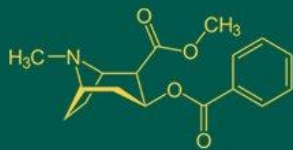


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## An economic analysis of varietal diversification of paddy in agro-climatic zone of Chhattisgarh plains

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### Abstract

The present investigation, titled “An Economic Analysis of Varietal Diversification of Paddy in the Agro-Climatic Zone of Chhattisgarh Plains,” was conducted in Chhattisgarh Plains with Dhamtari, Raipur and Janjgir-Champa districts. Chhattisgarh comprises three agro-climatic zones: Chhattisgarh Plain, Bastar Plateau, and Northern Hills. The study focused on the Study area, where Dhamtari, Raipur, and Janjgir-Champa districts were purposively selected based on extensive paddy cultivation. From each district, two blocks were randomly chosen: Dhamtari and Kurud (Dhamtari), Arang and Abhanpur (Raipur), and Pangarh and Nawagarh (Janjgir-Champa). A total of 386 farmers were purposively sampled and categorized by landholding size as marginal (0-1.0 ha), small (1.01-2.0 ha), medium (2.01-4.0 ha), and large (>4.0 ha). Primary data were collected through personal interviews using pre-tested questionnaires and structured schedules. Varietal diversification was quantified using Simpson’s Index of Diversity (SID). Certified paddy seed supply totalled 8.42 lakh quintals, with IGKV-developed varieties accounting for 10.04 percent (84,502 qtl) and externally developed varieties 89.96 percent (757,185 qtl). Swarna (MTU 7029) dominated, covering 181.49 ha (34.71 percent) and adopted by 147 farmers (38.08 percent), followed by Cottondora Sannalu (16.56 percent) and Vijetha (13.70 percent). Simpson’s Index of Diversity ranged from 0.77 to 0.84 across farm sizes, indicating high varietal diversification, with medium farmers achieving the highest index (0.84).

**Keywords:** Varietal Diversification, Simpson’s Index, agro-climatic zones and certified paddy seed

### 1. Introduction

Varietal diversification of paddy refers to the practice of cultivating multiple rice varieties within a region or farm to ensure stability in production and sustainability of the farming system. It is an important aspect of crop diversification that focuses specifically on varietal choice rather than crop type. This approach enhances the adaptive capacity of farmers against environmental stress, helps conserve valuable genetic resources, and meets diverse consumer preferences for grain quality and market demand.

In recent years, the adoption of improved and hybrid rice varieties has expanded significantly in India, including Chhattisgarh, resulting in yield enhancement and better returns. At the same time, the continued cultivation of traditional and location-specific varieties maintains the ecological and cultural heritage of rice farming. Therefore, studying varietal diversification provides critical insights into how farmers balance productivity, risk management, and sustainability in the changing agricultural landscape. The most often used Simpson diversity index which is essentially a derivation of the Herfindal index was employed in this study to numerically assess the diversification of rice varieties in the state. Diversity in varieties at the farmer level indicates the adoption and spread of varieties by individual farmers. A higher diversity index reflects a wider choice of varieties of the farmers. This can be further disaggregated at the ecology level to understand how the varietal diversity index differs across ecologies. Simpson diversity index (SDI) assesses the degree of concentration of varieties at farm level in different ecologies (Dar *et al.*, 2020) <sup>[1]</sup>. The same index was often used to measure the extent of diversification.

Given as per the United States Department of Agriculture (USDA, 2024) and national statistics, India continues to be the largest exporter and second-largest producer of rice globally, contributing approximately 27 percent of the world's rice output. Furthermore, domestic rice inventories reached a record 44.1 million tonnes by December 2024, exceeding

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buffer norms and positioning India to remain a leading player in the global rice market (Reuters, 2024) <sup>[5]</sup>.

2. Methodology

To achieve the study's objectives, primary data collected from the selected paddy growers using a well-structured and pre-tested questionnaire and schedule through personal interviews. The primary data collected pertained to the agricultural year of 2024-25. A diversity index is a quantitative measure. These indices are statistical representations of the diversification of the dataset. The diversity index technique was used to analyze the varietal diversification of paddy in the study area. The Simpson Diversity Index (SDI): index used to explain diversification: Simpson Diversity Index (SDI):

$$VDI = 1 - \sum_j (\alpha_{ij} / A_i)^2$$

Where:

$\alpha_{ij}$  = Area under the  $j^{th}$  paddy variety in the  $i^{th}$  farm or unit

$A_i$  = Total paddy area in the  $i^{th}$  farm or unit

VDI = Varietal Diversification Index

A higher VDI value (closer to 1) indicates a higher degree of varietal diversification at the farm level.

2. The varietal diversification of Paddy variety in the study area

2.1 Supply of Certified Paddy Seed from Different Agencies

Table No. 1 presents the supply of certified paddy seed in Chhattisgarh for the year 2024, showing the contributions of different agencies such as the Chhattisgarh State Seed and Agriculture Development Corporation (SSC), other state agencies (SAUs, government farms and cooperative societies), and private companies. The total supply of certified paddy seed in the state amounted to 8,41,687 quintals. Out of this, varieties developed by Indira Gandhi Krishi Vishwavidyalaya (IGKV) accounted for 84,502 quintals, which formed only 10.04 percent of the total, while the majority share of 7,57,185 quintals or 89.96 percent came from varieties developed by other agencies/organizations.

Within IGKV-developed varieties, Mahamaya was the leading variety with 48,850 quintals, followed by IGKVR-1 with 9,479 quintals, Vikram TCR with 8,474 quintals, and CG Devbhog with 7,233 quintals. Other varieties like CG Dhan 1919, Indira Aerobic-1, and Karma Mahsuri were supplied in smaller amounts, while Dubraj Selection-1, Badshahbhog Selection-1, and Tarunbhog Selection-1 had negligible supply. This indicates that although IGKV has developed a range of varieties, only a few of them are distributed widely to farmers.

In contrast, varieties developed by other agencies/organizations dominated seed supply. Swarna (MTU 7029) was the most important variety, with 3,12,894 quintals supplied, representing 37.17 percent of the total. Hybrid Dhan followed with 1,95,535 quintals (23.23 percent), and Cottondora Sannalu (MTU-1010) contributed 1,05,699 quintals (12.56 percent). Other varieties like Vijetha, MTU-1153, MTU-1156, MTU-1318, and Swarna-Sub-1 were also notable contributors, while DRR-44 and IR-64 were distributed in very small quantities. Agency-wise distribution in Table No. 1 shows that Chhattisgarh State Seed and Agriculture Development Corporation (SSC) was the largest supplier with 4,45,865 quintals (52.97 percent), followed by other state agencies with 1,09,102 quintals (12.96 percent), and private companies supplying 2,86,720 quintals (34.06 percent). While Chhattisgarh State Seed and Agriculture Development Corporation (SSC) remains the major agency, the role of the private sector has become significant in meeting the seed demand in the state. Overall, Table No. 1 highlights that certified paddy seed supply in Chhattisgarh is largely concentrated in a few varieties developed outside IGKV, with Swarna and Hybrid Dhan alone accounting for more than 60 percent of the total distribution. IGKV varieties like Mahamaya and IGKVR-1 have some regional presence but remain marginal in comparison. This reflects the need for stronger promotion and adoption of IGKV varieties to ensure greater varietal diversity and reduce dependence on externally developed seeds (Directorate of Agriculture Department, Atal Nagar, Raipur, C.G., 2024).

Table 1: Supply of certified Paddy seed from different agency in Chhattisgarh (in Qtl.)

S. No.	Variety	SSC (C.G. State Seed & Agri. Dev. Co. Ltd.)	Other State Agency (SAU/ Govt. farm / Co. Society)	Private	Total	Percent-age
A. Variety developed by IGKV						
1	IGKVR-1	2979	6500	0	9479	1.13
2	Mahamaya	36350	12500	0	48850	5.80
3	Vikram TCR	2674	5800	0	8474	1.01
4	C.G. Zink Rice-1	2165	0	0	2165	0.26
5	CG Devbhog	7233	0	0	7233	0.86
6	CG Dhaan 1919	1179	0	0	1179	0.14
7	Badshahbhog Selection-1	16	0	0	16	0.0019
8	Chhattisgarh Madhuraj Dhaan-55	125	0	0	125	0.01
9	Dubraj Selection -1	110	280	0	390	0.05
10	Vishanu Selection-1	24	0	0	24	0.003
11	IGKVR-2 (IET 19795)	104	0	0	104	0.01
12	Indira Aerobic-1 (R1570-2649-1-1546-1) (IET 21686)	1877	600	0	2477	0.29
13	Indira Barani Dhan-1 (RF-17-38-70) (IET 21205)	816	0	0	816	0.10
14	Karma Mahsuri (IET 19991)	2719	0	415	3134	0.37

15	Tarunbhog Selection-1	36	0	0	36	0.004
Sub Total Developed by IGKV		58407	25680	415	84502	10.04
		(13.10)	(23.54)	(0.14)	(10.04)	
B. Variety developed by other organisations/companies						
1	Cottondora Sannalu (MTU-1010)	71744	13750	20205	105699	12.56
2	Vijetha (MTU-1001)	24252	5855	5830	35937	4.27
3	Swarna (MTU 7029)	243229	33750	35915	312894	37.17
4	DRR-44	744	0	0	744	0.09
5	Hybrid Dhan	0	0	195535	195535	23.23
6	IR-64	12153	7500	12500	32153	3.82
7	MTU-1153	1487	4300	3500	9287	1.10
8	MTU-1156	9743	6500		16243	1.93
9	MTU-1318	1642	3710	1595	6947	0.83
10	PKV HMT	0	3557	9015	12572	1.49
11	Swarana-Sub-1 (CR 2539-1) IET-20266	22464	4500	2210	29174	3.47
Subtotal of variety developed by other organisations /companies		387458	83422	286305	757185	89.96
		(86.90)	(76.46)	(99.86)	(89.96)	
	Total	445865	109102	286720	841687	100
		(52.97)	(12.96)	(34.06)	(100.00)	

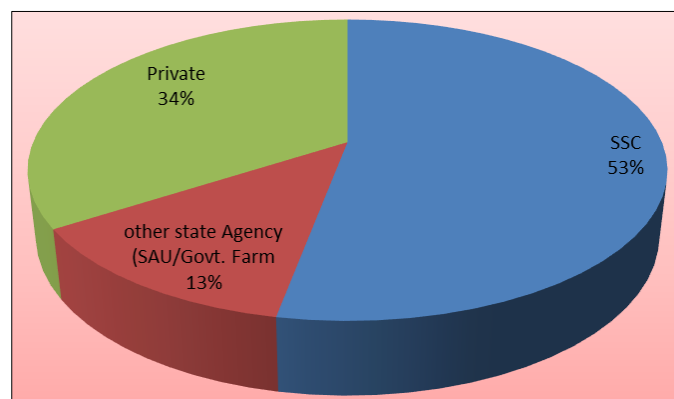
Figures in the parentheses indicate the percentages to the total

(Source: Directorate of Agriculture Department, Atal Nagar, Raipur (C.G.) 2024)

### 3.2. Sector-wise Supply of Certified Seed in Chhattisgarh

Table 2 and Figure 1 depict the sector-wise distribution of certified seed in Chhattisgarh during 2024. The total certified seed supplied amounted to 8.42 lakh quintals, with the public sector contributing the majority share (65.93 percent), while the private sector accounted for 34.06 percent.

Within the public sector, the Chhattisgarh State Seed and Agricultural Development Corporation (SSC) was the leading supplier, distributing 52.97 percent of the total certified seed. Other state agencies, including SAUs, government farms, and cooperative societies, supplied 12.96 percent. The private sector distributed 2.87 lakh quintals (34.06 percent), reflecting its growing role in seed supply and accessibility across the state.



**Fig 1:** Sector wise supply of certified seed in Chhattisgarh

**Table 2:** Sector wise supply of certified seed in Chhattisgarh

S. No.	Institutional sector		Distribution (in Qt.)
1.	Public sector	a) Chhattisgarh State Seed and Agriculture Development Corporation (SSC)	445865.00 (52.97)
		b) Other state Agency (SAU/Govt. Farm)	109102.00 (12.96)
2.	Private sector	Private	286720.00 (34.06)
Total			841687.00 (100)

Figures in the parentheses indicate the percentages to total supply of certified seed

(Source: Directorate of Agriculture Department, Atal Nagar, Raipur (C.G.) 2024)

The data highlights that while the public sector continues to dominate seed distribution, particularly through Chhattisgarh State Seed and Agriculture Development Corporation (SSC), the private sector has established a strong presence, contributing over one-third of the total supply. This indicates a balanced but shifting trend in the seed distribution system of Chhattisgarh, where both public and private agencies play complementary roles in meeting farmers' demand (Table 2 and Figure 1).

### 3.3. Varietal Diversification of Paddy

To study the varietal diversification of paddy in the Chhattisgarh plain, a total of 386 paddy-growing farmers were surveyed. Out of these, 208 farmers cultivated a single

variety, 113 farmers cultivated two varieties simultaneously, and 65 farmers grew more than two varieties.

Table 3 and Figure 2 present the varietal distribution of paddy adopted by farmers under different conditions. Among the different varieties, Swarna (MTU-7029) emerged as the most widely cultivated, adopted by 127 farmers, followed by Cottondora Sannalu (MTU-1010) grown by 62 farmers, and Vijetha (MTU-1001) cultivated by 44 farmers. Other varieties such as MTU-1061 (17 farmers), MTU-1064 (19 farmers), and MTU-1156 (24 farmers) also had notable presence. Less common varieties included Arize 6444 Gold (41 farmers), MPR-404 (7 farmers), MPR-606 (7 farmers), and HMT (15 farmers).

The findings indicate that while some degree of varietal diversification exists, the paddy farming system is dominated by a few major varieties, particularly Swarna and MTU-1010, which together account for nearly half of the sampled farmers. This concentration suggests a preference for varieties with higher yield potential and adaptability, though it may also imply a risk of varietal vulnerability in the event of pest, disease, or climatic stresses (Table 3 and Figure 2).

### 3.4. Paddy varietal diversification as per area coverage

Table 4 presents the varietal diversification of paddy in the study area based on the area cultivated and the number of farmers. The total area under paddy varieties was 522.85 hectares, cultivated by 386 farmers. Which reveals a clear

dominance of a few high-yielding and popular varieties with marked differences in area coverage and number of adopting farmers. Among all the reported varieties, Swarna (MTU 7029) emerged as the most dominant, covering the maximum area of 181.49 ha (34.71 percent) and adopted by 147 farmers (38.08 percent). This shows its wide acceptance owing to high adaptability, yield potential, and farmer preference.

The second most important variety was Cottondora Sannalu (MTU-1010) with 86.60 ha (16.56 percent) and 62 farmers (16.06 percent), closely followed by Vijetha (MTU-1001) which covered 71.65 ha (13.70 percent) with 44 farmers (11.40 percent). Together, these three varieties alone accounted for more than 65 percent of the total paddy area, indicating a high concentration in varietal adoption.

**Table 3:** Varietal diversification of paddy in the study area

S. No.	Variety name and Number of farmers growing single variety	Variety name and Number of farmers growing Two variety	Variety name and Number of farmers growing More than two variety	Total
	208	113	65	386
1.	Arize 6444 Gold (20)	Arize 6444 Gold (13)	Arize 6444 Gold (08)	Arize 6444 Gold (41)
2.	HMT (08)	HMT (05)	HMT (02)	HMT (15)
3.	MPR - 404 (05)	MPR - 404 (02)	MPR-606 (02)	MPR - 404 (07)
4.	MPR-606 (05)	MPR-606 (03)	Vijetha (MTU-1001) (08)	MPR-606 (10)
5.	Vijetha (MTU-1001) (22)	Vijetha (MTU-1001) (14)	MTU - 1061(03)	Vijetha (MTU-1001) (44)
6.	MTU - 1061(09)	MTU - 1061(05)	MTU - 1064 (04)	MTU - 1061(17)
7.	MTU - 1064 (10)	MTU - 1064 (05)	MTU - 1156 (07)	MTU - 1064 (19)
8.	MTU - 1156 (11)	MTU - 1156 (06)	Swarna (MTU 7029) (22)	MTU - 1156 (24)
9.	Swarna (MTU 7029) (83)	Swarna (MTU 7029) (42)	Cottondora Sannalu (MTU-1010) (09)	Swarna (MTU 7029) (147)
10.	Cottondora Sannalu (MTU-1010) (35)	Cottondora Sannalu (MTU-1010) (18)		Cottondora Sannalu (MTU-1010) (62)
Number presented in the parentheses were percentage to total				

Among the other varieties, Arize 6444 Gold was cultivated over 53.13 ha (10.16 percent) by 41 farmers (10.62 percent), followed by MTU-1156 with 38.19 ha (7.30 percent) and 24 farmers (6.22 percent), and MTU-1064 with 32.53 ha (6.22 percent) and 19 farmers (4.92 percent). These varieties contributed moderately to overall varietal spread in the region. In contrast, some varieties had only a limited share. MTU-1061 accounted for 20.14 ha (3.85 percent) with 17 farmers (4.40 percent), and HMT covered 19.50 ha (3.73 percent) with 15 farmers (3.89 percent). Similarly, MPR-606 recorded a marginal coverage of 13.94 ha (2.67 percent) with 10 farmers (2.59 percent), while MPR-404 was the

least adopted variety with only 5.68 ha (1.09 percent) and 7 farmers (1.81 percent).

Thus, the overall results of Table 4.9 highlight that varietal concentration is skewed towards a few dominant varieties, particularly Swarna, MTU-1010, and MTU-1001. While this ensures higher productivity, it reflects a low level of varietal diversification, which may increase the risk of vulnerability to pests, diseases, and climatic variability. Hence, extension services and better seed distribution policies are needed to promote a wider adoption of other promising varieties to ensure resilience and sustainable paddy production in the Chhattisgarh plain.

**Table 4:** Varietal diversification of paddy as per area coverage in study area

S. No.	Variety Name	ha	Farmer No
1.	Swarna (MTU 7029)	181.49 (34.71)	147 (38.08)
2.	Cottondora Sannalu (MTU-1010)	86.6 (16.56)	62 (16.06)
3.	Vijetha (MTU-1001)	71.65 (13.70)	44 (11.40)
4.	Arize 6444 Gold	53.13 (10.16)	41 (10.62)
5.	MTU - 1156	38.19 (7.30)	24 (6.22)
6.	MTU - 1064	32.53 (6.22)	19 (4.92)



7.	MTU - 1061	20.14 (3.85)	17 (4.40)
8.	HMT	19.5 (3.73)	15 (3.89)
9.	MPR-606	13.94 (2.67)	10 (2.59)
10.	MPR - 404	5.68 (1.09)	7 (1.81)
	Total	522.85 (100.00)	386 (100.00)

Figures in the parentheses were percentage to total farmers numbers

### 3.5. Paddy varietal diversification under different farmer categories

Table 5 presents the varietal diversification of paddy across different farmer categories in the study area. The total paddy area under the sampled farms was 522.85 hectares, cultivated by 386 farmers, distributed among marginal (165.71 ha), small (123.27 ha), medium (122.61 ha), and large (111.25 ha) farmers. Among marginal farmers, Swarna (71.13 ha) and Cottondora Sannalu (26.54 ha) were the leading varieties, followed by Vijetha (16.99 ha) and Arize 6444 (13.63 ha). Small farmers also preferred Swarna (32.49 ha) as the dominant variety, in addition to Vijetha (29.56 ha) and Cottondora Sannalu (19.93 ha).

Medium farmers demonstrated a balanced varietal adoption with Swarna (38.92 ha), Cottondora Sannalu (14.70 ha), and MTU-1064 (8.83 ha) as major varieties. In the case of large farmers, Swarna (38.95 ha) remained the most cultivated variety, but there was also noticeable diversification with Cottondora Sannalu (20.85 ha), MTU-1156 (10.08 ha), and MTU-1064 (12.86 ha). The analysis highlights that Swarna (MTU-7029) dominated across all categories, occupying the largest share of total area (181.49 ha; 34.71 percent) and cultivated by the highest number of farmers (147; 38.08 percent). Cottondora Sannalu and Vijetha were the next most adopted varieties, though their spread varied by farm size.

A comparison across farmer categories reveals that marginal and small farmers concentrated more on Swarna, while medium and large farmers exhibited relatively greater diversification by adopting multiple improved varieties like MTU-1061, MTU-1064, and MTU-1156. The findings

indicate that varietal diversification tends to increase with farm size, as larger farms are more capable of allocating land to multiple varieties. However, the dominance of a few major varieties, especially Swarna, reflects limited genetic diversity at the system level, which may increase production risks. A similar pattern of varietal diversification was reported by Jaiswal *et al.* (2024), who also found that Swarna remained the predominant variety across Chhattisgarh, though larger farmers showed greater varietal spread.

### 3.6. Paddy Diversification using Simpson's Index

Table 6 presents the results of varietal diversification of paddy using Simpson's Index of Diversity (SID) across different landholding categories. The index values ranged from 0.77 to 0.84, all of which indicate a high level of varietal diversification among the sampled households.

Among the farm categories, the medium farmers recorded the highest diversity index (0.84), followed closely by small farmers (0.83). Large farmers also exhibited a considerably high level of diversification (0.79), while marginal farmers had the lowest but still high value (0.77). At the aggregate level, the overall Simpson Index for all sampled farmers was 0.81, confirming a high degree of varietal diversification in the study area. Overall Simpson's Index value (0.81) indicates high varietal diversification, but it lies close to the boundary of moderate diversification, suggesting that while paddy varieties are well distributed, a few dominant varieties still hold a relatively higher share in the total cropped area.

**Table 6:** Varietal diversification of under different farmer category in the study area

S. No.	Variety Name	Marginal		Small		Medium		Large		Total	
		ha	Farmer No	ha	Farmer No	ha	Farmer No	ha	Farmer No	ha	Farmer No
1.	Swarna (MTU 7029)	71.13 (42.92)	105 (41.34)	32.49 (26.36)	22 (30.14)	38.92 (31.74)	13 (31.71)	38.95 (35.01)	7 (38.89)	181.49 (34.71)	147 (38.08)
2.	Cottondora Sannalu (MTU-1010)	26.54 (16.02)	37 (14.57)	19.93 (16.17)	14 (19.18)	19.26 (15.71)	7 (17.07)	20.85 (18.74)	4 (22.22)	86.6 (16.56)	62 (16.06)
3.	Vijetha (MTU-1001)	16.99 (10.25)	30 (11.81)	29.56 (23.98)	8 (10.96)	11.61 (9.47)	4 (9.76)	13.5 (12.13)	2 (11.11)	71.65 (13.70)	44 (11.40)
4.	Arize 6444 Gold	13.63 (8.23)	25 (9.84)	12.57 (10.20)	9 (12.33)	11.92 (9.72)	4 (9.76)	15.01 (13.49)	3 (16.67)	53.13 (10.16)	41 (10.62)
5.	MTU - 1156	6.86 (4.14)	12 (4.72)	9.13 (7.41)	7 (9.59)	12.12 (9.89)	4 (9.76)	10.08 (9.06)	1 (5.56)	38.19 (7.30)	24 (6.22)
6.	MTU - 1064	6.89 (4.16)	12 (4.72)	3.95 (3.20)	3 (4.11)	8.83 (7.20)	3 (7.32)	12.86 (11.56)	1 (5.56)	32.53 (6.22)	19 (4.92)
7.	MTU - 1061	8.3 (5.01)	12 (4.72)	5.78 (4.69)	3 (4.11)	6.06 (4.94)	2 (4.88)	0 (0.00)	0 (0.00)	20.14 (3.85)	17 (4.40)
8.	HMT	6.89	9	5.02	4	7.58	2	0	0	19.5	15

		(4.16)	(3.54)	(4.07)	(5.48)	(6.18)	(4.88)	(0.00)	(0.00)	(3.73)	(3.89)
9.	MPR-606	4.2	6	3.44	2	6.31	2	0	0	13.94	10
		(2.53)	(2.36)	(2.79)	(2.74)	(5.15)	(4.88)	(0.00)	(0.00)	(2.67)	(2.59)
10.	MPR - 404	4.28	6	1.4	1	0	0	0	0	5.68	7
		(2.58)	(2.36)	(1.14)	(1.37)	(0.00)	(0.00)	(0.00)	(0.00)	(1.09)	(1.81)
	Total	165.71	254	123.27	73	122.61	41	111.25	18	522.85	386
		(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)
	Diversity index	0.77		0.83		0.84		0.79		0.81	

(Figures in the parentheses were percentage to total farmers numbers)

These findings suggest that as farm size increases, farmers tend to diversify more, likely due to greater resource availability and risk-spreading strategies. However, the consistently high index values across all categories also indicate that even smaller farmers did not depend solely on a single paddy variety.

The results are in line with previous studies (Jangde *et al.*, 2024) <sup>[4]</sup>, which also reported a high level of varietal diversification in Raipur district of Chhattisgarh, reflecting farmers' efforts to balance productivity, market preference, and risk management in paddy cultivation.

**Table 7: Paddy Diversification using Simpson's Index**

S.No.	Land holding	Simpson value	Diversity index
1.	Marginal	0.77	High
2.	Small	0.83	High
3.	Medium	0.84	High
4.	Large	0.79	High
5.	Overall	0.81	High

(SDI Range: - 0.00 - 0.33- Low Diversification, 0.34 - 0.66 - Moderate Diversification, 0.67 - 1.00- High Diversification)

#### 4. Suggestions / Recommendations

To enhance varietal diversification of paddy, efforts should focus on promoting region-specific and climate-resilient varieties through effective seed distribution and farmer awareness programs. Strengthening research-extension linkages and participatory varietal selection can ensure wider adoption. Balanced promotion of traditional and improved varieties will conserve biodiversity and increase market opportunities. Policy support, incentives for seed diversity, and digital dissemination of varietal information are essential for sustainable adoption. Developing value chains and documenting varietal performance will further aid decision-making and enhance productivity, profitability, and resilience in paddy cultivation.

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