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Comparative assessment of farming practices adopted by the beneficiary and non-beneficiary farmers of canal irrigation system

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Abstract

This paper analyses the determinants of different farming practices undertaken by the beneficiary and non-beneficiary respondents of Mahanadi reservoir canal irrigation system. This study was conducted in Mahanadi reservoir canal irrigation system of Chhattisgarh state during the years 2017-18 and 2018-19. Four canals were considered for this study namely Mahanadi main canal, Mandhar branch canal, Baloda branch canal and Lawan branch canal. The finding revealed that higher proportion of the beneficiaries and non-beneficiaries possessed small size and marginal size of land holding. Around 45.00 per cent of beneficiaries and 54.17 per cent non-beneficiaries had their land holding in two locations. Total land holding of beneficiary respondents was 357.92 ha and of non-beneficiary respondents was 144.44 ha. Maximum area coverage of Vertisols (43.93%) had been occupied by 55.42 per cent of beneficiaries, similarly maximum coverage of Vertisols (34.82%) had been occupied by 54.17% of non-beneficiary farmers. Majority 31.80 per cent, land holding was covered by Inceptisols. One third per cent land holding had been covered with vertisols in non-beneficiaries. Out of the total beneficiary respondents, about half of them (54.18%) were practicing farming on irrigated mid land situation and 40.54 per cent of non-beneficiaries were doing farming in rain fed midland. More than half and nearly half of the beneficiary and non-beneficiary respondents were adopted Rice- Fallow- Fallow cropping pattern respectively. Majority of the head reach (21.75%), mid reach (76.25%) and tail reach (78.75%) respondents were adopting Rice- Fallow- Fallow followed by Rice - Wheat- Fallow cropping pattern.

Keywords: Beneficiary, non-beneficiary, land holding, soil type, farming situation, cropping pattern

Introduction

Agriculture makes a pre-eminent contribution in the Indian economy. About seventy per cent of the rural families depend on it. According to the reports of Indian economic survey 2017-2018 more than 50 per cent of the work force in India is involved in agriculture and has a share of 17 to 18 per cent in the total GDP. Many factors depends on agricultural production like soil, climate, genetic diversity, abundance of micro-organisms, water etc, among which water play an important role because it is required from seed germination to other physiological stages of crop growth. Total net cultivated area of India is 143 million ha. About 96 million ha land from the total net cultivated area is rainfed / dryland, covers 60 per cent and 47 million ha land is irrigated which is 40 per cent area covers. In the country annual average rainfall ranges from 400 to more than 2000 mm is recorded. So, to capture and restore this rain water, reservoir has very beneficial and probable to be implemented in different programmes of central or state government.

Materials and Methods

Location of the study area

The present study was carried out in Mahanadi reservoir canal irrigation system of Chhattisgarh state during the years 2017-18 and 2018-19. Mahanadi reservoir canal irrigation system comprise of seven canal systems namely, Mahanadi main canal, Mandhar branch canal, Abhanpur lift canal, Bhatapara branch canal, Baloda branch canal, Lawan branch canal and Mahanadi feeder canal system. 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. Total of 24 village as beneficiary village and half (12) of the total beneficiary villages had been selected from same locality as non-beneficiary village. 20 farm families (beneficiary of canal irrigation) had been selected randomly from each of the selected village. In this way, total 240 beneficiary families and 120 non beneficiary farm families has been selected randomly.

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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

Land holding

The distribution of respondents according to their land holding is presented in table 1. The data concluded that 45.42 per cent of the beneficiaries and one third of the non-beneficiaries were having small size of land holding (1.1 to 2 ha), followed by 30 per cent beneficiaries and 41.67 per cent of the non- beneficiary farmers had less than 1 ha. Some of the beneficiaries (20%) and non- beneficiaries (20.83%) were having semi medium size of land holding i.e. 2.1 to 4.0 ha. While, it was also found that 4.17 per cent of beneficiary and 4.17 per cent of non- beneficiary farmers had medium (4.1 to 10) size of land holding. However, very few (0.42%) beneficiaries and non- beneficiaries were having big size of land holding (above 10 ha).

Table 1: Distribution of respondents according to their land holding

Sl. No.	Land holding	Beneficiaries (n= 240)		Non- beneficiaries (n= 120)	
		F	%	F	%
1	Marginal (up to 1 ha)	72	30.00	50	41.67
2	Small (1.1 to 2 ha)	109	45.42	40	33.33
3	Semi Medium (2.1 to 4.0 ha)	48	20.00	25	20.83
4	Medium (4.1 to 10.0 ha)	10	4.17	05	4.17
5	Big (above 10 ha)	01	0.42	NA	NA

F = Frequency, % = Percentage

These table clearly indicating that maximum respondents had medium and small size of land holding.

Fragmentation of land

Land fragmentation can be defined as the varied locations of plots in a farm family. Table 2 indicating the distribution of respondents according to the fragmentation of their land. Wherein, it depicts that 45.00 per cent of beneficiaries and 54.17 per cent non- beneficiaries had their land holding in two locations, followed by 29.17 per cent beneficiaries and 34.17 per cent non- beneficiaries had their land holding in single fragmentation.

Moreover, 22.92 per cent beneficiary and 10 per cent of non-beneficiary farmers had their land holding in three locations. Whereas, only 2.92 per cent beneficiaries and 1.67 per cent of non- beneficiaries had their land holding in more than three locations.

Table 2: Distribution of respondents according to fragmentation of their land

Sl. No.	Land fragmentation	Beneficiaries (n= 240)		Non- beneficiaries (n= 120)	
		F	%	F	%
1	In single Location	70	29.17	41	34.17
2	In two Locations	108	45.00	65	54.17
3	In three Locations	55	22.92	12	10.00
4	More than three Locations	07	2.92	02	1.67

F = Frequency, % = Percentage

Area under different soil types

Type of soil is most important factor for the productivity of crops. In the present study, total land holding of beneficiary respondents was 357.92 ha and of non-beneficiary respondents was 144.44 ha. The distribution of respondents according to variety of soil in their land holding is presented in table 3. Data shows that maximum area coverage of Vertisols (43.93%) had been occupied by 55.42 per cent of beneficiaries, similarly maximum coverage of Vertisols (34.82%) had been occupied by 54.17% of non- beneficiary farmers.

Table 3: Area occupied by the respondents under different soil types

Sl. No	Types of Soil	Beneficiaries (n= 240)				Non- beneficiaries (n= 120)			
		F	%	Total area (ha)	% (Area)	F	%	Total area (ha)	% (Area)
1	Entisol (Bhata)	04	1.67	11.62	1.05	0	0.00	0.00	0.00
2	Inceptisols (Matasi)	127	52.92	169.90	31.80	25	20.83	32.65	17.43
3	Alfisols (Dorsa)	21	8.75	26.88	4.52	38	31.67	46.23	24.67
4	Vertisols (Kanhar)	133	55.42	193.37	43.93	65	54.17	65.24	34.82
5	Laterite Sols (Bharri)	03	1.25	0.2	0.05	02	1.67	0.32	0.17
Total				357.92				144.44	

F = Frequency, % = Percentage

About 32 per cent coverage of Inceptisols was occupied by 52.92 per cent of beneficiaries and 24.67 per cent coverage of Alfisols by 31.67 per cent non beneficiary respondents. Moreover, 4.52 per cent, 1.05 per cent and 0.05 per cent land holding was covered by Alfisols, Entisols and Lateritesols soils respectively, occupied by 8.75,1.67 and 1.25 per cent beneficiary respondents respectively. Likewise, 17.43 and 0.17 per cent land holding had been covered with Inceptisols and Lateritesols respectively occupied by 32.65 and 0.17 of non-beneficiary respondents, respectively.

Farming situation

The table 4 revealed the distribution of respondents according to the different farming situations for farming. It was observed that out of the total beneficiary respondents, about more than half (54.18%) of them were practicing farming on

irrigated mid land situation, 23.75 per cent in irrigated lowland and 7.36 per cent respondents were practicing farming on the rain fed mid land situations. Also, 7.02 per cent of the beneficiary respondents were doing farming in irrigated up land situation, followed by 4.68 per cent, in rain fed upland and about 3.01 per cent of them were practicing agriculture in rain fed lowland situation.

Similarly, among the non- beneficiary respondents, it was found that 40.54 per cent farmers were doing farming in rain fed midland, followed by 20.54 per cent were practicing in rain fed lowland. Whereas, 14.59 per cent in irrigated midland and about 14.05 per cent in irrigated lowland situation. It was also found that 5.41 per cent of the non- beneficiaries were doing agriculture in rain fed upland and 4.86 per cent of them in irrigated upland situation.

Table 4: Distribution of respondents according to their farming situation

Sl. No.	Farming Situation	Beneficiaries (n=240)		Non-beneficiaries (n=120)	
		F	%	F	%
1	Rainfed upland	14	4.68	10	5.41
2	Rainfed midland	22	7.36	75	40.54
3	Rainfed lowland	09	3.01	38	20.54
4	Irrigated upland	21	7.02	09	4.86
5	Irrigated midland	162	54.18	27	14.59
6	Irrigated lowland	71	23.75	26	14.05

F = Frequency, % = Percentage *Data based on multiple responses

Cropping pattern

Cropping pattern refers to the production area under different crops at a point of time. The data regarding cropping pattern followed by the respondents is presented in table 5. The findings indicated that, about 59 and 43 per cent of the beneficiary and non-beneficiary respondents were followed

Rice- Fallow- Fallow cropping pattern. Rice + Pigeonpea - Fallow- Fallow were followed the 4.17 per cent of beneficiaries and 2.50 per cent of non-beneficiaries.

The Rice-Wheat-Fallow (15%), Rice-Chickpea-Fallow (3.33%), Rice-Mustard-Fallow (6.25%), Rice-Sunflower-Fallow (3.75%) and Rice-Fallow-Summer rice (8.75%) had been recorded as the important cropping pattern being followed by comparatively less number of beneficiary farmers.

Further, it was also found that among non- beneficiaries, Rice-Wheat- Fallow and Rice- Chickpea - Fallow cropping pattern were followed by 12.50 and 16.67 per cent of the respondents, respectively. Similarly, 5.83 per cent of the respondents followed Rice- Mustard- Fallow, 6.67 per cent followed Rice- Sunflower-Fallow and 12.50 per cent were followed Rice- Fallow-Summer rice cropping system in their farms.

Table 5: Cropping patterns followed by the respondents

Sl. No.	Cropping Patterns	Beneficiaries (n=240)		Non Beneficiaries (n=120)	
		F	%	F	%
1	Rice- Fallow-Fallow	141	58.75	52	43.33
2	Rice+ Pigeonpea - Fallow- Fallow	10	4.17	03	2.50
3	Rice- Wheat- Fallow	36	15.00	15	12.50
4	Rice- Chickpea- Fallow	08	3.33	20	16.67
5	Rice-Mustard-Fallow	15	6.25	07	5.83
6	Rice-Sunflower-Fallow	09	3.75	08	6.67
7	Rice-Fallow-Summer Rice	21	8.75	15	12.50

F = Frequency, % = Percentage

Major crops grown in irrigated areas

The data regarding distribution of respondents according to major crops grown in irrigated situation are presented in table 6. It depicts that cent per cent beneficiaries were growing rice on 321 ha irrigated area and 29.41 per cent non- beneficiaries were growing rice in 20.91 ha irrigated area.

It was followed that 4.17 per cent beneficiaries did grow pigeon pea with an area of 3.10 ha. While, 15.00 per cent beneficiaries grew wheat with area of 49.16 ha. Similarly, 3.33 per cent beneficiaries cultivated chickpea with the area of 8.21 ha irrigated area. It was also observed that 6.25 per cent of the beneficiaries were growing mustard on 15 ha. About 3.75 per cent beneficiaries grew sunflower on the area of 8 ha, and 8.75 per cent had cultivated summer rice in 19.92 ha of irrigated area.

As regards the non- beneficiaries, it was found that none of them were cultivating pigeon pea in irrigated area. The non-

beneficiaries (12.50%) cultivated wheat in an area of 10.25 ha, followed by chickpea (16.67% non-beneficiaries) with an area of 2.23 ha. and mustard (5.83% non-beneficiaries) with an area of 1.75 ha. Similarly, 6.67 per cent of the non-beneficiaries were growing sunflower on 2.75 ha and 10 per cent were growing summer rice on 9.14 ha of the total irrigated area.

The table also shows that maximum irrigated area amongst beneficiaries was found under rice (75.65%) followed by wheat (11.39%), summer rice (4.69%), mustard (3.53%), chickpea (1.91%), sunflower (1.88%) and peageon pea (0.73%), respectively. While, amongst the non- beneficiaries, maximum irrigated area was covered by the rice (44.21%) followed by wheat (21.67%), summer rice (19.89%), sunflower (5.81%), mustard (4.71%) and Chickpea (3.70%), respectively.

Table 6: Distribution of respondents according to crops grown in irrigated area

Season	Crops	Beneficiaries (n = 240)			Non- beneficiaries (n=120)		
		Res- pondents	Irrigated Area (ha)	Area (%)	Res- pondents	Irrigated Area (ha)	Area (%)
Kharif	Rice	100.00	321.00	75.65	29.41	20.91	44.21
	Peageon Pea	4.17	3.10	0.73	2.50	NA	NA
Rabi	Wheat	15.00	49.16	11.59	12.50	10.25	21.67
	Chickpea	3.33	8.12	1.91	16.67	2.23	4.17
	Mustard	6.25	15.00	3.53	5.83	1.75	3.70
	Sunflower	3.75	8.00	1.88	6.67	2.75	5.81
Zaid	Summer Rice	8.75	19.92	4.69	10.00	9.41	19.89
Total	Kharif		324.10	76.34		20.91	44.21
	Rabi		80.28	18.62		16.98	35.86
	Zaid		19.92	4.69		9.41	19.89

% = Percentage

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