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Popular rice varieties among farmers in wet and dry seasons rice cultivation in Chhattisgarh: A perception based analysis

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Abstract
The present investigation was carried in the state of Chhattisgarh's plain agro-climatic zone of Chhattisgarh state during the year 2019-20. The purpose of this study is to collect the information regarding popular rice varieties during the wet and dry seasons. The research was carried out in 18 villages selected randomly from six blocks in three districts in the Chhattisgarh's Plain Agro-Climatic Zone. The information was collected through a personal interview with the use of an interview schedule. The collected information was examined using appropriate statistical methodologies and tools. The findings on adoption of rice variety on the basis of area in wet season indicate that MTU-1010 in up to 1 ha, hybrid varieties in 1.1 to 2 ha, other varieties in 2.1 to 3ha and HMT in above 3ha widely adopted popular varieties. In dry season hybrid varieties in up to 1ha, HMT in 1.1 to 2ha, MTU-1010 in 2.1 to 3ha and mahamaya in above 3ha area widely adopted popular varieties. It was observed that in wet season MTU-1001 in Matasi (*Inceptisols*), other varieties in Dorsa (*Alfisols*) and hybrid varieties in Kanhar (*Vertisols*) were popular varieties. In case of dry season, the HMT in Matasi (*Inceptisols*), Swarna in Dorsa (*Alfisols*) and MTU-1010 in Kanhar (*Vertisols*) were the popular varieties.

Keywords: popular rice variety, wet season, dry season, adoption

1. Introduction
Rice accounted for 43.78 million hectares of area coverage among all cereals in India, and 118.43 million tonnes of production with a productivity of 2705 kg/ha in 2019-20. (Directorate of economics & statistics, DAC & FW). The agriculture's contribution to global GDP is decreasing, it continues to support the livelihoods of more than 2.6 billion people worldwide, and the majority of whom live in rural regions (Anonymous, 2016) [1]. In Chhattisgarh, the absence of adequate rainfall and reliable irrigation water are major factors in the low cultivation of rabi or dry season rice. Modern agriculture necessitates a cutting-edge technology that applies scientific knowledge to farming in a methodical manner (Gbegeh and Akubuilo, 2013) [2]. Higher earnings and lower poverty have been linked to the adoption of new agricultural technologies, as well as improved nutritional status, cheaper staple food prices, more work options, and earnings for landless labourers (Mwangi and Kariuki, 2015) [4].

2. Material and Methods
The present study was carried out in Chhattisgarh Plains Agro-Climatic Zone of Chhattisgarh State. On the basis of maximum area coverage of dry season rice cultivation, the three districts in the zone i.e. Janjgir-Champa, Dhamtari, and Raipur were undertaken for the study. Two blocks from each of the selected district were selected randomly for this investigation. In this way a total of 6 blocks were taken for this study, from each selected block, 3 villages were selected randomly for the selection of respondents and from each selected village, 15 farmers were selected randomly. In this way, a total of 270 farmers were considered as respondent to respond as per the interview schedule design for the study.
The interview schedule was designed on the basis of objectives and independent and dependent variables considered for this investigation. To facilitate the respondents, the interview schedule was framed in "Hindi". Each question was thoroughly examined and discussed with the experts before finalizing the interview schedule. Adequate precautions and care were taken into consideration to formulate the questions in a manner that they were well understood by the respondents and would find it easier to respond. Before using prepared interview schedule for collection of data it was pre-tested by 20 non-sample respondents and

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also checked its reliability and validity. On the basis of experience gained in pre-testing, the necessary modifications and suggestions were incorporated before giving a final touch to interview schedule. The collected data were analyzed with the help of suitable statistical methods like Frequency, Percentage, etc.

3. Results and Discussion
3.1 Popular rice varieties in wet and dry season
Selection and adoption of appropriate rice variety plays a vital role in production and productivity of rice in particular area and helps in gaining more profit from rice farming in all season. A large number of rice varieties is found in the study area, but few are quite popular in study area. It is very hard and tame taking task to discuss all the variety therefore, some popular rice variety are taking in to consideration for detail and purposeful analysis. The data pertains to major rice varieties grown in both wet and dry season are presented in

Table 1. It shows that Swarna is most popular rice variety in wet season maximum (60.37%) number of respondents grown it in wet season, followed by Mahamaya (32.96%), Other varieties (25.92%), Hybrid varieties (17.78%), MTU-1010 (12.59%), HMT (11.11%) and MTU 1001 gown by 10.74 per cent of the respondents in wet season. In case of dry season MTU-1010 (69.26%) is found most popular variety among all the rice variety grown by the respondents in this season, followed by Other variety (18.51%), Swarna (14.14%), Hybrid varieties (10.00%), HMT (9.26%) and about 2 per cent of respondents were growing MTU-1001 in dry season. The swarna is most popular in wet season because it has good marketing value and productivity is significant in study area. The MTU-1010 is found most popular rice variety in dry season because the availability of seed and quality production in this season as compare to other rice variety in dry season. These findings finds quite support from Narbaria, S. 2013 and Pradhan, S.K. 2014 [3, 5].

Table 1: Distribution of respondents according to cultivation of major rice varieties in Wet and Dry seasons

Sl. No	Varieties	Wet season		Dry season	
		Frequency	Percentage	Frequency	Percentage
1	Swarna	163	60.37	39	14.14
2	MTU-1010	34	12.59	187	69.26
3	Mahamaya	89	32.96	42	15.55
4	HMT	30	11.11	25	9.26
5	MTU 1001	29	10.74	5	1.85
6	Hybrid varieties	48	17.78	27	10.00
7	Other varieties	70	25.92	50	18.51

*Data are based on multiple responses

3.2 Purpose / objectives for adoption of popular rice varieties
The selection and adoption of particular rice variety not only depends on productivity but also depends on many other purposes like market demand, eating quality, milling quality, for irrigated and rain-fed area and many others. An attempt has been made to explore the purpose wise adoption of popular rice varieties among the respondents. A request had made to each respondent to rank wise place each popular rice variety for different purposes.

The information about purpose wise adoption of rice varieties are compiled in Table 2. The findings indicates that for eating purpose all the respondents placed HMT at first rank, followed by Swarna second rank, MTU-1010 third rank, MTU-1001 fourth rank, Hybrid varieties fifth rank and Mahamaya sixth rank, respectively. Regarding milling purpose, all the respondents placed Mahamaya at first rank, followed by Swarna second rank, MTU-1010 third rank, Hybrid varieties fifth rank and HMT sixth rank respectively.

Table 2: Rank wise distribution of rice varieties for different purposes as perceived by the respondents

Sl. No	Varieties	Rank for suitability for various purposes/situation					
		Eating	Milling	Sell in mandi	Irrigated area	Rain-fed area	Low land
1	Swarna	II	II	IV	III	II	I
2	MTU-1010	III	III	III	IV	I	VI
3	Mahamaya	VI	I	II	II	III	IV
4	HMT	I	VI	I	V	V	II
5	MTU 1001	IV	V	VI	VI	IV	III
6	Hybrid Varieties	V	IV	V	I	VI	V

In case of ease to sell in mandi, respondents placed HMT at first rank, followed by Mahamaya in second rank, MTU-1010 in third rank, Swarna in fourth rank, Hybrid varieties in fifth rank and MTU-1001 at sixth rank, respectively. Regarding suitability for irrigated area, respondents placed Hybrid varieties at first rank, followed by Mahamaya in second rank, Swarna in third rank, MTU-1010 in fourth rank, HMT in fifth rank and MTU 1001 at sixth rank, respectively. In case of suitability for rain-fed areas, respondents placed MTU-1010 at first rank, followed by Swarna in second rank, Mahamaya in third rank, MTU-1001 in fourth rank, HMT in fifth rank and Hybrid varieties at sixth rank, respectively. Towards

suitability for the low land, respondents placed Swarna at first rank, followed by HMT in second rank, MTU-1001 in third rank, Mahamaya in fourth rank, Hybrid varieties in fifth rank and MTU-1010 at sixth rank, respectively.
The data regarding overall preferences of rice varieties as perceived by the respondents are presented in Table 3. The data shows that the respondents gave highest preference to Swarna (77.78%), followed by 66.67 per cent Mahamaya (II rank), 61.11 per cent both HMT and MTU-1010 (II rank), 44.44 per cent Hybrid varieties (IV) rank and 38.89 per cent MTU 1001 (V rank), respectively.

Table 3: Overall preferences of rice varieties for different purposes as perceived by the respondents (as per selected characteristics)

Sl. No	Rice varieties	Overall preferences		
		Scores	Percentage	Rank
1	Swarna	28	77.78	I
2	MTU-1010	22	61.11	III
3	Mahamaya	24	66.67	II
4	HMT	22	61.11	III
5	MTU 1001	14	38.89	V
6	Hybrid Varieties	16	44.44	IV

The information about area wise or soil type wise adoption of rice varieties also collected and tabulated according different area coverage and type of soil. The data pertains to area wise adoption of rice varieties in wet and dry season are presented in Table 4. The finding reveals that in wet season up to 1 ha area coverage majority (78.95%) of the respondents had grown MTU-1001, followed by half of the respondents had grown HMT, Other varieties (40.00%), Swarna (37.43%), MTU-1010 (23.53%), Hybrid varieties (15.00%) and Mahamaya (13.48%) respectively. Regarding dry season, the maximum (62.96%) respondents grown Hybrid varieties, followed by other varieties (45.00%), Swarna (28.99%), HMT (14.67%) and MTU-1010 (6.30%), respectively. Mahamaya and MTU-1001 not adopted by any respondents in up to 1ha area coverage in dry season.

In case of 1.1 to 2ha area coverage in wet season the data shows that majority (75.00%)of the respondents had grown

Hybrid varieties, followed by Mahamaya (73.03%), MTU-1010 (55.88%), Swarna (36.80%), HMT (35.00%), Other varieties (26.00%) and MTU-1001 (21.05%), respectively. In dry season the majority (76.00%) of the respondents had grown HMT in 1.1 to 2ha area, followed by Mahamaya (54.44%), Swarna (52.17%), MTU-1001 (40.00%), MTU-1010 (20.42%) and Hybrid varieties (14.81%), respectively. Regarding 2.1 to 3ha area coverage in wet season the data shows that maximum (44.00%) respondents had grown other varieties, followed by Swarna (19.02%), MTU-1010 (14.71%), Mahamaya (10.11%) and Hybrid varieties (10.00%), respectively. HMT and MTU-1001 not adopted by any respondents in 2.1 to 3ha area coverage in wet season. In case of dry season maximum (68.50%) respondents had grown MTU-1010, followed by MTU-1001 (60.00%), Hybrid varieties (22.22%), Swarna (14.49%), Other varieties (5.00%), Mahamaya (4.55%) and HMT (4.00%), respectively. About above 3ha area coverage in wet season the finding indicates that maximum (15.00%) respondents had grown HMT, followed by Swarna (6.75%), MTU-1010 (5.88%) and Mahamaya (3.37%), respectively. MTU-1001, Hybrid varieties and other varieties not adopted by any respondents in above 3ha area in wet season. In dry season the maximum (40.91%) respondents grown Mahamaya, followed by MTU-1010 (11.02%), HMT (5.33%) and Swarna (4.35%), respectively. MTU-1001, Hybrid varieties and other varieties not adopted by any respondents in above 3ha area coverage in dry season.

Table 4: Percentage distribution of respondents according to area wise adoption of rice varieties in wet and dry seasons

Rice varieties	Respondents (%)									
	Respondents		Up to 1 ha		1.1 to 2 ha		2.1 to 3 ha		Above 3ha	
	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry
Swarna	163	39	37.43	28.99	36.80	52.17	19.02	14.49	6.75	4.35
MTU 1010	34	187	23.53	6.30	55.88	20.47	14.71	68.50	5.88	11.02
Mahamaya	89	42	13.48	0.00	73.03	54.55	10.11	4.55	3.37	40.91
HMT	30	25	50.00	14.67	35.00	76.00	0.00	4.00	15.00	5.33
MTU 1001	29	5	78.95	0.00	21.05	40.00	0.00	60.00	0.00	0.00
Hybrid varieties	48	27	15.00	62.96	75.00	14.81	10.00	22.22	0.00	0.00
Other varieties	70	50	40.00	45.00	26.00	50.00	44.00	5.00	0.00	0.00

The data pertains to soil type wise adoption of existing rice varieties in wet and dry season are presented in Table 5. The findings regarding Matasi (*Entisols*) soil type in wet season indicates that the maximum (59.47%) respondents grown MTU-1001, followed by Mahmaya (55.06%), MTU-1010 (54.71%), Other varieties (34.29%), HMT and Hybrid varieties (20.00%) and Swarna (19.50%), respectively. About dry season the data show that most (67.00%) of the respondents had grown HMT, followed by Hybrid varieties (55.56%), Mahamaya and MTU-1001 (50.00%), Swarna (40.58%), Other varieties (36.00%) and MTU-1010 (12.17%), respectively. The data regarding adoption of rice varieties in Dorasa (*Alfisols*) in wet season shows that maximum (22.85%) respondents had grown Other varieties, followed by Swarna (19.00%), Mahamaya (12.36%), Hybrid varieties (10.00%), MTU-1010 (8.82%), HMT (5.00%) and MTU-

1001 (3.89%), respectively. In dry season maximum (27.54%) respondents had grown Swarna, followed by Others varieties (24.00%), HMT (14.00%), MTU-1001 (10.00%) and MTU-1010 (2.00%), respectively. Mahamaya and Hybrid varieties not adopted by any respondents in Dorasa (*Alfisols*). The findings regardin adoption of rice variety in Kanhar (*Vertisols*) in wet season indicates that majority (75.00%) of the respondents had grown HMT, followed by Hybrid varieties (70.00%), Swarna (61.50%), Other varieties (42.86%), MTU-1001 (36.64%), MTU-1010 (36.47%) and Mahamaya (32.58%), respectively. In dry season the majority (85.29%) of the respondents had grown MTU-1010, followed by Mahamaya (50.00%), Hybrid varieties (44.44%), MTU-1001 and Other varieties (40.00%), Swarna (31.88%) and HMT (19.00%), respectively.

Table 5: Percentage distribution of respondents according to soil type wise adoption of existing rice varieties in wet and dry seasons

Rice variety	Respondents		Respondents (%)					
			Matasi (*Inceptisols*)		Dorasa (*Alfisols*)		Kanhar (*Vertisols*)	
	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry
Swarna	163	39	19.50	40.58	19.00	27.54	61.50	31.88
MTU 1010	34	187	54.71	12.17	8.82	2.00	36.47	85.29
Mahamaya	89	42	55.06	50.00	12.36	0.00	32.58	50.00
HMT	30	25	20.00	67.00	5.00	14.00	75.00	19.00
MTU 1001	29	5	59.47	50.00	3.89.	10.00	36.64	40.00
Hybrid varieties	48	27	20.00	55.56	10.00	0.00	70.00	44.44
Other varieties	70	50	34.29	36.00	22.85	24.00	42.86	40.00

4. Conclusion
From the above research findings it can be concluded that the swarna in wet season and MTU-1010 in dry season had highest overall preference. Most of the respondents cultivated HMT for eating purpose, mahamaya for milling purpose, HMT for sell in mandi, hybrid varieties for irrigated situation and MTU-1010 for rain-fed situation. In case of overall preferences, majority of them preferred swarna. Swarna in wet seasons and MTU-1010 in dry season found most suitable variety among all adopted varieties. The rationales behind these findings may be the availability of seed, topographic factors and high rate in mandi. The fine quality rice always sold out at higher price in the market.

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