

“Diversification of Agriculture in Sehore District of Madhya Pradesh”
THESIS



Submitted to the

Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior

**In partial fulfilment of the requirements for
the degree of**

MASTER OF SCIENCE

In

AGRICULTURE

(AGRICULTURAL ECONOMICS AND FARM MANAGEMENT)

By

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College of Agriculture

Sehore (M.P.)

2011

CERTIFICATE-I

This is to certify that the thesis entitled “**Diversification of agriculture in Sehore district of Madhya Pradesh**” submitted in partial fulfillment of the requirements for the degree of Master of Science/Doctor of Philosophy in Agriculture/Horticulture of the Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior is a record of the bonafide research work carried out by **Mr.Santosh Meena, ID No. RA/SH/1200/2009** under my guidance and supervision. The subject of the thesis has been approved by the student’s Advisory Committee and the Director of Instruction.

No part of the thesis has been submitted for any other degree of diploma (Certificate awarded etc) or has been published/ published part has fully acknowledged. All the assistance and help received during the course the course of the investigation has been acknowledged by him/her.

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ACKNOWLEDGEMENT

Thanks to almighty God for giving me an opportunity to express my gratitude to all those who have given me a helping hands to make this study a successful one. Words are insufficient to express the emotions and therefore, my acknowledgement is many times than my expressions. I wish to avail this opportunity in ex-pressing my deep sense of gratitude to my advisor, Dr. P.S.Raghuwanshi, Head of Section (Agril. Economics), R.A.K. College of Agriculture, Sehore (M.P.) for his invaluable guidance, immense labour, untiring interest, valuable comments, criticism and sympathetic treatment in every step and work in completion of this work and finalization of this manuscript.

I am indebted to the members of advisory committee, Dr. P.K.Malviya, Professor, Agricultural Economics and Farm Management, Dr.S.N.Sharma, Professor (Agril. Extension), for their suggestions and encouragement during the preparation of this manuscript.

I am obliged to Dr.V.S.Goutam, Dean, R.A.K. College of Agriculture, Sehore (M.P.) for their inspiration and help during my studies.

No appropriate words could be treated in the lexicon to convey my sub line obeisance to express my deep sense of gratitude to my parents Shri. Narmarda Prasad Meena and Smt. Kousaliya Meena and brother Ramanand Meena, Narayan Meena, Dinesh Meena all my family members whose love and affection inspired me during this course of investigation brought me to this success.

Heartily thanks are due to my friends Akilesh Sonaniya, Dharam Verma, Sunil Goyal, Amit Tare, Nageen Verma, Kaamlesh Rawat and all my colleagues and friend who helped me directly or indirectly during the coerces of this investigations.

Last but not the least, My thanks are due to the Mr. Praveen Kumar Soni (Computer Teacher) Who given me his valuable time and supportive backing without any time boundation.

My thanks are due to the Staff members of academic section of all my respondence where valuable response had made this manuscript to see the light of the Day.

Place: Sehore

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CHAPTER I

INTRODUCTION

Biological nature of farm enterprises entails some risk and uncertainties in their production and prices, coupled with uncertainties of availability of inputs. In this situation in the decision making process of farmers, profitability is thus the major criterion of adoption of an enterprise or practice. Farm as a business enterprise, farmers considers all possible aspects of an enterprise for the farm as a unit. It does not concern with merely one profitable enterprise, but with most profitable enterprise combinations to obtain maximum income from the farm as a whole, on continues basis, exploiting the advantages of complementarity and supplementarity in the farm enterprises. It is much more concerned with total farm production enterprises instead of crops production. Diversification of agriculture is adopted as a strategy to minimize risk to cover crop failure where the immediate goal is not to make profit but to stabilize income for survival.

Diversification is interpreted differently by different scholars, it means shifting from subsistent farming to commercial farming to some extent, it implies shifting from low value food/non food crops to high value food/ non food crops and switching over from local to high yielding varieties with the integration of animal husbandry, fisheries, horticulture etc. The economists and researchers have advocated evolving of an integrated system approach to the problem of rural diversification for a rapid balanced and equalitarian growth of rural economy. Diversification of rural economy is considered essential for finding solution to the problem of rural unemployment, poverty and hunger.

Diversification is an age-old practice of risk minimization and attainment of stable income from the farm. Farm diversification includes diversification of crops and farm based enterprises to broaden the income base of the farmers resulting in the increased level of employment, production and income.

Estimates regarding the magnitude and determinants of diversification among the most vulnerable section of the rural society are not available. The present study is therefore, carried out. The diversification of agriculture towards selective high value cash crops including fruits and off-season vegetables compatible with the comparative advantage of these regions are suggested as a viable solution to stabilize and raise

farm income, increase employment opportunities, conserve and enhance the natural resources, principally land and water etc. The adoption of high value cash crops, particularly fruit crops, helps the regions in two ways. First, it promotes the productive use of abundant marginal lands available in the regions. Second, these crops help in maintaining and improving the ecology and environment by promoting soil conservation and improving soil fertility. In economic terms, it leads to significant improvement in the quality of life of the people. The micro level experience further shows that diversification through high value crops is not only economically beneficial but ameliorates stress on natural resource. At the macro level the agricultural transformation led rural prosperity is manifested in a number of socio-economic indicators and poverty level that compare favorably both with under developed states and other development States.

Dairying being a self income enterprise is an important alternative to diversify the arable farming for getting more, stable and continuous farm income and higher employment opportunities on smaller farms. However, an omnipresent problem facing the farmer these days lies in the decision making about the profitable levels of diversification of crop farming with dairying so as to maximize his farm profits by increasing the productivity of milch animals and crops per unit of land and time within the framework of scarce resources.

Crop cultivation in India is subject to a high degree of risk and uncertainty and provides only seasonal, irregular and uncertain incomes to the farmers. With a view to mitigate the risk and uncertainties of income from crop enterprises and reducing the time lag between input costs and returns, it is essential that the farmers incorporated such enterprises in their production programme which yield regular and evenly distributed income throughout the year are not subjected badly to vagaries of nature.

Agriculture economists have conducted a large number of studies in past years on the subject at micro and macro level. But in the region under study it is felt need to have some basic information regarding diversification of agriculture. Looking to the importance of the crop economy of the region, the specific objectives of this study were found out the nature and extent of variations in the patterns of rural diversification.

Objectives:

1. To assess the crop diversification on the sample farms.
2. To assess the farm diversification on the sample farms.
3. To suggest ways and means to increase the farmers income through diversification of agriculture in study area.

CHAPTER II

REVIEW OF LITERATURE

The study of researcher work done by various research workers helps in organizing and conducting the research on proper lines. It helps to choose suitable analytical tools to process and analyze the data, and draw relevant conclusions. In view of this, an attempt has been made to review the work done in the field of “Diversification of Agriculture in Sehore District of Madhya Pradesh”.

Some of the important and relevant studies conducted so far on the subject, are reviewed in the present chapter.

Amrik, Saini S. and Rajvir Singh (1985), observed the impact of diversification on income employment and credit needs of small farmers in Punjab. The diversification of crop farming with high-yielding milch animals can play an important role in increasing income and employment on small farms. Dairying being a self-income generating enterprise reduces the short-term credit requirement by supplying regular income to the farmers. However its requirements for medium term credit increase manifold with the introduction of high yielding milch animals of improved breeds. Thus the study suggests that the financing institution should come forward unhesitatingly to provide medium terms credit on easy terms to the small farmers to diversify their arable farming with dairy enterprise which would reduce the income variability and dynamic, the entire gamut of income potential and which offers the single best measures to solve the chronic problem of unemployment/under employment of family labour on these farms.

Chawla and Chahal (1985), conducted a study on diversification in Punjab Agriculture during 1979-80, compared to 1974-75. The relative significance of different enterprises is revealed that income from crop production to farm size, income from dairying, poultry, piggery, forestry, and local transport expended over the year as well as in relation to farm size. The marginal, small and medium farmers got increasing income from dairy, poultry and miscellaneous sources whereas the large and big farmers obtained more income from forestry, local transport and miscellaneous source. Therefore, this impact of diversification was apparent in all categories of farmers.

Haque, T. (1985), regional trends and patterns of diversification of the rural economy in India. It becomes clear from the foregoing discussion that despite some

occupational shifts in the rural sector from crop production, forestry, leading to animal husbandry, poultry and fisheries in recent years, the country's rural economy may still continues to remain largely crop based in the years to come. Moreover, occupational shifts from crop production to animal husbandry. Poultry and fishing as either independent or subsidiary occupational do not seem to have uniform bearing on the incidence of rural poverty in all the region of the country and therefore no generalized relationship between rural diversification and poverty could be established.

Pal and Pal (1985), reported that a new measure of crop diversification is developed and experimented with the farm economy of West Bengal. The analysis is based on the farm management data of West Bengal. The study is based on 108 irrigated farms, during the period 1972-73 to 1978-79, revealed that the mode of farming, the degree of mechanization and the farm size have been effective in enhancing diversification. Diversification is more produced in the capitalist farms that in the present farms. Mechanization affects diversification directly.

S.B. Dangat and R.G. Patil (1985), potential for increasing farm income in dry farming areas through diversification. The increase in the income over variable cost was also worked out. The average per farm as well as per hectare income over variable cost also increased in the optimal plans in all the three size-groups in both the zones. However the gross income had shown a much higher rate of rise than the income over variable costs. This might be due to the demand of more monetary input in the alternate plan as compared to that the existing plan, which demands for the provision of credit to meet the additional expenses, required for adoption of diversification.

Satheesh A.V. *et al.* (1985), impact of diversification and liberal credit policy on income and employment of non-viable farmers in Pithumpuram block of East Godavari district (A.P.) shows that the adoption of recommended technology coupled with adequate credit facilities under crop-dairy sericulture farming systems dynamics the entire gamut of income potential and offers an economically viable and practically feasible solution of low-income problem of the non-viable farmers. A liberal credit policy is found to be indispensable for the poorest section of the farmers like those of group I for pushing them up into higher levels of income as these do not have sufficient surpluses to invest. However when capital is limited the crop-sericulture farming system

has maximum potential of augmenting income and employment. Besides the results emphasize the need for strengthening a close co-ordinate between credit and other developmental agencies and streamlining the flow of necessary inputs and services like extension marketing in order to benefit the peasants below the poverty line.

Singh, A.J. *et al.* (1985), study the diversification of Punjab Agriculture: an econometric analysis. From the foregoing analysis it can be inferred that the Punjab economy is undergoing gradual diversification in favor of secondary and tertiary sectors, while the cropping pattern is getting gradually oriented towards food grains particularly wheat and rice as measured by both Herfindhal and Entropy indices, At the macro level diversification adversely affected by fertilizer consumption, inter - crop value productivity variability, tractor density skew ness in the distribution of holdings and per cent cropped area irrigated. It is positively affected by market density. At the micro level diversification is inversely related to size of farm, distance from the market and assets per hectare directly related to family size and dairy income.

Singh and Singh (1985), found in a study of diversification of Agriculture in Agra district of U.P. on the whole, there has been marginal increase in labour use per hectare of cultivated area. In the case of small and medium farms the increase was marginal while on large farm these was marginal displacement of human labour. This is due to mechanization of certain farm operation and minimum tillage concept.

R.P. Gupta and S.K. Tiwari (1985), an empirical analysis on factor affecting crop diversification, farm diversification may take place as a means of profit maximization through reaping the gains of complementary relationship or in equating substitution and price ratios for competitive products. Farm diversification may also be used as a risk precaution. Studies indicate that under the situation of risk and capital constraint, diversification stabilizes farm income at a higher plane. These considerations make a strong case for farm diversification in Indian. The results of the present study shed some light on policy instruments, which can be used for affecting the crop diversification level. In this regard effective implementation of land ceiling policy may encourage, to some extent crop diversification. Tenancy is required to be discouraged for promoting crop diversification. Improvement in irrigation and marketing facilities may encourage crop diversification. However with improvement in irrigation and marketing facilities yield

and price risks are expected to reduce but in that new situation diversification may be adopted more as a means of profit maximization than as a risk precaution. However it is possible that this may have some dampening effect on the level of crop diversification. Further smaller farms are more diversified therefore farm benefit programme may be tied to such farms. Even other farms may be required to practice a certain minimum level of diversification to be eligible to participate in farm benefit programme. However such participation may lead to stronger financial position, which in turn may bring a reduction in the level of crop diversification. These implications indicate that an initial thrust on diversification promoting policies may finally lead to betterment in the economic position of farmers.

Thorve,P.V. *et al.* (1985), study on diversification indicated that the overall conclusion that emerges from this study is that mixed farming with dairy enterprise has a positive effect on the income of the farmers in all the size groups.

Chand,R. (1996), study the paper analyses the effect of agricultural diversification (fruit and vegetable production) and other relevant socioeconomic factors on farm and off-farm employment. The nature of the relationship between the off-farm employment and the level of agricultural progress as a result of diversification in Himachal Pradesh is examined. Data are presented from 225 households of Solan block, Solan district, Himachal Pradesh. Data from the 1981 and 1991 census and other official sources are also used. Agricultural growth initially might have resulted in faster growth in employment in farm activities compared to off-farm activities, but as growth spreads and becomes broader based; it results in the faster growth of off-farm employment. It is concluded that the experience of Himachal Pradesh indicates that agricultural diversification through fruit and vegetable production in the hill regions is a very effective strategy to promote off-farm and on-farm employment.

Chand,R. (1996), study examines the scope for raising income and employment on various categories of land holdings by means of diversification into off-season vegetable production and also examines the scope for fruit cultivation in the middle hill zone of Himachal Pradesh, India. The analysis is based on information collected from 298 farm households drawn from four panchayats in Solan block of Solan district. The reference year is 1992/93. The study shows that farmers allocated area based on

relative profitability, irrespective of the food grain requirement of the family, which could be easily met through purchases. There is strong evidence that it is not farm size but infrastructure (such as access to a motorable road, market and irrigation) which determines the extent, success and profitability of diversification into high return crops like off-season vegetables. While diversification into fruit production has been a success in temperate areas it has not been so in the non-temperate zone. Estimates of labour use and net returns reveal that a 1% shift in area from other crops to off-season vegetables would lead to a 1.2% or 1.6% growth in the existing level of employment and to a 3.42% or 4.06% growth in income depending on whether the shift takes place in irrigated or unirrigated areas.

D.V. Gopalappa (1996), study on crop diversification and income level in Karimnagar District of Andhra Pradesh. As has been noted in the survey that there is good scope to increase the income through crop diversification. Appropriate cropping pattern along with other suitable farm business has to be identified for diversifying the farming system. All these have to go hand in hand with suitable infrastructure and institutional support. Last but not the least, the socio-economic feasibility survey of a new crop should be taken up to highlight the advantages and disadvantages of a new crop. This would help the farmers to diversify their cropping system.

Vyas (1996), observed the diversification is an integral part of the process of structural transformation of an economy. These developments are fairly common. However the prompting diversification and the speed with which the change occur vary in different situation. In the last few years the need for rapid diversification was strongly articulated in the context of the rice economics of south East Asia. In this context a forced pace of withdrawal of farm resources, including man power farm agriculture and significant changes in cropping pattern were advanced as a more desirable alternative in the Indian context, the need for diversification is advocated on certain addition grounds.

Anonyms (1997), the study provides an economic analysis of agricultural diversification within the crop sector and the livestock sector in Farrukhabad district of Uttar Pradesh, India, during the year 1995/96. The specific objectives were: (1) to study the farm structure and cropping pattern; (2) to study the comparative advantage of

different enterprises; and (3) to determine the effect of diversification on farm holdings. A sample of 60 farmers was selected from six villages in three blocks (Kannauj, Barpur and Kaimganj). The study revealed a strong linkage effect between crop composition and economic performance. Income and employment could be considerably increased by changing livestock numbers and the composition of animals. The study notes the need for expansion of credit facilities, fodder development and development of food industries.

Maria Saleth (1997), reported the diversification strategy for small farmers and landless some evidence from Tamil Nadu. The major promise behind crop diversification strategy is that the economic performance of crop sector is intimately linked to the underlying cropping pattern. Therefore, to explain the differential performance of crop enterprises across farm group and resource regions it is necessary to look into the reasons for the variation in their crop composition for analytical convenience, crop composition is evaluated in terms of seven broader crop group i.e. food grain (paddy).

Satyasai, K.J.S. and Viswanathan, K.U. (1997), study the examination is presented of various aspects of the diversification of Indian agriculture with a specific emphasis of food security and nutritional state. These areas were addressed from a production aspect only. Data were collected from several secondary sources, and cover the period 1950-94. Results of analyses on this data are presented under the headings: diversification in agriculture; diversification within the crop sector; diversification within the livestock sector; diversification and food security.

Shiyani and Pandya (1998), diversification of agriculture in Gujarat. The rural economy, in general and small and marginal farmers in particular the crop diversification has been largely considered as a ray of hope for their economic mint. The diversification in agriculture is also practiced with a view to avoiding risk and uncertainly due to climatic and biological vagaries. In the early stage of development the farmers generally grow subsistence crops. With the increase in human population they try to produce more to maximize total farm output. In the third stage they again diversify their agriculture to strengthen the existing level of development.

Raghuwanshi *et al.* (1999), study on diversification of agriculture in Hoshangabad was carried out in 1990-91. The result indicated that the crop diversification in Hoshangabad district is close to perfect diversification. While assessing the situation of farm diversification with selected farmers it was poor and only crops and live stock (milch cattle) were found to be the popular enterprises. Diversification is an age- old practice of risk minimization and attainment of stable income from the farm. Farm diversification includes diversification of crops and farm enterprises to broaden the base of the farmers resulting in the increasing level of employment, production and income.

Saxena *et al.* (1999), calculated that the rural youths expressed their desire to involve themselves in more economic and profitable aspects such as vegetable growing, egg production and motor binding. The youths were interested to obtain knowledge of any technology of a continuous nature rather than restructured to particular period or season. It was also noted that youth were reluctant to higher input cost crops with low benefit ratio. It is therefore suggested that the trainings for rural youth should be organized on such aspects or enterprise that requires less initial cost and is of a continuous nature.

Sharma, S.S.P. (1999), study the paper highlights the nature of diversification that has taken place in Bhutan and the rationale for diversification between agriculture and the non-farm sector as well as within agriculture, and examines the determinants of such changes, the impacts of diversification on employment and poverty, and policies for the future. Diversification within agriculture has taken place by moving away from crop production into other agricultural activities such as animal husbandry and forestry. The economy is diversified because of the need to increase the income of smallholdings, provide fuller employment opportunities for farm households, stabilize seasonal income and enhance the use of natural resources. Diversification has mainly depended on the development of market infrastructure and institutional arrangements, the agro-economic condition in a given region and the technology available for various crops and appropriate technology. The pace of diversification can be accelerated to meet the objectives of higher income, higher employment, stabilization of income and conservation of natural resources by initiating purposeful policies and actions in different areas.

Ashok Kumar *et al.* (2002), concluded that the profitability and risk in pulses and oilseeds production vis-a-vis cereals and vegetable production in Kangra district, Himachal Pradesh, India, were investigated. Data pertaining to seven agricultural years ending in 2001 were obtained from a sample of 150 farms. Risk efficient farm plans (i.e. for vegetable farms, and for vegetable and dairy enterprises) were also formulated. Results indicate that risk could be notably decreased if farmers diversify their cropping pattern. It was found that vegetable plus dairy is the most appropriate choice for the farmers of the study area whereby they could increase their farm income by as much as 47.76% (from Rs. 70 450 to Rs. 104 100) of their existing farm income. However, pure vegetable farming was found to be more risky and less remunerative.

Kumar Ashok *et al.* (2002), the study on profitability, risk and impact of diversification suggests that vegetables, pulses, dairy was the most appropriate choice for the farmers of the study area where by they could increase their farm income by as much as 47.76 per cent of the existing farm income. However the pure vegetable farming was found to be more risk and less remunerative. The coarse cereals, pulses and oilseed having low profitability did not enter into programming. However the area under cereals for subsistence level was kept as a constraint to have area under them in optimum cropping pattern. Therefore the study suggests that if we are to retain these eco friendly crops to promote human health the productivity and profitability haze to be further enhanced through research efforts. The study clearly indicated the fact that risk could be notably decreased if the farmers diversify their cropping pattern. The study has further evaluated different plan showing different level of risk and income associated with them. Therefore the farmers have an option to choose different plans, suggested by the model as per their income risk criterion.

Marawar,S.S. *et.al.* (2002), reveals the order to develop competitiveness in the global market, farmers have become conscious of the way they allocate area under crops/enterprises. This has necessitated researchers to undertake in-depth studies related to the extent of diversification and the crops responsible for diversification. The present study examines crop diversification in Vidarbha, Maharashtra, India. Markov chain approach was used to study the crops causing diversification while the Herfindahl and Entropy index was used to determine the extent of crop diversification. The results

of the Herfindahl and Entropy index confirmed the existence of crop diversification in Vidarbha during the period 1980-99. The transition probability matrix estimated using Markov chain analysis indicated that there is a shift in area under different crops in 1990-99 and that kharif jowar, paddy and cotton are the most stable crops of Vidarbha.

Ratnalikar, D.V. *et al.* (2002), the present study examines crop diversification in Vidarbha, Maharashtra, India. Data were obtained from a sample of 800 farmers to examine changes in cropping patterns on farmers' fields at different points in time, viz. 1980-81, 1990-91, and 2000-01. Kendall's rank correlation coefficients indicated that there was no change in the cropping patterns over a period of 19 years. However, the cropping patterns in Akola and Buldhana districts showed some short-term changes during 1988-99. The agri-horticultural system of crop diversification was found to be more remunerative among the existing systems under study.

D.P. Singh *et al.* (2004), Need of diversification in Agriculture through farming systems. Time concept relates to increase in the intensity of cropping under assured irrigated condition whereas space utilization pertains to building up of vertical dimension through multi-tier cropping and farming system approach. By adopting these concepts the productivity per unit area per unit time can be enhanced in a sustainable manner. Farming system is one of the main approaches where the risk in dealing with single component can be minimized and at the same time increase in the productivity through effective recycling can be ensured. With the consideration of above points the diversification in farming system was made and carried out on the farmers' fields of Farrukhabad Kannauj district. The farmers of both districts are very analytical and they accepted the diversification in farming system after computation of overall net income. Famous saim, dalmot of Farrukhabad district is a product of this farming system.

Joshi, P.K. *et al.* (2004), examines the trends, impacts and policy implications of agricultural diversification in South Asia and in India in particular, based on data for the period 1980/81-1999/2000. South Asian countries are gradually diversifying with some inter-country variation in favour of high value commodities, namely, fruits, vegetables, livestock and fisheries. Agricultural diversification is strongly influenced by price policy, infrastructure development (especially markets and roads), urbanization and technological improvements. Rainfed areas have benefited more as a result of

agricultural diversification in favour of high value crops that substitute for inferior coarse cereals. Agricultural diversification is also contributing to employment opportunities in agriculture, and in increasing exports. The need is to suitably integrate production and marketing of high-value commodities through appropriate institutions. Market reforms in developing and strengthening desired institutions through required legal changes would go a long way in boosting agricultural growth, augmenting income of small farm holders and promoting exports.

Mahajan (2004), study an empirical analysis of Kangra farm of Himachal Pradesh. This study has examined the crop diversification in the farm sector of Kangra district and has investigated the empirical relationship between the magnitude of diversification and various socio-economics factors. The study has been conducted on two developed (developed category) and two backward blocks (backward category) using the two stage stratified random sampling technique. The crop diversification has been found regression results of crop diversification have indicated that both economic factor such as farm size tractor and bullock density extent of tendency, farm income and non farm income and social factors like family size age and education of the head of the family diversification in the developed category.

Shankar Singh (2004), feasibility of diversification in farming system through Agri-Horti system on ecological degraded land of U.P. Therefore the diffusion of the diversification through different crops in fruits trees was proved beneficial to the farm families of both ecological degraded area and they are harvesting the fruits of generated technology and maintained good cash flow systems.

Bala and Sharma (2005), diversification and commercialization of agriculture in Kullu District of Himachal Pradesh depicted that the traditional a spectacular shift in the cropping pattern over the period 1990-91 to 2002-03 in the Kullu district. The traditional cereal crops have been almost completely replaced by the vegetable crops. The dominance of relatively short duration vegetable crops in the cropping pattern has raised the cropping intensity. The vegetable crops being highly labor-intensive have generated more employment opportunities in the villages. The overall labour employment has increased by about 49 percent. The agriculture income per farm has

increased by 332 percent over the period. Consequently, the general standard of living of the farming community has been perceived to be uplifted.

Joshi, P.K. *et al.* (2005), this chapter (1) examines the extent, nature and speed of agricultural diversification in South Asian countries; (2) identifies the determinants of agricultural diversification in the crop and livestock sectors; and (3) assesses the implications of agricultural diversification on food security, employment, and exports. The study is confined at two levels: (i) macro-level (across Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka), and (ii) meso-level (across different regions in India). The latter includes an analysis of diversification in the fisheries and aquaculture sector. It is revealed that the agricultural sector in South Asia is gradually diversifying in favour of high-value commodities, namely, fruits, vegetables, livestock and fish products. Much of the diversification came, if at all, with little support from state governments. Markets, roads and technology absorption are the key determinants influencing diversification. The macro-level information shows that food security is not adversely affected by diversification; high-value crops have substantial potential for generating employment opportunities; and high-value commodities have a good performance in international trade.

Sharma, H.R. (2005), study the agricultural development and crop diversification in Himachal Pradesh depicted that the Crop diversification indicated that the explicit consideration of mountain specificities in formulating developmental strategies that resulted in the creation of basic infrastructure facilities available of huge market in the neighboring states high level of market consciousness among the farmers and the emergence of self-help institution were some of the important factors. Agricultural development and crop diversification to get underway even in remote tribal areas like Lahaul and Spiti Kinnaur on the other hand harness of crop land from road head adequate availability of family labour and the availability of irrigation facilities were important factors that prompted the farmers to switch over to the cultivation of high value cash crops.

Ravisankar, T. *et al.* (2005), diversification of Fish culture and exports among major shrimp-producing countries of Asia: A spatial and temporal analysis. Diversification in Fish production as well as exports has been advocated for assured

income to the farmers. Diversification of Fish culture helps in avoiding disease incidences and aids in better utilization of resources. The Asian countries could take advantage of their rich endowments of resources and become more diversified in their Fish production and exports. The governments and research institution addressing the requirement of these countries should strengthen their efforts on diversification of fisheries. The disease problems associated with shrimp farming make it a risky enterprise to carry on with continued monoculture of shrimp. Though technology development has been done in many alternate culture systems like finfish culture, mollusk culture, and seaweed culture. These are yet to take off commercially. Specialized and hygienic processing and adoption of Hazard Analysis and Critical control point from aquaculture production to processing will help the aqua culturists to fetch better prices for alternate species comparable to that of shrimp in the international markets.

Joshi,P.K. *et al.* (2006), reported that viability of small farms can be improved through diversification of agriculture into higher value crops like fruits and vegetables. They have assessed the impact of diversification of agriculture towards vegetables on farm income and employment using household level information from the Indian state of Uttar Pradesh.

Kewda,P.C. (2006), stated that The value of the Herfindahl's index was estimated for small, medium and large farmers at 0.177, 0.198 and 0.181 respectively. The overall Herfindahl index was 0.182, which was close to the zero and indicated enough crop diversification. There were no direct relationships of holding size and diversification index among the different category of the farms.

CHAPTER III

MATERIALS AND METHOD

The present chapter deals with the concise description of the data required; its collection and analytical methods used in the light of stated objectives. This study on "Diversification of agriculture in Sehore district of Madhya Pradesh" is specially undertaken with the main objective to examine the nature and extent of variations in the patterns of rural diversification. The study was conducted in Sehore district of Madhya Pradesh because now a day farmers in the district are shifting their area under commercial crops with using the modern production technologies. The research methodology used in the study is presented into three groups i.e. selection of sample, collection of data and analysis of data as per stated objectives.

Sampling Procedure:

In the present study multi purpose sampling technique were used for drawing the sample. At the first stage, Sehore Block has been selected purposively for the study due to conventions as well as well acquaintance of researcher. At the second stage, out of total villages in the Block, five villages namely Kakerkheda, Bhaukhedi, Mogarram, Sekadakhedi and Hasnabad were selected randomly. For the selection of respondents at the third stage of sampling, a list of cultivators of each village was prepared in ascending order according to the size of their land holding and grouped into small (up to 2 hectare.), medium (2.1 to 4 hectare.) and large (above 4 hectare.) categories. Amongst these groups 100 farmers were selected in proportion to their number. Detail of the selection are present in table 3.1.

Table 3.1: Allocation of sample farmers from selected villages according to different size groups.

Size group of holding	No. of farmers in different villages					
	(1)	(2)	(3)	(4)	(5)	Total
Small (Up to 2.0 ha.)	100	80	70	90	60	400
Medium (2.1-4.0 ha.)	100	90	70	40	50	350
Large (Above 4.0 ha.)	50	40	60	40	60	250
Total	250	210	200	170	170	1000

Size group of holding	No. of farmers selected from different villages					
	(1)	(2)	(3)	(4)	(5)	Total
Small (Up to 2.0 ha.)	10	8	7	9	6	40
Medium (2.1-4.0 ha.)	10	9	7	4	5	35
Large (Above 4.0 ha.)	5	4	6	4	6	25
Total	25	21	20	17	17	100

Thus, the present study has accounted of total hundred farmers from Sehore block of Sehore district in Madhya Pradesh.

Collection of data:

Both primary and secondary data were used in this study to fulfill the objective of this study. The primary data were collected by survey method through a well-designed pre-tested schedule by personally interviewing of sampled respondents. The secondary data were recorded from the Department of Agriculture and other authorized sources.

For the collection of primary data, a schedule was prepared and it framed by arranging the required questions systematically. In preparing such schedules the objectives of study were primarily kept in view. As usual, taking few farmers did pre-testing of schedules. Suitable modification and recasting questions due consideration was given to factors such as language, consciousness, comprehensiveness etc.

Period of study:

The study was conducted for the agricultural years 2009-10.

Analytical framework:

The data were analyzed using appropriate tools like tabular analysis, using average and percentage of sample households. The extent of diversification on crop was studied using Herfindhal indices.

Herfindhal index (H):

$$H = \sum_{i=1}^N p_i^2$$

$$P_i = \frac{A_i}{N}$$

$$\sum A_i = 1$$

Where,

- H= Herfindhal index and is defined as sum of square of all "N" proportions.
- Pi = Proportion of the Ith crop acreage and
- Ai = Area under Ith crop
- N = Total number of crop
- I = 1,2,3,4,.....N

Demography of study area:-

The description about background information of district and study area is essential so that researchers can correlate the finding with the prevailing conditions under study.

Situation:

Sehore district is one of the agricultural backbone districts among the State, Madhya Pradesh and it supports the greater part of farmers' economy. The district is situated in the west part of the state. There are five blocks in the district namely Sehore, Ashta, Ichhawar, Budhani and Nasrullaganj representing each tehsil of the district.

Sehore lies between Latitudes 30⁰33' and 23⁰54' North and Longitudes 76⁰11' and 78⁰02' East. It is surrounded by Dewas and Sajapur districts in the West, Rajgarh

district in the North-West and Vidisha district in North-East. Bhopal and Raisen districts in the East and Hoshangabad district in the South. The hill region constitutes about 14 per cent in the Malwa Plateau.

Soil:

The type and depth of soil determine cropping pattern of the area. Generally, black cotton soil fit for soybean cultivation is found in the district, which is quite fertile and suitable for Kharif and Rabi crop production.

Climate:

There are 3 distinct climatic seasons in the study area, viz. rainy season from mid June to October, winter season from November to February and summer season from March to middle of June. The climate of study area is moderate. The maximum temperature is on an average 45⁰c in May and the minimum is on an average 10⁰c in the month of January.

Rainfall:

Generally, the monsoon rains commence after 15th June. The average rainfall in the study area is about 900mm. The rains last up to the second week of October.

85 per cent rains are received in monsoon months and about 15 per cent rains are received in off seasons of monsoon.

Cropping pattern

The major crops in the district were selected on the basis of percentage share of crops acreage in cropping pattern to total gross cropped area of the district. The allocation of crops and cropping pattern of respective district is presented in table 3.2:

Table: 3.2: Allocation of crops and cropping pattern of the district.

(area in 000 hect.)

Year	Soybean	Jowar +maize	Tur	Other	Total Kharif	Wheat	Gram	Other	Total Rabi
1992-93	184.9 (63.08)	22.4 (7.64)	8.7 (2.97)	77.1 (26.31)	293.1 (100)	101.4 (56.36)	57.3 (31.85)	21.2 (11.79)	179.9 (100)
2008-09	308.7 (92.23)	17.8 (5.31)	4.6 (1.37)	3.6 (1.09)	334.7 (100)	81.5 (42.76)	102.7 (53.88)	6.4 (3.36)	190.6 (100)
Average percentage	246.80 (78.62)	20.1 (6.40)	6.65 (2.12)	40.35 (12.86)	313.9 (100)	91.45 (49.37)	80.00 (43.18)	13.8 (7.45)	185.25 (100)

Figures in parenthesis show the percentage to total respective crop area in the

season.

On the basis of above data, depicted in table, it is clear that soybean, jowar-maize and tur found to major crops in kharif season while wheat and gram found to the major crops in rabi season (average data of 1992-93 and 2008-09). The above-mentioned crops represent more than 85 per cent of respective total cropped area of the season respectively. Other minor crops could not be included in the study, practically because these were insignificant from acreage point of view.

CHAPTER IV

RESULT

The data presented in this chapter is concerned with the analytical results as per objectives stated earlier. This chapter has been divided into five sections.

4.1: Socio economic characteristics and farm resources structure of the sample farmers.

4.2: Relative share of crops and value of production in their respective total cropped area and production value of sample farmers.

A: Relative share of crops in the total cropped area of sample farmers.

B: Relative share of production's value in the total production value of sample farmers.

4.3: Crops and allied activities of sample farms and farm diversification.

4.4: Constraints related to farm diversification.

4.1: Socio economic characteristics and farm resource:

Since the socio economic characteristics and farm resource structure reflect the operational organizational and managerial constraints of the farm business activity. Hence, it is very important to study these characteristics of the sample farmers.

Age and education level of sample farmers: -

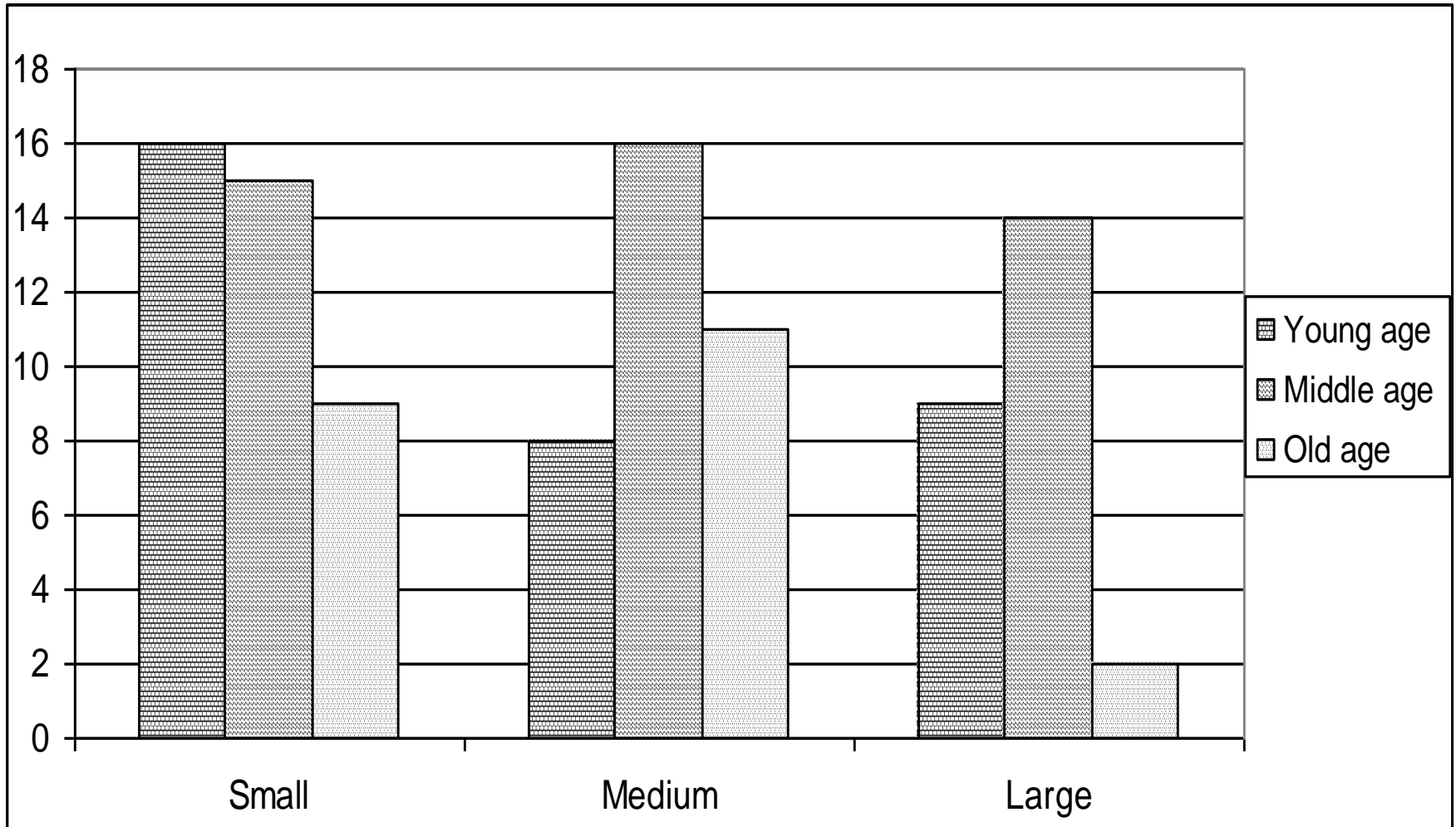
The farmers generally take the important decisions of the farms with reference to input use, cropping pattern and other farm managerial decisions. Therefore, it is pertinent to have an idea regarding the age and education level of the sample farmers. The age and education level of sample farmers is presented in table 4.1:

Table 4.1: Age and education level of sample farmers.

S.No.	Age group (year)	Small	Medium	Large	Overall
I.	Young age (18-30 year)	16	08	09	33
II.	Middle age (31-50 year)	15	16	14	45
III.	Old age (above 50years)	09	11	02	22
	Total	40	35	25	100
S.No.	Level of Education				
I.	Illiterate	16	13	08	37
II.	Up to primary	11	10	05	26
III.	Up to middle	04	08	04	16
IV	H.S.S.C and above	09	04	08	21
	Total	40	35	25	100

The study reveals that the total respondents in the study area were 100; out of this 33 belong to young age group followed by 45 farmers belong to middle age group and 22 farmers belong to old age group respectively.

Fig:1: Distribution of respondent according to their Age.



This figure did not show any specific trend between age group and size of holding.

The literacy position shows that among the overall sample farmers, the illiterate respondents found to 37 per cent or 37 farmers. Among the literate respondents the maximum 26 found to up to primary education followed by 21 respondents got H.S.S.C and higher education and middle school 16 respondents respectively. The table shows that the maximum percentage of H.S.S.C and higher education respondents found in large size group and the illiterate percentage found to maximum in small size group.

It is generally hypothesized that the size of holding has a great bearing on the level of education. The study also reveals that relationship between size of holding and level of education was observed positive in study area. As depicted from the table, the total 37 respondents were belonging to illiterate category. Out of which 16 farmers (40%) belong to small size group followed by 13 (37%) medium group and 08 (32%) to large size group respectively. This shows that the level of illiteracy decrease with the increase of size of holding. Against this the total number of 21 farmers, having H.S.S.C and higher level of education and among them 09 respondents (22%) belong to small size group followed by 08 respondents (32%) belongs to large size group respectively. But in case of medium farmers the total 04 respondents was got H.S.S.C and higher education i.e. (11%) farmers shows minimum level among the other groups.

It can be therefore, concluded that there was no identical relationship between the level of age and size of holding of the sample farmers but the relationship between level of education and size of holding found to some what identical positive relation i.e. the level of education found to higher among the large size of farmers.

Land use pattern of sample respondents: -

Land is probably the most important measure in classifying the farms, because it is a primary and fixed input constituting the major portion of the fixed cost. It is also relatively free from the substantial annual fluctuations. The land use pattern for different size group of holding is presented in table 4.2.

Fig:2: Distribution of respondent according to their Education:

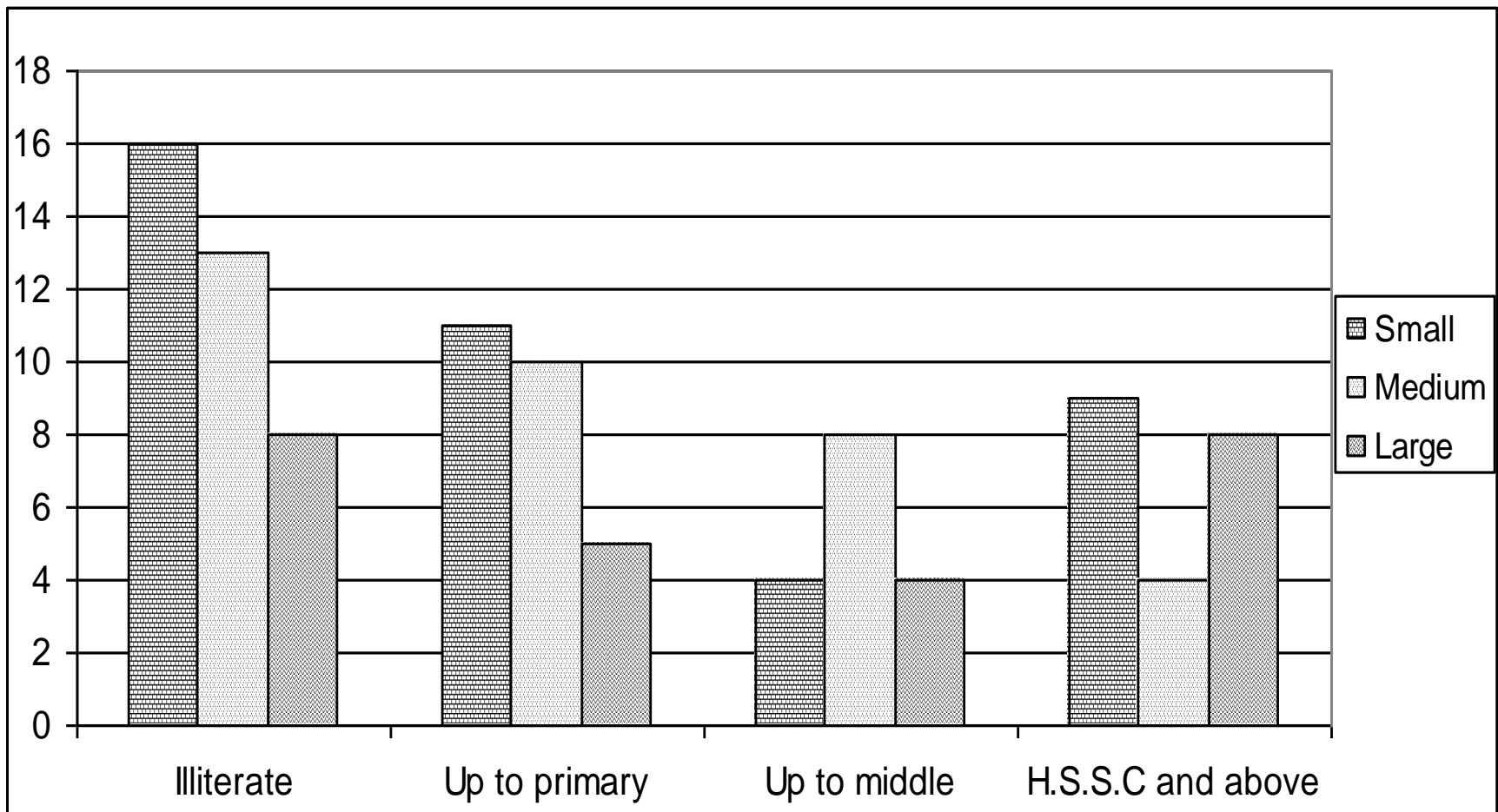


Table 4.2: Land use pattern of sample respondents.

S. No.	Particular	Size group of holdings			Average
		Small	Medium	Large	
1.	Size of holdings	1.36	3.26	8.92	4.51 (100)
2.	Net cultivated area	1.29	3.14	8.70	4.38 (97.12)
3.	Net irrigated area	0.73	1.39	2.42	1.51 (33.48)
4.	Area under kharif	1.29	3.14	8.70	4.38 (97.12)
5.	Area under rabi	1.02	1.64	3.76	2.14 (47.45)
6.	Gross cropped area	2.24	4.68	12.26	6.52 (144.57)

Figure in parenthesis show the percentage to the size of holding.

The table reveals that on an average size of holding for all farmers it was found to 4.51 hectare per farm. Out of them the net cultivated area as percentage of size of holding found to 97.12 per cent. The irrigated area as percentage of size holdings found to 33.48 per cent. It shows that there is very small land found to irrigate in study area i.e. reason the rabi area found to very limited and mostly gram was grown in rainfed condition. Due to less availability of irrigation, the area under gross cropped or double cropping area found to very limited. The gross cropped area on sample farm found to only 144.57 per cent to average size of holding.

Cropping pattern of sample holdings: -

The cropping pattern of sample farmer's holding indicated the crops and cropping sequences grown in the study area. The cropping pattern refers to the allocation of land among different crops in a year. The economy of farm is fully depends upon crops and crops sequence are grown in a particular land and in a year. The detail of cropping pattern of sample holding is presented in table 4.3.

Table 4.3: Cropping pattern of sample holdings.

S. No.	Particular	Size group of holdings			Average (Ha. /Farm)
		Small	Medium	Large	
A.	Kharif crops	1.23	3.04	8.54	4.27 (100)
1.	Soybean	0.71	1.65	5.76	2.71 (63.46)
2.	Jowar +Maize	0.30	0.76	1.13	0.73 (17.09)
3.	Tur	0.09	0.30	0.85	0.41 (9.60)
4.	Other kharif crops	0.13	0.33	0.80	0.42 (9.53)
B.	Rabi crops:	1.02	1.64	3.76	2.14 (100)
1.	Wheat	0.36	0.91	1.76	1.01 (47.20)
2.	Gram	0.54	0.60	1.58	0.91 (42.52)
3.	Other rabi crops	0.12	0.13	0.42	0.22 (10.28)

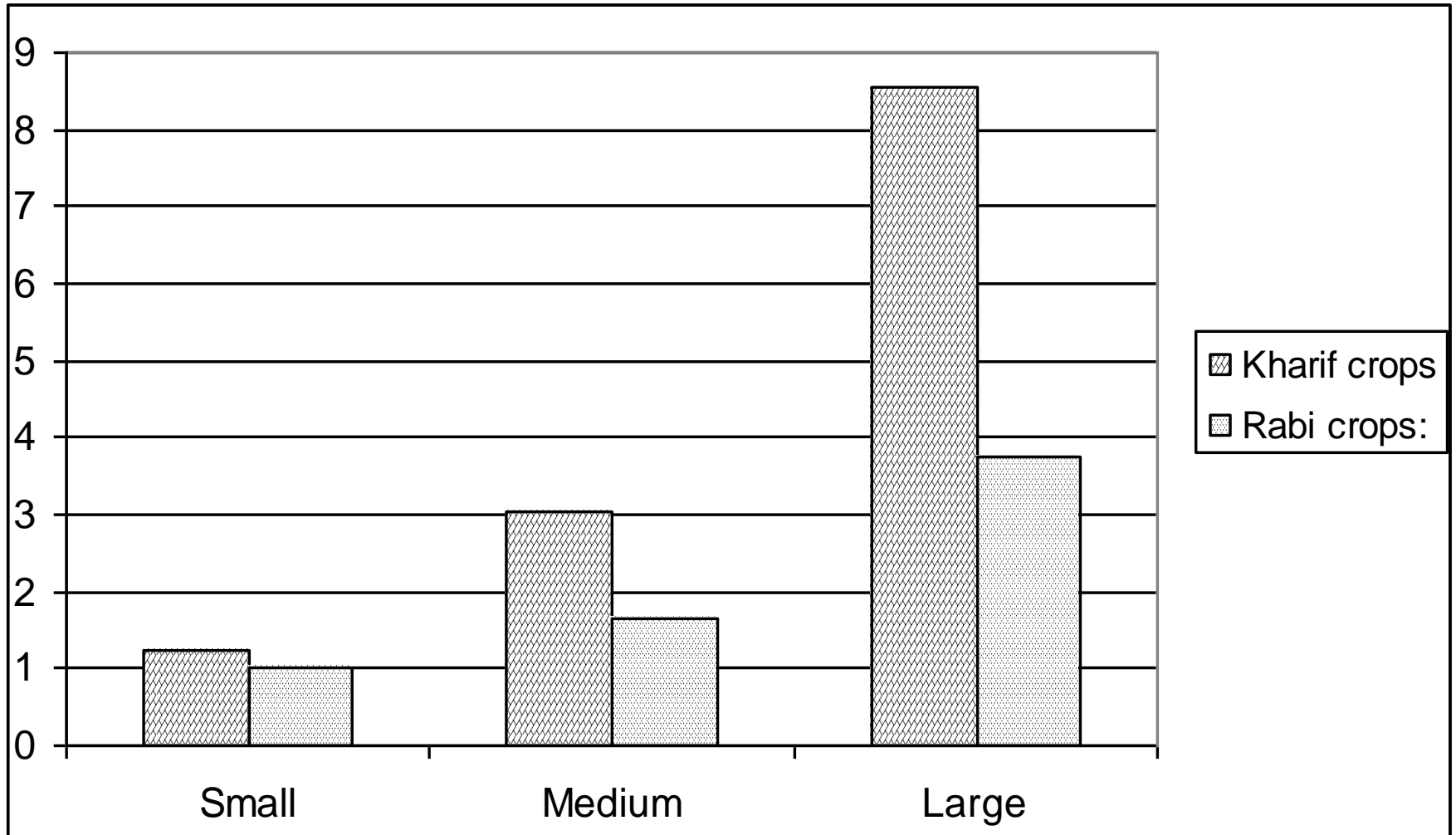
Figure in parenthesis show the percentage to the gross cropped area.

The table showed that kharif crops found to dominate over rabi crops. Among the kharif crops soybean was the main crop on all size of sample holdings. On an average, 63.76 per cent of the kharif cropped area was devoted to the soybean. The average area of soybean under small category was found to 0.71 hectare it was 1.65 hectare in medium category and 5.76 hectare in large category respectively. The other important kharif crops of the area were jowar-maize and tur. These crops having position of second and third place in kharif crops with the average of 0.73 hectare (17.18% to total kharif area) and 0.41 hectare (9.65% to total kharif area) respectively.

Among the rabi crops, wheat was the main crop on all size of sample holding followed by gram and other rabi crops. Wheat crop was grown; on an average of 47.20 per cent of the total rabi cropped area. Gram was found to the second important rabi crops on overall size of group 42.52 per cent area of rabi crops was devoted to this crop.

The overall data on cropping pattern on sample holding revealed that soybean and jowar-maize were the important kharif crops. Tur was sown as a sole crop in rainfed area. In irrigated condition wheat was the major rabi crop. While in rainfed area or semi irrigated condition, the sample farmers grown gram. This was the common cropping pattern adopted

Fig:3: Distribution of respondent according to their Cropping pattern:



in study area. The soybean and wheat cropping sequence was dominant on sample holdings due to facility of irrigation and other agro-climatic advantages. On the other hand jowar-maize in kharif season and rainfed gram was the common cropping pattern. The study reveals that on an average farm, the area under these four crops was found to maximum. This shows that the profitability of soybean followed by wheat directly affect the whole farm income during the year.

Production's value of main crops on sample holdings: -

As per the cropping pattern of sample farmers holding, the production's values of main crops were denoted in table 4.4.

Table 4.4: Production's value of main crops on sample holdings.

S. No.	Particular	Size group of holdings			Average
		Small	Medium	Large	
A.	Kharif crops				
1.	Soybean	21300 (42.56)	49500 (46.55)	172800 (59.12)	81200 (54.32)
2.	Jowar +Maize	4410 (8.81)	11172 (10.51)	16611 (5.68)	10731 (7.17)
3.	Tur	1701 (3.40)	5670 (5.33)	16065 (5.50)	7749 (5.18)
4.	Total crops	27411	66342	205476	99780
B.	Rabi crops				
1.	Wheat	10483 (20.95)	26499 (24.92)	51251 (17.54)	29411 (19.65)
2.	Gram	12150 (24.28)	13500 (12.70)	35550 (12.16)	20475 (13.68)
3.	Total crops	22633	39999	86801	49886
C.	Grand Total (kharif + rabi)	50044 (100.00)	106341 (100.00)	292277 (100.00)	149666 (100.00)

Figure in parenthesis show the percentage to the total production values.

The table reveals that the maximum values among the total crop production of a farm come on an average 54.32 per cent from soybean. The average production value of soybean under small category was found to 42.56 per cent and medium category was found 46.55 per cent and large category 59.12 per cent of total values of crop production in a farm. The other important kharif crops of the area were jowar-maize and tur. These crops having position of second and third place in total production values in kharif crops with the average production values of 7.17 per cent and 5.18 per cent to total crop production values per farm respectively.

Among the rabi crops, wheat was the main crop on all size of sample holding followed by gram. Wheat crop was given on an average of 19.65 per cent values of the total crop production. Gram was found to the second important rabi crops which given on an average 13.68 per cent values of total crop production values per farm.

4.2: Relative share of crops and value of production in their respective total cropped area and production value of sample farmers:

A: Relative share of crops in the total cropped area of sample farmers:

The relative share of main crops grown by sample farmers in their farms and their relative shares to the total cropped area is presented in table 4.5:

Table 4.5: Relative share of main crops in the total cropped area of sample farmers.

Size group	Particulars	Main crops				
		Soybean	Jowar + maize	Tur	Wheat	Gram
Small	Average area	0.71 (31.69)	0.30 (13.39)	0.09 (4.02)	0.36 (16.07)	0.54 (24.12)
	% share when total taken to be (Pi)	0.316	0.133	0.040	0.160	0.241
	Square of the % share (Pi ²)	0.099	0.017	0.001	0.025	0.058
	Herfindhal index	0.200				
Medium	Average area	1.65 (35.27)	0.76 (16.24)	0.30 (6.41)	0.91 (19.44)	0.60 (12.82)
	% share when total taken to be (Pi)	0.352	0.162	0.064	0.194	0.128
	Square of the % share (Pi ²)	0.123	0.026	0.004	0.038	0.016
	Herfindhal index	0.207				
Large	Average area	5.76 (46.87)	1.13 (9.19)	0.85 (6.92)	1.76 (14.32)	1.58 (12.85)
	% share when total taken to be (Pi)	0.468	0.091	0.069	0.143	0.128
	Square of the % share (Pi ²)	0.219	0.008	0.004	0.020	0.016
	Herfindhal index	0.267				
Average	Average area	2.71 (42.41)	0.73 (11.42)	0.41 (6.42)	1.01 (15.80)	0.91 (14.24)
	% share when total taken to	0.424	0.114	0.064	0.158	0.142

	be (Pi)					
	Square of the % share (Pi²)	0.180	0.013	0.004	0.025	0.020
	Herfindhal index	0.242				

Figure in parenthesis shows percentage to gross cropped area

The table showed that soybean was the main kharif crop on all size of sample holdings. The relative share of soybean among the gross cropped area found to on an average 2.71 hectare (42.41%). The category wise relative share of soybean showed that in case of small farmers it was found to 0.71 hectare (31.69%) of gross cropped area followed by medium farmers 1.65 hectare (35.27%) and large farmers was found to 5.76 hectare (46.87%) to gross cropped area respectively.

The table also showed that jowar-maize was the next important kharif crop on all size of sample holdings. The relative share of jowar-maize among the gross cropped area found to on an average 0.73 hectare (11.42%). The category wise relative share of jowar-maize showed that in case of small farmers it was found to 0.30 hectare (13.39%) of gross cropped area followed by medium farmers 0.76 hectare (16.24%) and large farmers was found to 1.13 hectare (9.19%) to gross cropped area respectively.

The table also showed that tur was the less important kharif crop on all size of sample holdings. The relative share of tur among the gross cropped area found to on an average 0.41 hectare (6.42%). The category wise relative share of tur showed that in case of small farmers it was found to 0.09 hectare (4.02%) of gross cropped area followed by medium farmers 0.30 hectare (6.41%) and large farmers was found to 0.85 hectare (6.92%) to gross cropped area respectively.

The table showed that wheat was the main rabi crop on all size of sample holdings. The relative share of wheat among the gross cropped area found to on an average 1.01 hectare (15.80%). The category wise relative share of wheat showed that in case of small farmers it was found to 0.36 hectare (16.07%) of gross cropped area followed by medium farmers 0.91 hectare (19.44%) and large farmers was found to 1.76 hectare (14.32%) to gross cropped area respectively.

The table showed that gram was the next important rabi crop on all size of sample holdings. The relative share of gram among the gross cropped area found to on

an average 0.91 hectare (14.24%). The category wise relative share of gram showed that in case of small farmers it was found to 0.54 hectare (24.12%) of gross cropped area followed by medium farmers 0.60 hectare (12.82%) and large farmers was found to 1.58 hectare (12.85%) to gross cropped area respectively.

The overall data on cropping pattern on sample holdings revealed that soybean and jowar-maize were the important kharif crops and wheat and gram were the major rabi crops. Soybean-wheat cropping sequences were mostly adopted by the sample farmers in irrigated condition. While soybean-gram or jowar+maize-gram cropping sequence were adopted on sample holding (rainfed or semi irrigated condition) and due to other agro climatic advantages. On an average per farm the area under these four crops was found to 83.87 per cent of gross cropped area. The category wise area under these crops was on an average 85.27 per cent on small size group of holding followed by 83.77 per cent on the medium size group and 83.23 per cent was on large size of group of holding respectively. This showed that the profitability of soybean and wheat (irrigated condition) and jowar/maize or gram (rainfed and semi irrigated condition) directly affected the whole farm income during the year.

The overall average of all crops grown by sample farmers, the Herfindhal index was found to 0.242, which was close to the zero and indicated enough crop diversification. The value of the Herfindahl's index was estimated for small, medium and large farmers were found to 0.200, 0.207 and 0.267 respectively. The values of Herfindhal index shows that it was found to increase with the increase of size of holding. Hence, it can be say that there were direct relationships between size of holding and diversification index among the different category of the farms. The study indicated that crop diversification was found more on small farms as against larger size of groups.

The irrigation facility that is crucial for agriculture production and productivity was found to very nominal in study area. The available irrigated area encouraged the farmers towards intensive use of their land on commercial agriculture. This result indicated that the lower average sizes of land holding was motivated to farmers for adoption of new farming technology which in turn resulted enough crop diversification in the study area.

B: Relative share of production's value in the total production value of sample farmers:

The relative share of productions value of crop among total production value of total crop of sample farmers is presented in table 4.6.

Table 4.6: Relative share of production value in total production values of crops of sample farmers.

Size group	Particulars	Main crops				
		Soybean	Jowar + maize	Tur	Wheat	Gram
Small	Average production value	21300 (42.56)	4410 (8.81)	1701 (3.40)	10483 (20.95)	12150 (24.28)
	% share when total taken to be (Pi)	0.425	0.088	0.034	0.209	0.242
	Square of the % share (Pi²)	0.181	0.008	0.001	0.044	0.059
	Herfindhal index	0.292				
Medium	Average production value	49500 (46.55)	11172 (10.51)	5670 (5.33)	26499 (24.92)	13500 (12.70)
	% share when total taken to be (Pi)	0.465	0.105	0.053	0.249	0.127
	Square of the % share (Pi²)	0.216	0.011	0.003	0.062	0.016
	Herfindhal index	0.308				
Large	Average production value	172800 (59.12)	16611 (5.68)	16065 (5.50)	51251 (17.54)	35550 (12.16)
	% share when total taken to be (Pi)	0.591	0.056	0.055	0.175	0.121
	Square of the % share (Pi²)	0.349	0.003	0.003	0.031	0.015
	Herfindhal index	0.401				
Average	Average production value	81300 (54.32)	10731 (7.17)	7749 (5.18)	29411 (19.65)	20475 (13.68)
	% share when total taken to be (Pi)	0.543	0.071	0.051	0.196	0.136
	Square of the % share (Pi²)	0.295	0.005	0.003	0.038	0.018
	Herfindhal index	0.359				

Figure in parenthesis shows percentage to total production values of all crops

The study on aggregate level of income (total production value) per farm, revealed that the average value of production from total crops on farmers field found to be Rs.149666, which varied with the size of holding and found in case of small farmers Rs.50044 followed by medium farmers Rs.106341 and large farmers Rs.292277 per farm respectively.

The relative production value (income) of crops indicated that the value of individual crop in the total crops grown by the sample farmers, in the kharif season found to variation and in case of soybean crop the average value was found to Rs.81300 with relative share of 0.543 of the sample respondents. The category wise distribution value of soybean crop was found to Rs.21300 with relative share of 0.425 in case of small farmers followed by Rs.49500 with relative share value of 0.465 in case of medium farmers and Rs.172800 with relative share value of soybean was 0.591 respectively.

In case of jowar-maize crops the average value was found to Rs.10731 with relative share of 0.071 of the sample respondents. The category wise distribution value of jowar-maize crop was found to Rs.4410 with relative share of 0.088 in case of small farmers followed by Rs.11172 with relative share value of 0.105 in case of medium farmers and Rs.16611 with relative share value of jowar-maize was 0.056 respectively.

In case of tur crop the average value was found to Rs.7749 with relative share of 0.051 of the sample respondents. The category wise distribution value of tur crop was found to Rs.1701 with relative share of 0.034 in case of small farmers followed by Rs.5670 with relative share value of 0.053 in case of medium farmers and Rs.16065 with relative share value of tur was 0.055 respectively.

Wheat and gram found to important economic crops in study area. Among the rabi crop in case of wheat crop the average value was found to Rs.29411 with relative share of 0.196 of the sample respondents. The category wise distribution value of wheat crop was found to Rs.10483 with relative share of 0.209 in case of small farmers followed by Rs.26499 with relative share value of 0.249 in case of medium farmers and Rs.51251 with relative share value of wheat was 0.175 respectively.

In case of gram crop the average value was found to Rs.20475 with relative share of 0.136 of the sample respondents. The category wise distribution value of gram crop was found to Rs.12150 with relative share of 0.242 in case of small farmers followed by Rs.13500 with relative share value of 0.127 in case of medium farmers and Rs.35550 with relative share value of gram was 0.121 respectively.

The overall average of all crops grown by sample farmers and there respective values receipts are the actual income or production value which was covered under study. On the basis of above on an average the Herfindhal index of total values was found to 0.359, which was close to the zero and very large gap from one which indicated enough crop diversification in the production of main crops in study area. The value of the Herfindahl index was estimated for small, medium and large farmers were found to 0.292, 0.308 and 0.401 respectively. The values of Herfindhal index shows that it was found to increase with the increase of size of holding. Hence, it can be say that there were direct relationships between size of holding and diversification index among the different category of the farms. The study indicated that the production values of crop diversification were found more on small farms as against larger size of groups.

4.3: Crops and allied activities of sample farms and farm diversification:-

Farm diversification on sample holdings was studied covering crops and other allied activities. The enterprise other than crops was found to livestock husbandry (milk cattle). No other enterprise was reported in the sample farms despite the integrated rural development programmed have been implemented in the district, as regards the farm diversification the main sources of farm income covering crops and allied activities of the sample farms is given below in the table 4.6.

Table 4.6: Crops and allied activities of the sample farms (Farm diversification). (annual income Rs./farm)

Size group	Particulars	Source of income		
		Crop production	Livestock (Milk Production)	Total
Small	Average production value	50044 (66.26)	25478 (33.74)	75522 (100.00)
	% share when total taken to be (Pi)	0.662	0.337	1
	Square of the % share (Pi²)	0.438	0.114	-
	Herfindhal index	0.552		
Medium	Average production value	106341 (64.36)	58874 (35.64)	165215 (100.00)

	% share when total taken to be (Pi)	0.643	0.356	1
	Square of the % share (Pi ²)	0.413	0.127	-
	Herfindhal index	0.540		
Large	Average production value	292277 (82.59)	61591 (17.41)	353868 (100.00)
	% share when total taken to be (Pi)	0.825	0.174	1
	Square of the % share (Pi ²)	0.681	0.030	-
	Herfindhal index	0.711		
Average	Average production value	149666 (75.47)	48647 (25.53)	198313 (100.00)
	% share when total taken to be (Pi)	0.754	0.255	1
	Square of the % share (Pi ²)	0.569	0.065	-
	Herfindhal index	0.634		

Figure in parenthesis shows percentage to total production values of all crops and livestock

The values from total crops production and livestock production taken together which found to on an average Rs.198313 among this the values of crop production found to on an average Rs.149666 per farm with the share of 0.754 followed by livestock production found to on an average Rs.48647 with the share of 0.255 respectively. The average values of Herfindhal index on sample farm, from crop production and livestock taken together found to 0.634.

The study shows positive correlation between crops and livestock production income with farm diversification (technological adoption index). The study has further concluded that the technological change contributed not only to family labour employment but also to the additional employment of agricultural labourers. Farm diversification is utterly poor since only crops and livestock (milk cattle) are the enterprises popular among the cultivators. Farm diversification based on agricultural products needs to be encouraged to enhance income from broad based income sources. Poultry keeping, sericulture and farm forestry should be encouraged in the district besides processing of agricultural produce at the farm level may be on cooperative basis.

The category wise Herfindhal index was calculated in respect of values of crop production and livestock production taken together. It is clear from the table that the value of Herfindhal index of sample farms in case of small category found to 0.552, medium was found 0.540 and large was 0.711 respectively. The data of these values clearly indicated that there is only half way between perfect diversification and complete specialization. The overall Herfindhal index of sample farms has also a value of 0.634,

which shows more than half way between perfect diversification and complete specialization. The only source of farm income other than crop enterprise was the production and sale of milk. The farm diversification is thus confined to crops and livestock and requires initiation of other allied activities to broaden the source of farm income and provide new opportunities of gainful employment.

The simplest activities, which need to be undertaken on farm were those connected with processing of agricultural produce and keeping of birds for eggs and broilers on the basis of the results discussed earlier. The study on changes in the income level per farm shows that the total farm income increases with size of holding and number of milch animal. This overall increase in farm income has uplifted the living standards of the local people. The gain of technology adoption in terms of income and employment of labour should be developed on farm.

4.4: Constraints related to farm diversification of sample farmers.

The constraints confronted by the sample farmers of farm diversification were recorded as per the incidence of their severity commonly faced by all the respondents. The observed constraints are presented in table 4.7.

Table 4.7: Constraints related to farm diversification of sample farmers.

S.No.	Particular	Small N=40	Medium N=35	Large N=25	Total N=100	Rank
1.	Lack of infrastructure	25	28	19	72	VI th
2.	Lack of capital	38	34	23	95	I st
3.	Lack of farm resources	38	32	20	90	II nd
4.	Lack of risk taking ability	35	27	18	80	III rd
5.	Climatic factors	30	22	13	65	IX th
6.	Socio-economic factors	32	25	14	71	VII th
7.	Financial factors	37	26	17	80	III rd
8.	Lack of technical Knowledge	36	23	14	73	V th
9.	Ignorance	35	21	19	75	IV th
10.	Traditional believe	34	20	16	70	VIII th

The constraint confronted by sample farmers was listed as per the rank of severity in respect of farm diversification. Study revealed that, lack of capital was major constraints came into the way of diversification as faced by on an average 95 per cent of respondents which depicted the rank Ist. Lack of farm resources in farm was another next important constraint experienced by nearly 90 per cent of respondents with rank of severity IInd. Lack of risk taking ability was a constraint on IIIrd rank reported by 80 per cent of farmers as well as same rank was expressed by farmers was financial factors. The IVth most important factor was ignorance confronted by 75 per cent. It may be concluded that all these factors are some what related with resource endowments, wealth capacity and ability of farmers which shows there is need to encourage the farmers with economic development from their own farm. For this purpose the required amount should be finance by the financing agencies.

The constraints as lack of technological knowledge expressed by 73 per cent of farmers showed rank Vth. It indicated that adoption of new agricultural technology has lagged for behind due to proper guidance and knows how, while the agricultural productivity could be increased in the area through the higher adoption of improved technology.

Lack of infrastructure was the constraint felt by the farmers in some extent and it was the same for irrespective of the size of holdings i.e. 72 per cent with rank VIth followed by socio-economic factors confronted by 71 per cent with rank VIIth, traditional believe confronted by 70 per cent with rank VIIIth and climatic factors confronted by 65 per cent farmers with rank IXth respectively.

On the basis of above constraints following suggestions also confronted by sample farmers:

1. The technological development involves a fair balance between welfare and productive services. This feature departs a great deal from the present methods of cultivation and allocation of resources on redrawn priorities with crop and farm diversification. Hence, farmers should given priority to use their resources on the basis of economic viability with proper management of their farm.

2. Social services in respect of agricultural development such as education, training and other extensive activities have a strong case both on economic and welfare grounds. But if they do not lead to productive efficiency then they are sterile and consume an over increasing recurrent allocation causing depletion of resource for productive purposes. Hence, even in the sphere of education and extension works emphasis needs to be laid on enhancing productive capacity with crop and farm diversification.
3. The present study revealed that there were relative significant differences between technology and farm diversification. Hence, it is suggested the policy planer of agricultural development should be implemented the plans to cover larger proportion of farms under improved technology by providing the necessary facilities like proper and timely finance, yield attributing inputs and proper guidance to the farmers with due attention to the small and medium size farms. This will also help in covering small uneconomic holdings into the profitable ones and thus, a considerable number of small and medium farmers will be benefited with large farmers respectively.
4. The extension worker and agencies engaged in extension activities must be strengthened for advocating adoption of crop production with livestock and other allied activities on their farms. They should be exhibited the impact of crop and livestock production with improved technology on farmers field. This process will be helpful in solving food scarcity and unemployment problems in the area.
5. Adaptive research must be conducted in the areas to find out the area specific problems regarding use in various levels of yield attributing inputs and their relative profitability. So that the crop and farm diversification may be encourage on the basis of most beneficial enterprises. Economic study to be conducted to suggests optimal cropping pattern and practices including crop, livestock and other allied activities in the specific area.

CHAPTER V

DISCUSSION

This chapter deals with the discussion of results in light of the objectives of the study, reviewed literature and theoretical concepts already available and established in the literature.

Present study was undertaken with the main objective of analyzing crop and farm diversification of sample farmers at Sehore district. The present study propose to understand the patterns, processes and factor that facilitated the process of agricultural development and crop and farm diversification follow from the States experience, so that the strategy of agricultural diversification and development could be replicated and expended to other areas both within and out side of the state.

It is well known fact that Madhya Pradesh, like other States, in the country is predominantly an agricultural State. The State has witnessed considerable growth under the impact of new farm technology and innovations result the change in cropping pattern, agricultural practices and other farm income with respect to lower status towards higher one. It is also known that a conjugal response of so many factor associations, changes in land utilization pattern is a global phenomena and subjective change in technology, degree of market perfection and economic status of the producers and consumers. All these pattern of the region do change with the pace of time.

It is true that green revolution have not been able to solve the much debated problem of seasonal income and employment on the farms. The problem can perhaps to be best solved by keeping a few milch animals on the farm. This would also help; step up farm income from the limited area.

Indian agriculture is the diversified farming system in which crop production and animal husbandry dovetailed for efficient and economic utilization of land, labour and capital. "Seventy per cent of the population of India is directly or indirectly associated with agriculture and animal husbandry". Cattle are the main source of age-old system of cultivation practices in India. In modernizing process an agricultural sector of our economy, development of dairying and live-stock has been given considerable

importance as a complimentary, supplementary and separate instruments for social and economic change.

The change in agriculture cropping pattern, crop diversification and farm diversification is an important decision of farmers which are taken on the basis of so many factors which also influence by the efficiency, experience and knowledge of farmers. It can be say that the important decisions of the farms with reference to input use, cropping pattern and other farm managerial decisions are generally taken by the farmer, therefore, it is pertinent to have on idea regarding the age and education level of the sample farmers. The size of land holding, their utilization in respect of crop production and other allied activities are directly related with socio economic condition of farmers. Hence, the information about these resources availability and their allocation in different enterprises is paramount important.

The study reveals that the total respondents in the study area were 100; out of this 33 belong to young age group followed by 45 farmers belong to middle age group and 22 farmers belong to old age group respectively. This figure did not showed any specific trend between age group and size of holding.

The literacy position shows that among the over all sample farmers, the illiterate respondents found to 37 per cent or 37 farmers. Among the literate respondents the maximum 26 found to up to primary education followed by middle school 16 respondents and 21 respondents got H.S.S.C and higher education respectively.

Land is probably the most important measure in classifying the farms, because it is a primary and fixed input constituting the major portion of the fixed cost. It is also relatives free from the substantial annual fluctuations. The land use pattern for different size group of holding revealed that the average sizes of holding representing that the small size of holding was 1.36 hectare followed by medium size of land holding 3.26 hectare and large size of land holding 8.92 hectare respectively.

The cropping pattern of sample farmer's holding indicated the crops and cropping sequences grown in the study area. The cropping pattern refers to the allocation of land among different crops in a year. The economy of farm is fully depends upon crops and crops sequence are grown in a particular land and in a year. The study showed that kharif crops found to dominate over rabi crops. The overall study on cropping pattern on

sample holding revealed that soybean and jowar-maize were the important kharif crops. Tur was sown as a sole crop in rainfed area. In irrigated condition wheat was the major rabi crop. While in rainfed area or semi irrigated condition, the sample farmers grown gram. This was the common cropping pattern adopted in study area. The soybean and wheat cropping sequence was dominant on sample holdings due to facility of irrigation and other agro-climatic advantages. On the other hand jowar-maize in kharif season and rainfed gram was the common cropping pattern. The study reveals that on an average farm, the area under these four crops was found to maximum. This shows that the profitability of soybean followed by wheat directly affect the whole farm income during the year.

Many studies refers, crop and farm diversification as a change in the parameter of a production function resulting directly from the use of new knowledge. In nut shell, the above statement refers “diversification implies, changing the input mixed in such a way as to increase output per unit of resources with the impact of maximum farm profit and welfare”. The studies also focused that there are number of indirect effect of diversification in agriculture which have potential for a more favorable outcome. The increased income of landowners may provide the basis of demand for goods and services which require additional production and labour in their production. Consequently, the benefits of growth are distributed to lower income people, increasing the demand and price incentives requisite to continued growth in agricultural production.

The profit from agricultural production is not only the effect of area under enterprise and to increase productivity but it also the result of remunerative price of produce which are the main ingredient of income. As per the cropping pattern of sample farmers holding, the production's values of main crops were studied to find out the crop diversification as per the response of production values.

The study reveals that the maximum values among the total crop production of a farm come on an average 54.32 per cent from soybean. The other important kharif crops of the area were jowar-maize and tur. These crops having position of second and third place in total production values in kharif crops with the average production values of 7.17 per cent and 5.18 per cent to total crop production values per farm respectively.

Among the rabi crops, wheat was the main crop on all size of sample holding followed by gram. Wheat crop was given on an average of 19.65 per cent values of the total crop production. Gram was found to be the second important rabi crop which was given on an average 13.68 per cent values of total crop production values per farm.

Diversification is interpreted differently by different scholars, it means shifting from subsistent farming to commercial farming to some extent, it implies shifting from low value food/non food crops to high value food/ non food crops and switching over from local to high yielding varieties with the integration of animal husbandry, fisheries, horticulture etc. The economists and researchers have advocated evolving of an integrated system approach to the problem of rural diversification for a rapid balanced and equalitarian growth of rural economy. Diversification of rural economy is considered essential for finding solution to the problem of rural unemployment, poverty and hunger. Diversification of agriculture is adopted as a strategy to minimize risk to cover crop failure where the immediate goal is not to make profit but to stabilize income for survival. Diversification is an age-old practice of risk minimization and attainment of stable income from the farm. Farm diversification includes diversification of crops and farm based enterprises to broaden the income base of the farmers resulting in the increased level of employment, production and income.

The overall average of all crops grown by sample farmers, the Herfindhal index was found to 0.242, which was close to the zero and indicated enough crop diversification. The value of the Herfindahl's index was estimated for small, medium and large farmers were found to 0.200, 0.207 and 0.267 respectively. The values of Herfindhal index shows that it was found to increase with the increase of size of holding. Hence, it can be say that there were direct relationships between size of holding and diversification index among the different category of the farms. The study indicated that crop diversification was found more on small farms as against larger size of groups.

The irrigation facility that is crucial for agriculture production and productivity was found to very nominal in study area. The available irrigated area encouraged the farmers towards intensive use of their land on commercial agriculture. This result indicated that the lower average sizes of land holding was motivated to farmers for adoption of new farming technology which in turn resulted enough crop diversification in

the study area.

The study of relative share of productions value of crop among total production value of total crops of sample farmers are paramount important to know crop diversification inconsequent effect of production values of crops. The overall average of all crops grown by sample farmers and there respective values receipts are the actual income or production value which was covered under study. On the basis of above on an average the Herfindhal index of total values was found to 0.359, which was close to the zero and very large gap from one which indicated enough crop diversification in the production of main crops in study area. The value of the Herfindahl index was estimated for small, medium and large farmers were found to 0.292, 0.308 and 0.401 respectively. The values of Herfindhal index shows that it was found to increase with the increase of size of holding. Hence, it can be say that there were direct relationships between size of holding and diversification index among the different category of the farms. The study indicated that the production values of crop diversification were found more on small farms as against larger size of groups.

Dairying being a self income enterprise is an important alternative to diversify the arable farming for getting more, stable and continuous farm income and higher employment opportunities on smaller farms. However, an omnipresent problem facing the farmer these days lies in the decision making about the profitable levels of diversification of crop farming with dairying so as to maximize his farm profits by increasing the productivity of milch animals and crops per unit of land and time within the framework scarce resources. Farm diversification on sample holdings was studied covering crops and other allied activities. The enterprise other than crops was found to livestock husbandry (milk cattle). No other enterprise was reported in the sample farms despite the integrated rural development programmed have been implemented in the district, as regards the farm diversification the main sources of farm income covering crops and allied activities of the sample farms. The category wise Herfindhal index was calculated in respect of values of crop production and livestock production taken together. It is clear from the table that the value of Herfindhal index of sample farms in case of small category found to 0.552 followed by medium and large were 0.540 and 0.711 respectively. The data of these values clearly indicated that there is only half way

between perfect diversification and complete specialization. The overall Herfindhal index of sample farms has also a value of 0.634, which shows more than half way between perfect diversification and complete specialization. The only source of farm income other than crop enterprise was the production and sale of milk. The farm diversification is thus confined to crops and livestock and requires initiation of other allied activities to broaden the source of farm income and provide new opportunities of gainful employment.

CHEPTER VI

SUMMARY, CONCLUSION AND SUGGESTION

Summary:

Experiences gained in developing states of India suggest that diversification of agriculture towards high value commodities and creation of non-farm employment opportunities have helped farmers to augment their incomes and bail them out of the vicious circle of poverty. The emerging opportunity in the changing economic environment needs to be diversified agriculture in specific region. The factors of diversification as concerned as with rising per capita income, changing food consumption patterns, growing urbanization and globalization are pushing up demand for high value commodities in both domestic and international markets.

Diversification of rural economy is considered essential for finding solution to the problem of rural unemployment, poverty and hunger. Diversification of agriculture is adopted as a strategy to minimize risk to cover crop failure where the immediate goal is not to make profit but to stabilize income for survival. The study on "Diversification of agriculture in Sehore district of Madhya Pradesh" was specially undertaken because now a day farmers are shifting their area to commercial crops with using of modern technology.

Keeping in view, the present study was under taken to probe into the various aspects of the diversification of agriculture in a period of time. The specific objectives of the study were as follows:

1. To assess the crop diversification on the sample farms.
2. To assess the farm diversification on the sample farms.
3. To suggest increase the farmers income through diversification of agriculture in study area.

In the present study three stage sampling technique was used for drawing the sample. At the first stage, Sehore Block in Sehore district was selected purposively for the study. At the second stage, five villages was selected randomly. For the selection of respondents at the third stage of sampling, a list of cultivators for each village was prepared and arranged in ascending order according to the size of their land holding and further grouped into small (up to 2 hectare.), medium (2.1 to 4 hectare.) and large

(above 4 hectare.) categories. Amongst these groups 100 farmers were selected in proportion to their number.

Both primary and secondary data was used to fulfill the objective of study. The primary data was collected by survey method through a well-designed pre-tested schedule by personally interviewing of sampled respondent. The secondary data was recorded from the Department of Agriculture and other authorized sources. The study was conducted for the agricultural years 2009-10.

The data was analyzed using appropriate tools like tabular analysis, using average and percentage of sample households. The extent of diversification on crop was studied using Herfindhal indices.

Herfindhal index (H):

$$H = \sum_{i=1}^N p_i^2$$
$$P_i = \frac{A_i}{N}$$
$$\sum A_i = 1$$

Where,

H= Herfindhal index and is defined as sum of square of all "N" proportions.

P_i = Proportion of the Ith crop acreage and

A_i = Area under Ith crop

N = Total number of crop

I = 1,2,3,4,.....N

Conclusions: -

Following conclusion was drawn from the analysis of collected data under study, as follows: -

- on an average size of holding for all farmers it was found to 4.51 hectare per farm. Out of them the net cultivated area as percentage of size of holding found to 97.12 per cent. The irrigated area as percentage of size holdings found to 33.48 per cent. It shows that there is very small land found to irrigate in study area.
- The overall data on cropping pattern on sample holding revealed that soybean and jowar-maize were the important kharif crops. Tur was sown as a sole crop in rainfed area. In irrigated condition wheat was the major rabi crop. While in rainfed area or semi irrigated condition, the sample farmers grown gram. This was the common cropping pattern adopted in study area.
- The soybean and wheat cropping sequence was dominant on sample holdings due to facility of irrigation and other agro-climatic advantages. On the other hand jowar-maize in kharif season and rainfed gram was the common cropping pattern. The study reveals that on an average farm, the area under these four crops was found to maximum. This shows that the profitability of soybean followed by wheat directly affect the whole farm income during the year.
- The study reveals that the maximum values among the total crop production of a farm come on an average 54.32 per cent from soybean. The other important kharif crops of the area were jowar-maize and tur. These crops having position of second and third place in total production values in kharif crops with the average production values of 7.17 per cent and 5.18 per cent to total crop production values per farm respectively.
- Among the rabi crops, wheat was the main crop on all size of sample holding followed by gram. Wheat crop was given on an average of 19.65 per cent values of the total crop production. Gram was found to the second important rabi crops which given on an average 13.68 per cent values of total crop production values per farm.
- The overall average of all crops grown by sample farmers, the Herfindhal index was found to 0.242, which was close to the zero and indicated enough crop

diversification. The value of the Herfindhal index was estimated for small, medium and large farmers were found to 0.200, 0.207 and 0.267 respectively. The values of Herfindhal index shows that it was found to increase with the increase of size of holding. Hence, it can be say that there were direct relationships between size of holding and diversification index among the different category of the farms. The study indicated that crop diversification was found more on small farms as against larger size of groups.

- The overall average of all crops grown by sample farmers and there respective values receipts are the actual income or production value which was covered under study. On the basis of above on an average the Herfindhal index of total values was found to 0.359, which was close to the zero and very large gap from one which indicated enough crop diversification in the production of main crops in study area. The value of the Herfindhal index was estimated for small, medium and large farmers were found to 0.292, 0.308 and 0.401 respectively. The values of Herfindhal index shows that it was found to increase with the increase of size of holding. Hence, it can be say that there were direct relationships between size of holding and diversification index among the different category of the farms. The study indicated that the production values of crop diversification were found more on small farms as against larger size of groups.
- The category wise Herfindhal index was calculated in respect of values of crop production and livestock production taken together. It is clear from the table that the value of Herfindhal index of sample farms in case of small category found to 0.552 followed by medium and large were 0.540 and 0.711 respectively. The data of these values clearly indicated that there is only half way between perfect diversification and complete specialization. The overall Herfindhal index of sample farms has also a value of 0.634, which shows more than half way between perfect diversification and complete specialization. The only source of farm income other than crop enterprise was the production and sale of milk. The farm diversification is thus confined to crops and livestock and requires initiation of other allied activities to broaden the source of farm income and provide new opportunities of gainful employment.

Suggestion for farm diversification:

On the basis of result of the study, the following suggestions may be made.

1. The farmers should use the available resources in efficient and effective manner to get the maximum profit from per unit of resources.
2. The yield per hectare can be increased by adopting farming operations and yield attributing inputs at the proper time and proper utilization of the resources in the farmer's field.
3. Lack of capital and non-availability of credit can be solved by providing loans to farmer's through government societies or regional rural banks in order to maximize their production of crop in livestock by using loan in appropriate manner for cultivation of crop.
4. To develop infrastructure of the region, proper planning and execution should be done in accordance to local need specific.
5. The extension media should be geared up to motivate the farmer's regarding the crop production and allied activities i.e. dairy, sericulture and fishery culture which are the social and economic welfare of the society.
6. Farmer's should be awake to the effect of diversification in monetary term and employment opportunities to counter the risk in agricultural business.
7. High remunerative crops to increase the income and standard of living of the people should replace with less remunerative crops.
8. To exploit the available water and natural resources diversification is prime need of the region hence, crop and farm diversification should be done as per the area specific availability of resources.
9. The agriculture should be taken as business and the socio-economic barrier should be avoided.
10. This is a need of the days to establish agricultural based industries processing units with marketing facilities for the over all development of the rural economy.
11. Farmer's of the area should be educated with proper crop production and livestock management technologies to minimize the yield gap of these enterprises as showed a higher difference between actual yield and potential yield in the area.

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APPENDIX – I

Topic :- “Diversification of agriculture in Sehore district of Madhya Pradesh.”

Advisor: Dr. P.S.Raghuwanshi

Investigator: Santosh Meena

DEPARTMENT OF AGRICULTURAL ECONOMICS AND FARM MANAGEMENT

R.A.K COLLEGE OF AGRICULTURE, SEHORE (M.P)

सामान्य जानकारी

- 1) कृषक का नाम श्री
- 2) पिता/पति का नाम श्री
- 3) जाति(सामान्य / पिछड़ा वर्ग / अ. जाति / अ. जनजाति)
- 4) पता ग्राम तहसील
जिला प्रदेश.....
- 5) व्यवसाय 1) प्राथमिक 2) द्वितीयक
- 6) सामाजिक एवं आर्थिक स्थिति (पारिवारिक जानकारी)

क्रमांक	सदस्य का नाम	उम्र	लिंग	शिक्षा	मुखिया से संबंध	व्यवसाय
1						
2						
3						
4						
5						
6						
7						

7) जोत का विवरण

- (i) स्वयं की भूमि हेक्टर
(ii) कुल राजस्व की राशि रु
(iii) किराये पर ली गई भूमि हेक्टर
(iv) कुल किराये की राशि रु
(v) किराये पर दी गई भूमि हेक्टर
(vi) प्राप्त रु
(vii) कुल जोत का क्षेत्रफल हेक्टर

8) आप कितने समय से कृषि कर रहे हैं वर्ष

9) व्यवसाय एवं आय सम्बंधित विवरण

क्रमांक	व्यवसाय	मुख्य	सहायक
1	कृषि		
2	पशु पालन		
3	नौकरी		
4	मजदूरी		
5	व्यापार		
6	अन्य		

कुल वार्षिक आय रु.

10) भूमि उपयोग विवरण :

क्रमांक	विवरण	क्षेत्रफल (हेक्टर)
(i)	शुद्ध बोया गया क्षेत्र	
(ii)	स्थाई पड़त भूमि	
(iii)	चालू पड़त भूमि	
(v)	रवी पड़त भूमि	
(c)	खरीफ पड़त भूमि	

(iv)	कृषि उत्पादन योग्य बेकार पड़ी भूमि	
(vii)	कृषि अयोग्य भूमि सड़क मार्ग	

11) सिंचाई के साधनों का विवरण :

क्रमांक	स्रोत	सिंचित क्षेत्रफल (हेक्टर)
(i)	कुओं द्वारा	
(ii)	नलकूप द्वारा	
(iii)	तालाब द्वारा	
(iv)	नहर द्वारा	
(v)	नदी नालो द्वारा	
(vi)	अन्य	

12) प्रक्षेत्र सम्पत्ति विवरण :

क्रमांक	विवरण	क्षेत्र/संख्या	वर्तमान कीमत	अनुमानित वार्षिक किराया	उपयोग के वर्ष
(i)	भूमि				
(ii)	भवन				
(अ)	कच्चा				
(ब)	पक्का				
(स)	अर्द्ध पक्का				
(iii)	सिंचाई यंत्र				
(अ)	कुआं				
(ब)	नलकूप				
(स)	विद्युप पम्प				
(द)	डीजल पम्प				
(इ)	जनरेटर				
(फ)	स्प्रिंकलर				
(य)	अन्य				
(iv)	उपकरण/यंत्र				
(अ)	मुख्य उपकरण				
(1)	हारवेस्टर				
(2)	ट्रेक्टर				
(3)	रीपर				
(4)	थ्रेसर				
(5)	सीडड्रिल				
(6)	चैफकटर				
(7)	कल्टीवेटर				
(8)	हैरों				
(9)	ट्राली				
(10)	बैलगाड़ी				
(ब)	लघु उपकरण				
(1)	देषी हल				
(2)	दुफन				
(3)	तिफन				
(4)	बखर				
(5)	पाटा				

(6)	डोरा				
(7)	बैल चलित शीङ्गल				

13) फसल पद्धति :

क्रमांक	मौसम / फसल	किस्म	क्षेत्रफल (हेक्टर)		
			सिंचित	असिंचित	अर्द्धसिंचित
(i)	खरीफ				
(अ)	३३३३३				
(ब)	३३३३३				
(स)	३३३३३				
(द)	३३३३३				
(ii)	रबी				
(अ)	३३३३३				
(ब)	३३३३३				
(स)	३३३३३				
(द)	३३३३३				

14) वर्ष 2008-09 से 2010-11 तक की फसलों का उत्पादन क्विंटल एवं कीमत रुपयों में (2008-09)

क्रमांक	फसल	क्षेत्रफल	उत्पादन (क्विं में)	उत्पादकता	कीमत
	<u>खरीफ</u>				
1					
2					
3					
4					

<u>रबी</u>					
1					
2					
3					
4					

(2009—10)

क्रमांक	फसल	क्षेत्रफल	उत्पादन (क्विं में)	उत्पादकता	कीमत
<u>खरीफ</u>					
1					
2					
3					
4					
<u>रबी</u>					
1					
2					
3					
4					

(2010—11)

क्रमांक	फसल	क्षेत्रफल	उत्पादन (क्विं में)	उत्पादकता	कीमत
<u>खरीफ</u>					
1					
2					
3					

4					
<u>रबी</u>					
1					
2					
3					
4					

15) पशु पालन का आय व्यय:

i) लागत का विवरण:

1) आहार पर लागत:

क्रमांक	विवरण	मात्रा	कीमत (रुपया)
1	सूखा चारा		
2	हरा चारा		
3	पौष्टिक आहार		
4	चराने पर लागत		
5.	अन्य लागत		

2) श्रम एवं अन्य लागत

क्रमांक	विवरण	मानव श्रम (दिन)	रुपया
1.	आहार व्यवस्था		
2.	रहने की व्यवस्था		
3.	अन्य कार्य		
4.	अन्य लागत	----	

ii) आय

क्र.	आय का विवरण	मात्रा	रुपया
1.	दूध उत्पादन		
2.	गोबर (खाद)		

3.	अन्य		
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16) कृषि व्यवसाय से आय-व्यय व्यय सम्बंधित विवरण

क्रमांक	व्यवसाय	आय	व्यय
1.	फसल उत्पादन		
2.	पशु पालन		
3.	बकरी पालन		
4.	मुर्गी पालन		
5.	अन्य		

VITA

Santosh Meena, the author of thesis was born on 09th June 1983 in Dewas district of Madhya Pradesh. He completed his primary education at Govt.School at Amla district Dewas. He passed his High School and Higher Secondary Certificate Examination of Madhya Pradesh Board Bhopal from The: Khategoan District Dewas (M.P.).

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*The author continued his Post Graduation from R.A.K. College of Agriculture, Sehore (M.P.), to specialize in “**Department of Agricultural Economics And Farm Management**” and partial fulfillment of the requirements for the award of the same, he allotted with interesting problem as “**Diversification of agriculture in Sehore district of Madhya Pradesh**” for thesis work which has been duly completed by his and presented in this thesis.*

His achievement in the sports is praiseworthy. He actively participated in all the cultural activities of the college. Now, he is going to complete his master’s degree programme by submission of this thesis.