A study on crop diversification toward cash crop and its impact on socio-economic status of the farmers in Indore district of M.P.

In the present study, three stage stratified random sampling technique were used for drawing the sample. At first stage, Mhow block was selected purposively. At the second stage, five villages were selected randomly within the block. For the selection of respondents at the third stage of sampling, a list of cultivators of each villages were prepared in ascending order according to the size of their land holding and grouped into small (up to 2.0 ha), medium (2.01 to 4.0 ha) and large (4.01 and above) categories.

SANTOSH PATIDAR*, DR. S.K. JAIN**, DR. A.M. RAJPUT*** & SHRI CHAND JAT****

Introduction :

Diversification, can be interpreted as, diverting a sizeable acreage from the the existing cropping system to some other alternate crops / cropping systems / farm enterprises, while maintaining a general equlibrium of meeting the four F's needs *viz.* Food, Fodder, Fiber and Fuel, while simulaneously taking care of basic soil health and productivity of agro ecosystem of the area at large.

Thus , it is a strategy of shifting from less profitable to more profitable crops, changing of varieties and cropping system, protecting the enviroment and making conditions favorable for combining different enterprises. It is an imporant tool for accleration of agricultural growth in the country by promoting food and nutritional security, income growth, poverty alleviation, employment generation, judicious use of natural resources, sustainable agricultural development and environmental and ecological improvement.

The present studies were taken up to assess the extent of crop diversification at the block level and farm level with the following objectives:

Objectives :

(1) To study the cropping pattern of the study area.

(2) To study the area diversified to cash crops.

(3) To study the change in socio economic status of the selected farmers.

(4) To identify the problems and prospects of crop diversification.

The studies were conducted in the Mhow block of Indore district of Madhya Pradesh because in general the sizes of land holding of farmers are good. The area is also known for the production of cash crops viz. potato, garlic and onion. Previously most of farmers were growing food grain crops with traditional farming system. But now days they are shifting their area to cash crops with using of modern technology.

Methodology :

In the present study, three stage stratified random sampling technique were used for drawing the sample. At first stage, Mhow block was selected purposively. At the second stage, five villages were selected randomly within the block. For the selection of respondents at the third stage of sampling, a list of cultivators of each villages were prepared in ascending order according to the size of their land holding and grouped into small (up to 2.0 ha), medium (2.01 to 4.0 ha) and large (4.01 and above) categories.

The primary data were collected by survey method through a well designed pre-tested schedule by personally interviewing of cultivators, for the agricultural year 2005-2006 and secondary data were recorded from the Department of Agriculture and other authorized sources.

The data were analyzed using appropriate tools like tabular analysis; using average and percentage were employed to present socio-economic features of sample households. The temporal changes in the process of crop diversification is studied in three ways. First, by computing the changing share of area under food grains and vegetable crops. Second, by constructing the Herfindhal index and finally an index was constructed to measure the changes in the area allocated to different crops between two time period.

*Student M.Sc. (Ag.), Deptt. of Agril. Econ. and Farm Management, Indore (Madhya Pradesh)
**Associate Proffesor, Deptt. of Agril. Econ. and Farm Management, Indore (Madhya Pradesh)
***Professor and Head of the Section, Deptt. of Agril. Econ. and Farm Management, Indore (Madhya Pradesh)
****Senior Research Fellow, Deptt. of Agril. Econ. and Farm Management, Indore (Madhya Pradesh)

that this telecommunications company does not currently have access to. With this model in hand new customers can be selectively targeted.

Test marketing is an excellent source of data for this kind of modeling. Mining the results of a test market representing a broad but relatively small sample of prospects can provide a foundation for identifying good prospects in the overall market. Following Table shows another common scenario for/building models: predict what is going to happen in the future.

Table - Data Mining for Predictions

Type of Information	Yesterday	Today	Tomorrow
Static information and current plans (e.g. demographic data, marketing plans)	Known	Known	Known
Dynamic information (e.g. customer transactions)	Known	Known	Target

If someone told you that he had a model that could predict customer usage how would you know if he really had a good model? The first thing you might try would be to ask him to apply his model to your customer base - where you already knew the answer. With data mining, the best way to accomplish this is by setting aside some of your data in a vault to isolate it from the mining process. Once the mining; is complete, the results can be tested against the data held in the vault to confirm the model's validity. If the model works, its observations should hold for the vaulted data.

Integrated Business Functions with Data Mining :

To best apply these advanced techniques, they must be fully integrated with a data warehouse as well as flexible interactive business analysis tools. Many data mining tools currently operate outside of the warehouse, requiring extra steps for extracting, importing, and analyzing the data. Furthermore, when new insights require operational implementation, integration with the warehouse simplifies the application of results from data mining. The resulting analytic data warehouse can be applied to improve business processes throughout the organization, in areas such as promotional campaign management, fraud detection, new product rollout, and so on.

The ideal starting point is a data warehouse containing a combination of internal data tracking all customer contact coupled with external market data about competitor activity. Background information on potential customers also provides an excellent basis for prospecting. This warehouse can be implemented in a variety of relational database systems: Sybase, Oracle, and so on, and should be optimized for flexible and fast data access.

A wide range of companies have deployed successful applications of data mining. While early adopters of this technology have tended to be in information-intensive industries such as financial services and direct mail marketing, the technology is applicable to any company looking to leverage a large data warehouse to better manage their customer relationships. Two critical factors for success with data mining are: a large, well-integrated data warehouse and a well-defined understanding of the business process within which data mining is to be applied (such as customer prospecting, retention, campaign management, and so on)

A large consumer package goods company can apply data mining to improve its sales process to retailers. Data from consumer panels, shipments, and competitor activity can be applied to understand the reasons for brand and store switching. Through this analysis, the manufacturer can select promotional strategies that best reach their target customer segments.

In Marketing it helps to collect historical Data from all types of customers.

Easy way to gather statistical analysis using Data Warehouse.

These Application leverage the knowledge about customers implicit in a data warehouse to reduce costs and imprpve the value of customer relationships. These organizations can now focus their efforts on the rjiost important (profitable) customers and prospects, and design targeted marketing strategies to best reach them.

Relaxation of Complexity through Data Mining :

Data Mining is the process of semi automatically analyzing large Databases to find useful patterns . Data mining deals with Knowledge recovery in Databases .Some type of knowledge discovered from a database can be represented by a set of rules. The dependency of Data mining is on Confidence and support **Support** - Is a measure of what fraction of the population satisfies both the antecedent and consequent of the rule

Confidence :

I a measure of how often the consequent is true when the antecedent is true.

PRODUCT1	PRODUCT2	CONFIDENCE
Milk	Bread	80%
Milk	Any other ...	0.001%
Notebook	Pen or Pencil	More than 80 %

The analysis can be tested for summarized data by creating rules . And the method generate fast results form big repositories.

Conclusion : Choosing the right data mining products means finding a tool with good basic capabilities, an interface that/natches the skill level of the people who'll be using it, and features relevant to your specific business problems. Customers gets confident information that he wants . Results which are processed by Data mining tools are depends upon expertise data therefore risk factor to complete any work through this method is very less.

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Result and Discussion :

The present study was conducted with 100 sampled farmers. It is generally hypothesized that the holding size has a great bearing on the level of education.

Table 1: Land utilization pattern of sample farmers
(राin ₹.)

S. N	Particulars	Small	Medium	Large	Average holdings
1.	Size of holding Land	1.030 (100)	2.85 (100)	6.77(100)	3.641(100)
2.	Permanent fallow land	0.062 (4.70)	0.142 (4.98)	1.100(16.25)	0.43 (11.8)
3.	Gross cropped area	2.032	5.398	11.66	6.357
4.	Net cultivated area *	1.241(95.30)	2.708 (95.02)	5.67 (83.75)	3.206 (88.2)
5.	Net irrigated area **	1.064(85.73)	2.139 (78.98)	4.84 (85.36)	2.681(83.62)
6.	Un irrigated area **	0.177(14.26)	0.569 (21.01)	0.83 (16.63)	0.525 (16.37)
7.	Current fallow	0.002	0.004	0.002	0.002
	Kharif	0.008	0.008	0.007	0.007
	Rabi				
	Total fallow	0.010	0.012	0.009	0.009

Note :

* Figures in parenthesis are the percentages of the size of holding.

** Figures in parenthesis are the percentages of the net cultivated area.

As observed from the study (Table 1) that the size of holding representing small (up to 2 ha.), medium (2.1 to 4 ha) and large size group (above 4 ha.) are 1.30, 2.85 and 6.77 ha respectively. On an average size of holding for all farmers it was 3.64 ha. The permanent fallow land, as a percentage of size of holding was 4.70%, 4.98% and 16.25% for small, medium and large size groups respectively. Net cultivated area as percentage of size: of holding ranged between 95.30 to 83.75 %, from small to large size group of holding. The irrigated area as percentage of size holdings ranged between 85.73 to 85.36 % concerned to small and large sizes of holding. The unirrigated area as a percentage of size of holding was 14.26%, 21.01 % and 16.63% in small, medium and large size group respectively.

Table 2: Area diversified to cash crop :
(Area in ha.)

S. No.	Crops	1999-2000	2005-2006
A.	**Kharif**		
1.	Soybean	26176 (71.11)	35281 (89.90)
2.	Jowar	2486 (06.75)	173 (00.44)
3.	Maize	2688 (07.30)	920 (02.34)
4.	Others	5461 (14.84)	2872 (07.31)
	Total	36811 (100)	39246 (100)
B.	**Rabi**		
1.	Wheat	10255 (36.21)	7408 (30.54)
2.	Gram	7276 (25.69)	5670 (23.38)
3.	Potato	5520 (19.49)	9680 (39.91)
4.	Others	5271 (18.61)	1497 (06.17)
	Total	28322 (100)	24255 (100)

Source : *Department of agriculture (Mhow).*

The soybean and wheat cropping sequence was dominant on sample holdings due to facility of irrigation and other agro-climatic advantages. This shows that the profitability of soybean directly affect the whole farm income during the year

Area diversified to cash crop in percentage
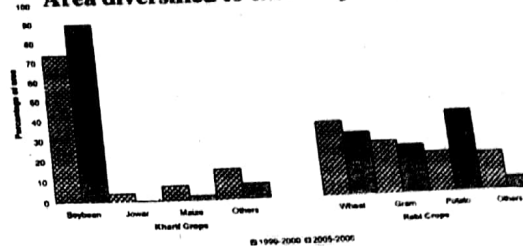
The study on diversification of agriculture in Indore district of M.P. was carried out on the basis of 7 years average (1999-00 to 2005-06). The results of analysis indicated that the crop diversification in mhow block is close to perfect diversification. The crops like soybean, potato, soybean, wheat and gram were dominated in the cropping pattern of the district as well as sample farmers of the study area (Table 2).

Table 3: Share of crops in total cropped area of sample farmers

| Particular	Traditional and cash crops						
	Soybean	maize	Jowar	pulses	Cucumber	vegetables	other
Average area in 000'ha	0.72 (35.43)	0.25 (12.30)	0.01 (0.73)	0.11 (5.56)	0.05 (2.56)	0.03 (1.72)	0.01 (0.59)
%share when total(pi)	0.35	0.123	0.007	0.056	0.024	0.017	0.006
Square of the % share(Pi²)	0.125	0.015	0.000	0.003	0.0006	0.0003	0.000
Herfindhal index	0.177						
Average area in 000'ha	1.70 (31.49)	0.39 (7.28)	0.01 (0.2)	0.18 (3.33)	0.04 (0.74)	0.06 (1.11)	0.04 (0.74)
%share when total(pi)	0.34	0.072	0.002	0.033	0.007	0.011	0.007
Square of the % share(Pi²)	0.098	0.005	0.000	0.001	0.000	0.0001	0.000
Herfindhal index	0.198						
Average area in 000'ha	3.52 (30.18)	0.67 (5.74)	0.07 (0.60)	0.12 (1.07)	0.11 (0.96)	0.43 (3.68)	0.07 (0.60)
%share when total(pi)	0.301	0.057	0.006	0.010	0.009	0.036	0.006
Square of the % share(Pi²)	0.090	0.003	0.000	0.000	0.000	0.001	0.000
Herfindhal index	0.181						
Average area in 000'ha	1.98 (31.14)	0.43 (6.76)	0.03 (0.51)	0.14 (2.20)	0.06 (1.50)	0.17 (2.75)	0.04 (0.62)
%share when total(pi)	0.311	0.067	0.005	0.022	0.010	0.027	0.006
Square of the % share(Pi²)	0.096	0.004	0.000	0.0004	0.001	0.0007	0.00 0
Herfindhal index	0.182						

The figures in parentheses shows percentage to total sample in each size group.

The irrigation facility that is crucial for agriculture production and productivity was higher as compared to state average, increased the value of land and encouraged the farmers towards intensive use of their land and commercial agriculture.

The value of the Herfindhal index was estimated for small, medium and large farmers at 0.177, 0.198 and 0.181 respectively. The overall Herfindhal 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 (Table 3).

Farm diversification on sample holdings was studied covering crop and other allied activities. The enterprise other than crop was the livestock (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 crop and allied activities of the sample farms is given below

Share of crops in total cropped area of sample farmers
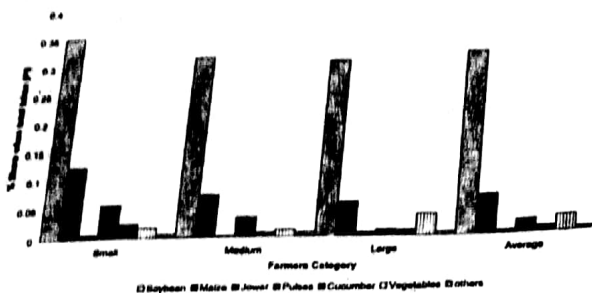
the study. It is clear from the study that the value of Herfindhal index of sample farms i.e. small, medium and large was 0.499, 0.503 and 0.601 respectively, which is only half way between perfect diversification and complete specialization.

In some extent the constraints were listed as lack of infrastructure, illiteracy, ignorance, risk taking ability etc. some other factors were also caused against diversification were socio-economic, climatic factor and lack of knowledge, capital and resource etc. Institutional constraints like finance for the farmers commonly faced processing, marketing, establishment of new enterprise, development of infrastructure etc.

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.

(2) The yield per hectare can be increased by adopting farming operations 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 co-operative societies or Regional Rural Banks.

(4) To develop infrastructure of the region, proper planning and execution should be done in accordance to the need of the people/locality.

(5) The extension media should be geared to teach the farmer's regarding the agriculture and allied activities i.e. Dairy, sericulture and fishery culture etc.

(6) Farmers should be awarded to the effect of diversification in monetary term and employment opportunities to counter the risk in agri. business.

(7) High remunerative crops to increase the income and standard of living of the people should replace the less remunerative crops.

(8) Diversification is an age old practice to minimize the loss takes place due to nature calamities.

(9) To exploit the available water and natural resources diversification is prime need of the region.

(10) The agriculture should be taken as business and the socio-economic barrier should be avoided.

(11) Farmer's of the area should be educated with proper crop production technologies.

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