Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; 8(2): 697-699
Received: 15-01-2019
Accepted: 18-02-2019

Shilpa Beck
Department of Agricultural Extension, College of Agriculture, I.G.K.V. Raipur, Chhattisgarh, India

MA Khan
Department of Agricultural Extension, College of Agriculture, I.G.K.V. Raipur, Chhattisgarh, India

Anjay Singh
Department of Agricultural Extension, College of Agriculture, I.G.K.V. Raipur, Chhattisgarh, India

Correspondence
Shilpa Beck
Department of Agricultural Extension, College of Agriculture, I.G.K.V. Raipur, Chhattisgarh, India

Comparison of productivity of rice in different water reaches of canals

Shilpa Beck, MA Khan and Anjay Singh

Abstract
The present study was carried out in Mahanadi reservoir canal irrigation system of Chhattisgarh state during the years 2017-18 and 2018-19. Most of the head, mid and tail reach respondents were adopting Rice- Fallow- Fallow cropping pattern. Swarna was the highest cultivating variety in head, mid and tail reach. Average productivity of rice was 45.05 q/ha, 43.42 q/ha and 41.14 q/ha, for head, mid and tail reach respectively. A significant difference (Anova) was also found in productivity of rice between the head, mid and tail reach.

Keywords: Head reach, mid reach, tail reach, rice variety, productivity and ANOVA

Introduction
Mahanadi reservoir project is comprises of 7 canals namely Mahanadi main canal, Mandhar branch canal, Abhanpur lift canal, Bhatapara branch canal, Baloda branch canal, Lawan branch canal and Mahanadi feeder canal and their length in km are 116.40, 52.00, 19.00, 45.00, 7.00, 69.00 and 42.00 onwards. Canals are the constructed structures basically water path or open channels which are connected mainly to agriculture field over widespread areas. In the state of Chhattisgarh, the Mahanadi canal System constituting the new Rudri weir, the Tandula canal and Ravishankar Sagar dam network irrigates the districts of Raipur, Durg and Dhamtari. These 7 canals are created to irrigate 264311 hectare of land of Baloda Bazar, Dhamtari and Raipur district. Out of these 7 canals we have to select 4 canals which are irrigating maximum area of land under this project. Accordingly, Mahanadi main canal with its irrigation capacity of 96233 ha, Lawan branch canal with its irrigation capacity of 53866 ha, Mandhar branch canal with its irrigation capacity of 43734 ha and Baloda bazar branch canal with its irrigation capacity of 24506 ha were selected.

Location of the study area
This study was conducted in Mahanadi reservoir canal irrigation system of Chhattisgarh state during the years 2017-18 and 2018-19. Out of the 7 canal system, 4 were considered for this study namely Mahanadi main canal, Mandhar branch canal, Baloda branch canal and Lawan branch canal, as, it is very difficult to cover entire 7 canal system. Accordingly, total 28, 14, 17 and 21 distributaries belonging to Mahanadi main canal, Lawan branch canal, Mandhar branch canal and Baloda branch canal, respectively were taken for sample collection. 20 farm families (beneficiary of canal irrigation) had been selected randomly from each of the selected village. In this way, total 240 beneficiary families (80 from Head reach, 80 from Mid reach and 80 from the tail reach) and 120 non beneficiary farm families has been selected randomly (40 head reach, 40 mid reach and 40 tail reach).

Method of data collection
The data were collected personally by the researchers in cooperation with gram sahayak and other officials of the blocks by using pre tested interview schedule.

Results and Discussion
Cropping pattern
Table 1 compiled the distribution of respondents according to different cropping patterns practiced in different water reaches of canal. Wherein, head reach (21.75%), mid reach (76.25%) and tail reach (78.75%) respondents were following Rice- Fallow- Fallow and 8.75 per cent in head reach and 3.75 per cent in mid reach farmers followed Rice + Pigeonpea- Fallow- Fallow cropping pattern. Moreover, Rice - Wheat- Fallow cropping pattern were followed the 27.50 per cent from head reach, 10 per cent from mid reach and 7.50 per cent from tail reach respondents.

Also, Rice- Chickpea- Fallow were followed by 5 per cent of head reach, 2.50 per cent of mid reach and 2.50 per cent of tail reach respondents. While, Rice- Mustard- Fallow were followed by 8.75 per cent in head reach, 3.75 per cent in mid reach and 6.25 per cent in tail reach. About 7.50 per cent of the respondents from head, 2.50 per cent from mid and 1.25 per cent from tail reach were followed Rice – Sunflower – Fallow cropping pattern. On the other side, Rice-Fallow-Summer Rice was followed by the 21.25, 1.25 and 3.75 per cent from head, mid and tail reach respondents, respectively.

Table 1: Distribution of respondents according to cropping patterns followed in different water reaches of canal

Sl. No.	Cropping Pattern	Head reach (n=80)		Mid reach (n=80)		Tail reach (n=80)	
		F	%	F	%	F	%
1	Rice- Fallow-Fallow	17	21.25	61	76.25	63	78.75
2	Rice + Pigeon pea- Fallow-Fallow	07	8.75	03	3.75	NA	NA
3	Rice- Wheat- Fallow	22	27.5	08	10	06	7.5
4	Rice- Chickpea- Fallow	04	5.00	02	2.5	02	2.5
5	Rice- Mustard-Fallow	07	8.75	03	3.75	05	6.25
6	Rice- Sunflower-Fallow	06	7.5	02	2.5	01	1.25
7	Rice-Fallow-Summer Rice	17	21.25	01	1.25	03	3.75

F = Frequency % = Percentage

Cropped area

The data regarding occupancy of rice crop in different water reaches are compiled in table 2 and the findings stated that in kharif season, rice growers used to grow rice in 129.65, 106.23 and 85.26 ha area in head, mid and tail reach respectively. In head reach, pigeon pea growers used 1.98 ha and in mid reach with an area of 1.12 ha.

Table 2: Area under major kharif crops in different water reaches of canal

Sl. No	Crops	Head Reach (n=80)	Mid reach (n=80)	Tail Reach (n=80)
		Area (ha)	Area (ha)	Area (ha)
1	Rice	129.65	106.23	85.26
2	Peageon pea	1.98	1.12	NA

Adoption of rice varieties in different water reaches

The table 3 compiled the distribution of respondents and area according to different rice varieties grown in different water reaches of canal. It was found that 40 per cent respondents were growing Swarna variety with an area of 25.31 ha in head reach, followed by MTU-1010 (31.25%), Mahamaya (28.75%), hybrid varieties (26.25%), Sonamasuri (16.25%), HMT (13.75%), Karma masuri (11.25%), IR 64 (10%) and other rice varieties (17.50%) were occupied an area of 20.67 ha, 17.21 ha, 13.02 ha, 9 ha, 9.33 ha, 8.23 ha, 7.23 ha and 12.42 ha, respectively in head reach.

Table 3: Rice varieties grown in different water reaches of canal

Sl. No	Rice Varieties	Head Reach (n=80)		Mid Reach (n=80)		Tail Reach (n=80)	
		Respon- dents (%)	Area (ha)	Respon- dents (%)	Area (ha)	Respon-dents (%)	Area (ha)
1	Swarna	40.00	25.31	35.00	23.65	36.25	20.81
2	Mahamaya	28.75	17.21	18.75	9.91	21.25	10.73
3	HMT	13.75	9.33	17.50	9.08	11.25	4.83
4	MTU-1010	31.25	20.67	17.50	11.31	18.75	16.17
5	Sonamasuri	16.25	9.00	12.50	6.05	13.75	4.50
6	IR 64	10.00	7.23	13.75	8.36	13.75	2.63
7	Karma masuri	11.25	8.23	18.75	10.77	31.25	12.27
8	MTU-1001	5.00	7.23	6.25	3.43	1.25	1.26
9	Hybrid varieties	26.25	13.02	17.50	15.02	22.50	8.80
10	Other rice varieties	17.50	12.42	15.00	8.65	15.00	3.26

*Data are based on multiple responses % = Percentage

Further, it was found that among mid reach respondents, majority were growing Swarna (35%) with the area of 23.65 ha followed by, Mahamaya (18.75%), Karma masuri (18.75%), hybrid variety (17.50%), HMT (17.50%), MTU-1010 (17.50%), IR 64 (13.75%), Sonamasuri (12.50%), MTU-1001 (6.25%) and other rice varieties (15%) of the mid reach respondents were growing on the area of 9.91 ha, 10.77 ha, 15.02 ha, 9.08 ha, 11.31 ha, 8.36 ha, 6.05 ha, 3.43 ha and 8.65 ha respectively.

It was also seen that in tail reach, majority were growing Swarna (36.25%) with an area coverage of 20.81 ha, followed by Karma masuri (31.25%), hybrid varieties (22.50%), Mahamaya (21.25%), MTU-1010 (18.75%), HMT (11.25%), Sonamasuri (13.75%), IR 64 (13.75%), MTU-1001 (1.25%) and other rice varieties with area coverage of 12.27 ha, 8.80 ha, 10.73 ha, 16.17 ha, 4.83 ha, 4.50 ha, 2.63 ha, 1.26 ha and 3.26 ha, respectively in study area.

Productivity of rice in different water reaches

The data regarding productivity of various crops grown by the respondents in the study area are compiled in table 4. The findings stated that 6.25 per cent head reach, 15 per cent mid reach and 20 per cent tail reach rice grower fetched up to 30 q/ha productivity, followed by 15 per cent in head reach, 23.75 in per cent mid reach, and 27.50 per cent in tail reach respondents obtained 30 to 40 q/ha yield.

About 78.75, 61.25 and 52.50 per cent of the head, mid and tail reach respondents obtained the productivity of rice above

40 q/ha respectively. While average productivity 45.05 q/ha for head reach, 43.42 q/ha for mid reach, and 41.14 q/ha for tail reach was found.

Table 4: Distribution of respondents according to productivity of rice in different water reaches of canal

Sl. No.	Productivity (q/ha)	Head reach (n=80)		Mid reach (n=80)		tail reach (n=80)	
		F	%	F	%	F	%
1	Upto 30	05	6.25	12	15.00	16	20.00
2	30 to 40	12	15.00	19	23.75	22	27.50
3	Above 40	63	78.75	49	61.25	42	52.50
Average productivity		45.05		43.42		41.14	

F = Frequency % = Percentage

Profitability gained from different water reaches from different crop

The findings related with occurrence of distribution of respondents according to profitability gain from different water reaches are presented in table 5. The findings reported that 7.50 per cent of head reach, 13.75 per cent of mid reach and 15 per cent from tail reach respondents were getting profitability up to 20000 (Rs/ha) in rice crop. Followed by 38.75 from head reach, 35 from mid reach and 38.75 per cent from tail reach respondents were getting 20001 to 30000 (Rs/ha) and 53.75, 51.25 and 46.25 per cent of head, mid and tail reach respondents getting profitability above 30000 (Rs/ha) respectively.

Table 5: Distribution of respondents according to profitability gained from different water reaches

Sl. No.	Profitability (Rs/ha)	Head mid (n=80)		Mid reach (n=80)		Tail reach (n=80)	
		F	%	F	%	F	%
1	Upto 20000	06	7.50	11	13.75	12	15.00
2	20001 to 30000	31	38.75	28	35.00	31	38.75
3	Above 30000	43	53.75	41	51.25	37	46.25

F = Frequency % = Percentage

Comparison of productivity of rice in different water reaches

Table 6 revealed that 45.05, 43.02 and 41.14 q/ha found in head, mid and tail reach respectively. In case of variance 26.52 in head reach, 58.70 in mid reach and 66.79 in tail reach was not same in rice crop. Degree of freedom was found 2 in between groups and 237 score found in within the groups.

Table 6: Comparison of productivity of rice in different water reaches using ANOVA

Summary						
Groups	Sum	Average		Variance		
Head reach (n=80)	3604.00	45.05		26.52		
Mid reach (n=80)	3474.31	43.42		58.70		
Tail reach (n=80)	3291.34	41.14		66.79		
ANOVA						
Source of Variation	SS	Df	MS	F	P-value	F critical
Between Groups	617.05	2	308.52	6.087	0.00264	3.03
Within Groups	12010.70	237	50.67			
Total	12627.75	239				

Mean square was found 308.52 and 50.67 in between and within the groups. In this case F-value (6.087) is greater than the F-critical value (3.033) for the alpha level selected (0.05) and p-value = 0.0026 < .05 = α. Therefore, we have evidence to reject the null hypothesis (there is no significant difference of productivity of rice in different water reaches) and say that at least one of the three samples have significantly different means and thus there was significant different in productivity of rice in the head, mid and tail reach and productivity of head reach rice grower was much higher than the mid and tail reach.

References

1. Anonymous. Survey, Results and Discussion. IES, NWDP-RA Watersheds in Maharashtra, Directorate of Soil and Water Conservation, Central Building, Pune (M.S.), 2001.
2. Bhange SB. Impact of National watershed development programme for rainfed areas on socio-economic status of farmers of Ahmednagar Distict. Ph.D. Thesis, Mahatma Phule Krishi Vidyapeeth, Rahuri, 2004.
3. Dhawan BD. Impact of Irrigation on Farm Economy in High Rainfall Areas. Econ., and Pol. Weekly 28(52 and 53): A179, 1985.
4. Gaikwad SM, Ingle PO. Impact of Karadinalla Irrigation Project. Indian J. Extn. Edn., Programme Evaluation Organisation of Planning Commission Govet. Of India. Study on problems of Minor irrigation 1968 – a and 1968-b report. 1992; 28(3&4):108-110.
5. Tilekar SN. Socio-Economic analysis of owner-tenant relationships: A Case study of Village Nimgaon Jali (Ahmednagar District). Indian J Agric. Econ. 2000; 55(3):338-339.