

Nature of crop diversification due to modernization of agriculture with special reference to Indore district

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ABSTRACT

In the present study, the pattern of crop diversification in five blocks of Indore district (Depalpur, Hatod, Mhow, Sanwer and Indore) has been investigated on the basis of primary data among sample size of 300 farmers. The Simpson index has been mainly used for the study, the value of the index is assumed to be between 0 and 1. If the value of the index is 0 i.e. specialization in crop diversification, and if the value is 1, i.e. complete specialization is found in crop diversification, And the classification of the index found between 0 to 1 was classified into low, middle and high grade. The maximum number of farmers in the middle category has been found under Indore district. On the other hand the crop diversity of marginal and small farmers is better than large farmers. In blocks wise study, crop diversity of farmers of Depalpur blocks is high.

Keywords: Simpson, Diversification, specialization, marginal

INTRODUCTION

In present scenario, Agriculture is playing a pivotal role in Economy of our nation. India's agricultural sector financial records for about 15.9 % of the country's US\$ 2.7 trillion economy and 49% of employment. 54.6 of the total workers are engaged in agriculture and connected sector activities (Census 2011) and accounts for 18.8% (First Advance Estimates) of country's Gross Value Added (GVA) for the year 2021-22 (at current prices). With the aim of bestowing importance to the agriculture sector, Government of India has taken several steps for its development in a sustainable approach. Initiatives have been taken to enhance the income of farmers. Viewed from the socio-economic point, agriculture is one of the most significant sectors that need focus and attention at all the levels. The Government of India wanted to accomplish the goal of

Doubling the Farmer's Income by 2022, in a way, epitomizes the need to pursue all possible ways of increasing the agricultural productivity and profitability of the farmers. (Department of Agriculture, Cooperation & Farmer Welfare Government of India) Indian agriculture is primarily a small and marginal farmers-based economy with approximately 85% of the operational holdings being below two hectares and at the same time, only 44.58% of the agricultural land is cultivated by them (Agriculture Census 2010-11, Government of India, 2010). Because of small operational holdings, it is indeed very cumbersome for the small peasants to improvise their earnings only by raising the yields of the existing crops, mainly cereals. Moreover, with the accessibility of modern farm inputs in the current decades, farmers have a ready option to engender comparatively higher levels of income by introducing high value crops commonly known as cash crops in their farming units. Thus, the high-value crops being more labour intensive eventually provide stable employment and income to a large section of the rural households those encounters severe dilemmas pertaining to seasonal unemployment and underemployment under the mono-crop economy (**De and Chattopadhyay, 2010**). Consequently, diversification from low-value crop to high-value crop at farm level can solve many of the problems faced by small and marginal farmers.

REVIEW OF LITERATURE

- **Prof. Alka Jain (2015)** M.P. In the context of changes and challenges of agricultural diversification, based on secondary data and using statistical techniques, percentage, average, index etc., said that there was an increase of 17% in agricultural production, which shows that the productivity is more than the production area. It has been expanded, agriculture diversification and other facilities are available in sufficient quantity in MP, use of fertilizers, agricultural credit and financial management etc. is continuously expanding.
- **Prime Minister Narendra Modi (2016)** in his speech at **Krishi Unnati Mela** called for increasing the income of farmers through diversification in farming activities; he said that along with growing crops, farmers grow timber trees on the sides of their fields. Can choose to plant, which will also reduce the risks associated with agriculture by diversifying agricultural activities
- **Minati mallick & Urmi pattanayak** crop diversification and sustainable agriculture in India (2017)The data is based on two-point data from 2007-08

and 2013 using Economic Survey of India and Economic Survey of various states and other statistical data. Harfindal index (HI) has been used for the study; the significant factor of change in agriculture is due to change in gross cropped area. Through diversification, farmers are shifting from water crops to other crops.

- **Gadkari (2018)** “Farmers focusing on crop diversification” said on the occasion of a three-day seminar on water management organized by MS Swaminathan Research Foundation, today water is not a problem, but there is a problem of its management, similarly the problem of food grain production. Problem may be it is not possible, with crop diversification we can increase production sufficiently, he said that along with change in cropping pattern, there is a need for diversification of agriculture towards energy and power sector.

OBJECTIVE OF RESEARCH

- Calculation of crop diversification index in agriculture with special reference to Indore district.
- To figure out block wise level of crop diversification in Indore district.

RESEARCH METHODOLOGY

Primary data sources were analysed to know the type and extent of crop diversification in entire Indore districts. The assessment of level of crop diversification index at the individual farmer level was also done by conducting a field survey of farmers. Multilevel sampling method were used to get a representative sample of Improving Agriculture production through Farm level diversification. A sample of 300 farmers was selected from the blocks of these districts through stratified random sampling techniques The population of each blocks of Indore district selected by the sampling formula

$$S = (z^2P(1 - P))/e^2$$

In study proportion of population in each blocks have been used and then selected size of farmers, 73 from Depalpur, 52 from Sanwer, 30 from Hatod, 74 from Mhow and 71 from Indore, Thus the total sampling size of farmers are 300.

- **Methods of data analysis:** Simpson index method has been used to calculate crop diversification index of farmers in Indore district.
- **Meaning of crop diversification:** Crop diversification in India means a move from habitually grown less remunerative crops to more remunerative crops. It depends on geo- climatic, socio-economic conditions and hi-tech

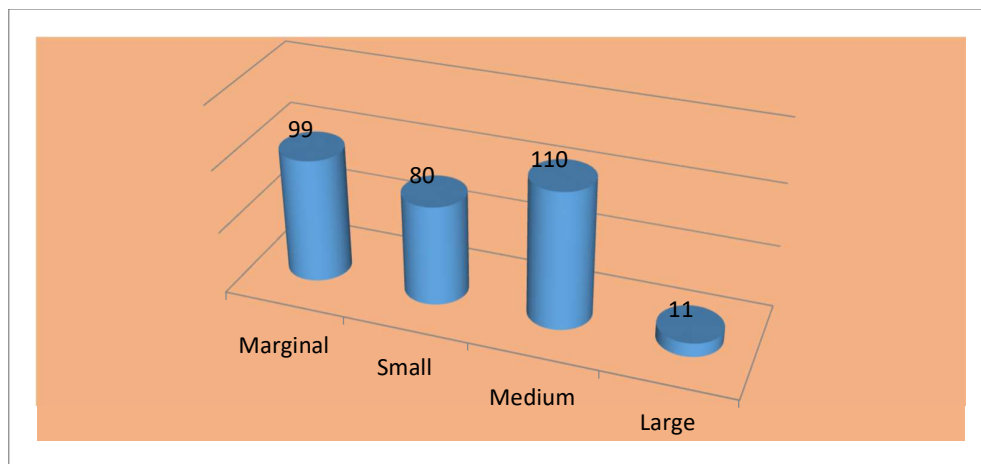
development in a region. While there are challenges which cannot be disregarded, crop diversification provides an opportunity to double farmer’s income and create food security for the nation. That’s why in study used method of calculates crop diversification in study area by Simpson index.

1. **Simpson Index:** This index was used to measure diversification, this index is the most suitable index to measure the diversification of crops in a geographical area, and it is calculated by the following equation.

$$\text{Simpson index (SI)} = 1 - \sum P_i^2$$

- P_i = is the proportionate area (or value) of crop activity in the gross cropped area (or the total value of output).
- The Simpson’s index ranges between 0 and 1.
- If there exists complete specialization, the index moves towards zero and away from zero implies diversification.

2. **Classification of farmer on the basis of land size:**



According to the above bar diagram we shall conclude that In this study, Out of 300, 99 farmers are marginal farmer, 80 farmers are small and 110 highest number of farmers belong to medium type category of farmers and lowest number of farmers are large farmers i.e. 11 farmer.

RESULT AND DISCUSSION

1. **Classification of crop diversity index**

Table 1.1

S.N.	Category	Expanding the Simpson Crop Diversification Index(SDI)
1	Low	< 0.58
2	moderate	0.58- 0.80
3	High	> 0.80

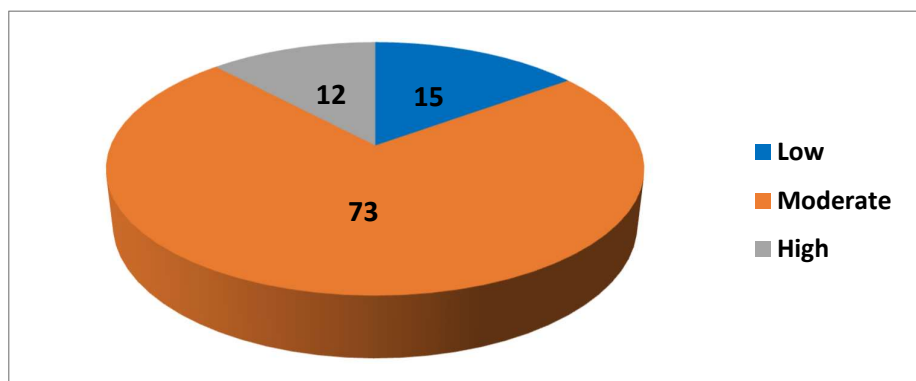
According to the above table, the crop diversification index in Indore district was calculated under the Simpson index. The data obtained was classified, which shall be mainly categorized into three categories - low, medium and high. Less than 0.58 is classified as low crop diversification index, 0.58- 0.80 is classified as medium crop diversification index and values above 0.80 are classified as high crop diversification index.

2. Crop Diversification Index and Number of Farmers

Table 2.1

S.N.	Category	Numbers of farmers	Percentage(%)
1	Low	45	15.00
2	Moderate	219	73.00
3	High	36	12.00
4	Total	300	100

Graph 2.1 Percentage of farmer in different category of crop diversification



It can be clearly understood through the above table and pie chart, that Indore district has the highest number of farmers in the crop diversification index i.e. 219 farmers out of total 300 farmers (73%) comes under medium level diversification category. The same 45 i.e. 15% of farmers comes under low level of diversification and lowest i.e. 36 farmers (12%) only come under high diversification.

3. Comparative Study between Crop Diversification Index and Farmer Classes:

S.N.	Category	Marginal	small	Medium	Large	Total
1	Low	14	9	18	4	45
2	Medium	70	62	80	7	219
3	High	15	9	12	0	36
4	Total	99	80	110	11	300

The level of diversification of agriculture in Indore district among different farmers can be undoubtedly understood from the above table. – In marginal farmers, maximum number of farmers is found under medium category diversification, same for all categories of farmers. In comparative study also it can be clearly said that crop diversification of marginal farmers is best. On the other hand, the high level of diversification level in the long-term farmers is zero.

4. Study of Block wise crop diversification Index

Table 4.1

S.N.	BLOCK	Low	Medium	High	Total
1	DEPALPUR	2	52	19	73
2	HATOD	1	25	4	30
3	INDORE	17	54	0	71
4	MAHU	23	49	2	74
5	SAWER	2	39	11	52

In the above table show the Blocks wise crop diversification. By the above table, it is clear from the study that the lowest diversification has been found in Mhow block followed by Indore, Depalpur and Hatod blocks respectively i.e. number of farmer 23 from Mahu, 17 from Indore, 2 from Depalpur & Sawer, 1 from Hatod. Medium level diversification is highest in Indore district followed by Depalpur, It is in Mhow, Sanwer and Hatod. i.e. number of farmer 54 from Indore, 52 from Depalpur, 49 from Mahu, 39 from Sanwer and 25 from Hatod.

Under high crop diversification, maximum cultivator is Depalpur followed by Sanwer, Hatod and Mhow respectively i.e. number of farmer is 19 from Depalpur, 11 from sanwer, 4 from Hatod, 2 from Mahu and 0 from Indore.

CONCLUSION AND POLICY IMPLICATIONS

The agriculture of Madhya Pradesh is characterized by traditional method agriculture and that underlines the poor state of it agricultural development. Adoption of modernization in agriculture will result in higher crop diversification index as well as increase in total productivity. Due to agriculture modernization the diverse cropping system in Indore districts have been seen. In all the blocks of Indore district, the number of middle class farmers is more, so the condition of agriculture and farmers falling in to this category is better. Due to the small and medium size of the agricultural holdings of the farmers, the level of modernity in agriculture is high. In Crop Diversification Index maximum farmers have

moderate level of crop diversification, which is in a comparatively better position. There is a sharp inclination towards crop diversification in all three categories of marginal, small and medium farmers. Therefore in developing cities like Indore, where we have plethora of availability and accessibility of resources, the probability of agricultural modernization is pretty high. And its impact shall be evidently seen in the crop diversification index. The most important policy implication derived from this study is that efforts are needed for effective agriculture modernization in our farm lands.

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