.73	1: 1.89	1: 1.38	1: 1.66	1: 1.53	1: 1.78	1: 1.55
		Coriander	--	--	--	--	1: 1.94	1: 1.53	1: 1.94	1: 1.53

7. As reported by the selected farmers in 3 district of Madhya Pradesh major problem in extension of organic farming is non availability of organic input like FYM, NADEP Compost, Vermi Compost, Vermi Culture and other plant protection medicines in sufficient quantity. Secondly, there is no difference in price between organic produce and inorganic produce in the market.

8. It was noticed that farmer are well acquainted with the importance of consumable foodgrains, vegetables and oilseed produced by using organic inputs. It is true that in organic crops by using sufficient chemical fertilisers, insecticides and pesticides provide more production, but the taste and quality of the produce is inferior in comparison to organic produce.

9. On the basis of data and results drawn after analysis that the viable alternative uses to inorganic chemical fertilizers and plant protection were DAP, Urea, Murate of potash, zinc, Sulphur and recommended pesticide in the “selected crops. The alternative fertilizers and chemical pesticides used by the farmers were NADEP Compost, NADEP Phospho Compost, Vermi Compost, Bio Gas Slurry, Green Manures, Bio fertilizers, Bhabhut Amrit Pani, Amrit Sanjavani, Matka Khad, Integrated Pest Management (IPM) Cow Urine and Neem etc.

10. The rate of substitution of organic manure, bio pesticides against chemical fertilizer and plant protection revealed a slow growth rate of 25.86 per cent under wheat, 59.51 per cent soybean and 120.16 per cent under coriander respectively. It is also observed that

the complete procedure for cultivating crops organically was not implemented although their is a specific guideline issued by the Deputy Director of Agriculture Vidisha. In which its registration to ultimate harvesting and threshing should be monitor.

11. It is observed from the result that the crops grown organically are profitable as compare to the inorganic crops as the B.C. ratio of organic group for wheat, soybean and coriander are 1: 2.13, 1: 1.78 and 1: 1.94 respectively. Against inorganic crops wheat, soybean and coriander are 1: 2.02, 1: 1.55 and 1: 1.53 respectively.

12. The most profitable organic farming system observed in the study area are as below:

Soybean (Rs.6,117.48)	-	Wheat in Vidisha district (Rs. 6,742.00)
Soybean (Rs.7,230.77)	-	Wheat in Ujjain district (Rs.10,918.42)
Soybean (Rs.5,605.90)	-	Coriander in Guna district (Rs.13,517.90)

13. Certification norms of organic produce

1. In Madhya Pradesh area under organic farming is increasing gradually. With a view to protect farmer's interest regarding fair price of organic produce, it is necessary to manage the registration of organic produce.

Standardization of Indian organic produce/ commodities on the basis of International standard are in process. Delay in this process is possible. Under such circumstances, it is necessary in the interest of farmers to register the organic produce in Madhya Pradesh so that our organic produce may be certified resulting organic produce may be pure and its marketing may be managed.

2. For registration of organic produce "Gram Sabha" of organic village will be responsible on priority with immediate effect. Senior Agricultural Development Officer will superwise the organic crops sown. Change in area under organic crop it is necessary to care previous crops grown on the plot and chemical inputs used. According to International standard three years period is necessary to remove the residual effect of chemical fertilizer and chemical insecticide pesticides. Therefore, this criteria must be followed for growing organic crops.

3. Looking farmers attraction towards organic farming following categories are decided according to period of change in crops.

I year - Registration certificate category – 'C'

II year - Registration certificate category – 'B'

III year- Registration certificate category – 'A'

4. The farmer, desirous to adopt organic farming will have to follow following norms -

i) Use of any type of chemical fertilisers, plant protection measures, insecticides pesticides and weedicides are prohibited.

ii) Seed produced by genetic engineering will not be used.

iii) Crop residues should not be burned after harvesting.

5. Recommendation of Organic Farming

i) Resistance varieties should be used.

ii) Crop rotation must be followed.

iii) To improve the soil fertility use of organic compost prepared by dung, slurry of bio gas, NADEP Compost, Phospho Compost, Vermi Compost etc. should be used.

iv) Use of Matkakhad, Bhabhoot, Amrit Pani and Amrit sanjeevani should be used.

v) Organic Medicines should be used in seed treatment.

vi) For plant protection cow urine and rotten matha should be used.

vii) Protection of crops from insects pests neem products should be used.

6. Conditions of Contract for Organic Farming

i) Farmer will be responsible for growing the organic crop only partly or fully on the particular number of plot in rabi kharif and zaid every year.

ii) He will not use any type of in organic fertilisers or plant protection measures.

iii) He will follow the crop pattern advised by the agril. department.

iv) He will not use the sprayer used for organic crops in use of inorganic sprayer.

v) In case of partly sown organic crop in the same plot he will maintain the distance of 3 metres so that effect of inorganic chemicals may not affect the organic crop.

vi) For registration Rs.25.00 per hectare must be deposited along with application from in Gramsabha.

vii) Last of application for registration will be 15th May for kharif crop, 30th Sept. for rabi crop and 15th February for zaid crop.

viii) Organic produce must be used for seed. Product of organic crop in first year should be used for seed purpose in second year.

ix) After harvesting any type of adulteration is prohibited.

x) Chemicals should not be used in storage of organic product.

xi) Registered farmer will have to apply in different crop reasons for registration of different crops with fee, but his previous registration number will not be changed.

xii) Applicant organic farmer will follow the advice of senior Agricultural Development Officer at any cost.

7. Registration System

1) Farmer will submit the application in prescribed proforma alongwith loan record book in two copies before gram sabha. One copy of this application will be forwarded to Senior Agricultural Development Officer with recommendation of Agricultural Society of Gram Sabha.

2) Separate registration as per proforma III will be prepared by permanent agril. society of gram sabha. In this register each applicant farmer's detail will be mentioned in one page. Entries will be made after receipt of application for registration. This will be certified by R.A.E.O.

3) Senior Agricultural Development Officer will certify the registration of organic farming at block level in proforma IV.

8. Supervisions and Role of S.A.D.O.

Agricultural Society of Gram Sabha will visit the organic crop monthly and record the comments in register of organic farming registration.

1) After crop sowing inspection will be done by S.A.D.O.

2) During inspection certification of conditions of organic farming will be verified.

3) During inspection of organic crop presence of the members of Agricultural Development Society will be essential.

4) S.A.D.O. will try to prove that the farmer has not applied any type of inorganic inputs from other sources.

5) S.A.D.O.'s comment will be recorded in the registration register of R.A.E.O.

6) Organic compost, medicines used by the farmer will be recorded in R.A.E.O. registration.

7) Follow the direction of S.A.D.O. will be essential.

8) agricultural Society and S.A.D.O. will not be responsible for certification in case of norms of organic farming not adopted by the farmer.

9) Inspection comment will be recorded in farmer's account.

9. Crop Harvesting Experiment

Crop of organic farming will be harvested according to fixed norms by S.A.D.O. At the time of harvesting presence of any member of Agricultural society is essential. In prescribed format result of organic crop harvesting will be recorded and after threshing quantity of produce will be recorded. Crop cutting experiment's result and real production quantity will be informed by agricultural society of gram sabha to the S.A.D.O.

10. Certificate of Organic Farming

On the basis of inspection S.A.D.O. will recorded the farmer for issue of certificate in proforma V. than Agricultural Society of Gram Sabha will issue the certificate of organic product.

1) Recommendations of TASK FORCE constituted by the Central Govt. for organic product norms will be followed for export certification of organic product will be done by authorized agencies, institutions.
2) Information about organic farmers will be available on website.
3) Authorised export agencies will be free to purchase the produce as per international norms.
4) Price of organic produce will be fixed by

11. It is observed from the results to explored the potential of organic produce in the light of export market that both inorganic and organic produce were purchase by the buyer/ traders/ purchasing agencies on the same rate without discriminating or considering the quality of inorganic and organic produce. This has lead to discourage the organic cultivation in future. Therefore, the farmers growing crops organically must get higher price for their produce or some other incentives from government to compensate the losses as the MSP declared for these crops with considering the above parameters.

12. Suggestions and Policy Implications

The concept of organic farming is not new increasing demand of foodgrains and other agricultural commodities use of chemical fertilisers, insecticides, pesticides and weedicides were applied with new technology to improve agricultural production. Due to mechanisation of agriculture number of livestock is decreasing rapidly. Such situation is becoming dangerous for human health and atmosphere under such circumstances organic farming is highly appreciated and recommended but agricultural production should not decrease.

For extension of organic farming following suggestions are provided :

1) Separate market for organic input and produce should be established.

2) Price of organic product should be higher than inorganic.

3) Govt. agency or agriculture department should issue certificate of organic farmer to encourage organic farming.

4) Organic input based on livestock dung and crop residue should be prepared at farm level through NADEP/ Vermi Compost etc. FYM should be well utilised as organic input.

5) Minimum support Price of organic produce should be fixed by the govt.

6) Training of organic farming and demonstration of organic crops should be provided at village level.

7) Organic fertilisers, plant protection medicines should be popularised.

8) Subsidy on organic input should be provided to the farmers.

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