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Socio-economic impact of paddy variety *Indrayani* on livelihood of paddy growers

¹Dr. Jyoti P Walke, ²Dr. Swati S Khandave and ³Dr. MV Ajotikar

¹Assistant Professor, Division of Agricultural Extension and Communication, College of Agriculture, Karad, Maharashtra, India

²Associate Professor, Division of Agricultural Extension and Communication, College of Agriculture, Pune, Maharashtra, India

³Subject Matter Specialist, Regional Extension Centre, Pune, Maharashtra, India

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Corresponding Author: Dr. Jyoti P Walke

Abstract

In India, rice is one of the important crops where farmers largely depend for their livelihood. In fiscal year 2023, the production of rice was highest with over 130 million metric tons among the food grains. In Maharashtra rice is an important crop with 14.11 lakh hectares area with 3439.40 thousand tonnes production.

Paddy variety *Indrayani* has the maximum acreage under paddy crop in the paddy growing belt of Western Maharashtra. This research project was undertaken to study the impact of this variety on the socio-economic aspects of paddy growers. Bhore and Maval tehsils from Pune district were purposively selected for the research project as the area under this variety has substantially increased over last 15 years in this area. Total 140 respondents were selected by simple random sampling and data was collected by designing the interview schedule.

Study on change in socio-political participation indicated that SHG's continued to be the most important avenue of social participation followed by youth club. The impact analysis indicated that area under cultivation of cereal and sugarcane crop was increased with resultant decrease in fallow land. There was slight increase in the percent of respondents who purchased the land for agriculture purpose and also there was overall increase in the use of agricultural inputs and machinery used by the farmers. Also the number of submersible pumps and electric motors were increased and the modern irrigation systems of drip and sprinkler increased in the five years under comparative study as 7.86 and 2.14 per cent of the respondents, respectively, installed these systems. The implements viz. sprayers, hoes and chaff cutters were found to be increased. The number of household items was increased. Per hectare Average yield from paddy crop has revealed an increasing trend over the study period.

Keywords: Paddy variety *Indrayani*, livelihood, Socio-economic Impact

Introduction

Paddy is one of the important cereal crop cultivated globally. India is the second-largest producer of rice in the world, after China. The India's estimated production for the year 2023-24 is projected to be 133 million tones (Anonymous, 2023)^[3]. In the state of Maharashtra paddy is a vital cereal crop grown in kharif season. Bhore Tehsil from Pune district is one of the predominant tehsil having paddy as a major crop. Bhore tehsil has the distinction of having highest productivity of paddy in the district.

Mahatma Phule Krishi Vidyapeeth has significant contribution in release of promising paddy varieties, viz. *Indrayani*, *Bhogawati*, *Phule Samruddhi* and *Phule Radha* and development and transfer of paddy production technology. The Rice Research Station, VadgaonMaval developed and released Paddy variety *Indrayani* in 1987. The variety gained popularity across the rice growing belt within western Maharashtra due to its qualitative attributes, viz., less shattering of grains, high productivity, high market demand as scented variety. Also as a result of the efforts of technology transfer made in the College Development Block, Bhore, more than 80.00 per cent area from Bhore tehsil

has been covered under *Indrayani* variety. Hence, it was felt necessary to study the impact of this variety on the socio-economic aspects of paddy growers.

Objectives

1. To study the personal, socio-economic characteristics of Paddy growers.
2. To study the impact of Paddy variety *Indrayani* on socio-economic aspects of paddy growers.

Methodology

The study was conducted in Pune District from Maharashtra State

Pune district consists of fourteen tahsils and out of these, Bhore and Maval tehsils were purposively selected as *Indrayani* is the major variety grown by the farmers and area under this variety is substantially increased over last three decades. From the list of paddy growers, 100 respondents from Bhore tahsil and 40 respondents from Maval tehsil were selected. Accordingly, the total sample size of 140 farmers was considered for the study. The respondents were selected by employing simple random sampling technique. In order

to study the varietal impact, year 2012-13 was considered as base year and impact was measured in terms of change in social political participation, land use pattern, land utilization, input use, farm mechanization, irrigation status, farm implements, production, productivity and yield of paddy crop over last decade. An interview schedule, in line with the objectives determined, was developed for obtaining the necessary information from respondents. The data was collected from the paddy growers by personal interview

method. Ex post facto research design was used. Data were analyzed, categorized by using frequency and percentage to know the change in each aspect over the considered time period.

Findings

Impact of Indrayani variety on paddy growers

Social impact

Table 1: Change in Socio-political participation

Sr. No.	Organization	Respondents (N=140)				Change	
		Before 2012-13		Till 2022-23			
		Member	Office bearer	Member	Office bearer	Member	Office bearer
1	Grampanchayat	5 (3.57)	8 (5.71)	5 (3.57)	8 (5.71)	NC*	NC
2	Panchayatsamiti	2 (1.43)	3 (2.14)	2 (1.43)	3 (2.14)	NC	NC
4	Multipurpose Co-Op. Society	11 (7.86)	3(2.14)	19 (13.57)	6 (4.29)	8(5.71)	3(2.14)
5	Self Help Group	31 (22.14)	8(5.71)	49 (35.00)	10 (7.14)	18 (12.86)	2(1.43)
6	TarunMandal	27(19.29)	6(4.29)	34 (24.29)	6(4.29)	7 (5.00)	NC
7	BhajaniMandal	24(17.14)	-	24(17.14)	-	NC	NC
8	Farmer-Scientist forum	9 (6.43)	2(1.43)	9 (6.43)	2(1.43)	NC	NC
Total		109	30	142	35	33	5

*NC = No Change

Table 1 reveals that membership of SHG's continued to be the most important avenue of social participation followed by youth club, *bhajanimandal* and co-operative society. The results are supported by Abbas Ali C. and Jiang Y. (2018)

[1].

Economic impact

Table 2: Change in Land Use Pattern

Sr. No.	Type of Land Use Area under (ha)	Area (ha.)		Change in area (ha.)
		Before 2012-13	Till 2022-23	
1	Area under cereal crops	119.11	127.68	8.57
2	Area under pulses crops	11.90	14.53	2.63
3	Area under fruit crops	03.33	06.30	2.97
4	Area under vegetable crops	13.30	14.70	1.40
5	Area under fodder crops	18.45	21.33	3.88
6	Sugarcane	52.50	68.25	6.75
7	Fallow land	10.50	03.99	-6.51

Data presented in table 2 indicates that area under cultivation of cereal, pulse, fruit, vegetable, fodder and

sugarcane crops had increased with a resultant decrease in fallow land.

Table 3: Change in land possession (land purchase)

Sr. No.	Purpose for land purchase	Respondents (N=140)			
		Before 2012-13		Till 2022-23	
		Frequency	Percentage	Frequency	Percentage
1	Agricultural	2	1.42	3	2.14
2	Residential	0	0	0	0
3	Commercial	0	0	0	0
Total		2	1.42	3	2.14

Data given in table 3 indicates that merely 1.42 per cent of the respondents purchased land for agricultural purpose

before 2012-13, while, 2.14 per cent of the respondents purchased land for the same purpose till 2022-23.

Table 4: Change in utilization of farm inputs

Sr. No.	Particulars	Quantities (Kg. / Liters / Tonnes)		Change
		Year 2012-13	Year 2022-23	
1	Improved Seed material	63.80 quintals	70.20 quintals	6.4 quintals
2	FYM/Compost/			
	In situ	225 tonnes	195 tonnes	-30 tonnes
	Purchased	102 tonnes	144 tonnes	42 tonnes

3	Chemical Fertilizers			
	Urea	78700 kg	106800 kg	28100 kg
	DAP	48300 kg	56700 kg	8400 kg
	SSP	18600 kg	23800 kg	5200 kg
	MOP	15200 kg	18400 kg	3200 kg
	Other (Micronutrients Fe, Zn, Mg, Bo, Mo, Cu, etc.)	1600 kg	2250 kg	650 kg
4	Biofertilizers/ BioControl measures			
	Acetobacter	90 kg	165 kg	75 kg
	PSB	12 kg	63 kg	51 kg
	Trichoderma / Metarhizium	23 kg	56 kg	33 kg
	Others (please specify) Azotobacter	80 kg	150 kg	70 kg

The results revealed in table 5 indicate that there was overall increase in the use of agricultural inputs, viz; improved seed, chemical fertilizers, micronutrients, bio-fertilizers and bio-control agents. The proportion of preparing and applying

FYM / Compost was replaced by purchasing and applying it. There was substantial increase in use of bio-fertilizers and bio-control agents as a result of promotional policies for organic and natural farming.

Table 5: Change in farm mechanization and Irrigation status (purchase)

Sr. No.	Particulars	No of Respondents (N=140)				Change	
	Farm mechanization	Year 2012-13		Year 2022-23			
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1	Tractor	04	2.85	12	8.57	08	5.71
2	Trolley	02	2.85	04	2.85	02	2.85
3	Ridger	09	6.42	21	15.00	12	8.57
4	Plough (Tractor drawn)	04	2.85	12	8.57	08	5.71
5	Thresher	-	-	2	2.85	2	2.85
6	Power Tiller	03	2.14	10	7.14	07	05.00
Total						39	27.86
	Irrigation status						
7	Submersible pump	62	44.28	75	53.57	13	9.28
8	Electric Motor	23	16.43	48	34.28	25	17.86
9	Drip Irrigation unit	04	2.86	15	5.00	11	7.86
10	Sprinkler unit	02	1.43	05	3.57	3	2.14
Total						52	37.14

It was observed that there was 5.71 and 5.00 per cent increase, respectively, in the number of tractors and power tillers owned over the period of ten years under study. Also the number of submersible pumps and electric motors increased to the tune of 9.28 and 17.86 per cent, respectively. This might be due to climate change induced

dry spells that necessitated irrigation of paddy fields. The modern irrigation systems of drip and sprinkler increased during the past five years under comparative study as 7.86 and 2.14 per cent of the respondents, respectively, installed these systems. Similar findings were obtained by Kumar, A. Tripathi, G. and Joshi, P.K. (2021)^[7].

Table 6: Change in Assets (purchase)

Sr. No. A.	Particulars	No. of Respondents (N=140)				Change	
	Farm implements	Year 2012-13		Year 2022-23			
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1	Harrow	11	7.86	4	2.86	-7	-05.00
2	Hoe	45	32.14	53	37.86	8	5.71
3	Seed drill / Two bowl seed drill	32	22.86	17	12.14	-15	-10.71
4	Wooden plough (Bullock drawn)	23	16.43	12	8.57	-11	-07.86
6	Dusters	3	02.14	1	0.71	-2	-1.43
7	Sprayers	140	100.00	172	122.86	32	22.86
8	Thresher / Harvester	-	-	2	1.43	2	1.43
9	Chaff cutter	11	7.86	18	12.86	7	5.00
B.	Livestock possession						
	Buffalos	83	58.29	125	89.29	42	31.00
	Cows	33	23.57	106	75.71	73	52.13
	Poultry	64	45.71	80	57.14	18	11.43
C.	Household Items						
	Refrigerator	65	46.40	98	70.00	34	23.60
	Television set	140	100.00	184	131.43	44	31.43
	Bio gas/LPG Gas	128	91.43	140	100.00	12	8.57
	Concrete house	28	20.00	56	40.00	28	20.00

The study revealed that the paddy farmers owned the different types of agricultural implements upto the base year from which the implements namely harrows, seed drills and wooden ploughs decreased until 2022-23 as they became obsolete on account of increased mechanization and use of hired tractors and tractor drawn implements. However, the implements sprayers, hoes and chaff cutters increased during the period under study due to their perceived and actual utility. Similar results were obtained by Dharmalingam P. and *et al.* (2021) ^[4] and Abebaw,A. *et*

al.((2022))^[2].

There was steady increase, approximately more or less than 20.00 per cent, in the purchases of household items viz. refrigerator, LPG gas connections, concrete house etc.s excluding television sets which showed an increase of 31.43 per cent. This increase in number of television sets might be attributed to introduction of LED technology in television. Similar findings were obtained by Abebaw,A. *et al.*((2022))^[2].

Table 7: Change in yield and income from paddy crop

Product	2012-13				2022-23			
	Yield (Qt/ha)	Selling price (Rs/qt)	Gross return (Qt/ha)	Net return (Rs/ha)	Yield (Qt/ha)	Selling price (Rs/qt)	Gross return	Net return
Main Product	46.00	1800	82800	37800	48.00	2400	115200	50600
By product	20.00	200	4000		20.00	300	6000	

Table 8: Change in average yield from paddy crop

Sr. no.	Production (Quintal/ha)	Year 2012-13	Year 2022-23
		Percentage	Percentage
1	31-40	37 (26.43)	29 (20.71)
2	41-50	82 (58.57)	76 (54.29)
3	51-60	19 (13.57)	27 (19.29)
4	60-70	2 (01.43)	8 (05.71)
	Total	100.00	100.00

The steady increase in yield and income was noticed over last decade. Average yield per hectare has revealed an increasing trend over the study period, but the yield levels have reached near saturation potential. The results are supported by Dharmalingam P. and *et al.* (2021) ^[4], Roslina Kamaruddin and *et al.* (2023) ^[9].

Conclusion

The results have indicated that there has been improvement in various socio-economic aspects of paddy growers cultivating *Indrayani* variety. Their yield and income levels from paddy crop, the main staple cereal, have been increased steadily and sustained over a period of more than three decades on account of this variety. The variety has still maintained its promising market potential and helped sustain the farmers' livelihood.

Recommendation

The research indicated that the Paddy variety *Indrayani* is very crucial in sustaining the yield and income level of paddy growers. Hence, it is necessary to take efforts to create awareness and increase the area under this variety in other rice growing tracts of Maharashtra by the State Department of Agriculture.

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Conflict of Interest

The authors declare no conflict of interest.

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