Impact of NWDPRA on Crop Productivity among Tribals of Chhattisgarh

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ABSTRACT

Survival of coming generation will depend o n farmer's ability to increase food production from rainfed agriculture. In the present situation, particularly in Indian context, it is most essential to enhance the productivity of crops due to upward trend in population pressure and this problem can only be tackled if proper management of rainfed agriculture is assured. Watershed management is one of such programme, through which the production target can be achieved. Looking to problems of rainfed areas, a multidisciplinary watershed development approach was started in the country. Chhattisgarh state is also a recipient of watershed programme (NWDPRA) with 175 watersheds covering 18.5 million ha area. The study was carried out in the purposively selected Bastar district of Chhattisgarh. Out of 14 blocks, 5 blocks along with 15 villages were randomly selected for the study. A total member of 300 respondents were selected (200 beneficiaries and 100 non beneficiaries) in terms 2:1 ratio for comparison of both the categories of respondents. The study reveals that average annual income of beneficiaries was found higher than non-beneficiaries and also in case of cropping intensity, the significant difference was recorded among both the categories of respondents. Further, in case of productivity level of different crops, slightly increasing trend was found among beneficiaries as compared to non-beneficiaries due to use of HYV, and agronomical practices, etc.

Key words: *Watershed management; Crop productivity*

Agriculture is the only sector where the production has increased four fold since independence from 51 million tonnes in 1950-51 to 209 million tonnes in 2000-01 against as three fold increase in population. Rapid growth of agriculture is essential not only to achieve self-sustenance at national level but also for food, nutrition and environmental security. Uneven development of agriculture across the regions and crops and also across different sections of farming community is mostly attributed to low level of productivity in rainfed areas coupled with degradation of natural resources of land and water. The challenge before the Indian agriculture, therefore, is to transform rainfed agriculture into more sustainable and productive through efficient use of natural resources. Hence, conservation and management of rainwater holds the key for sustainable development of agriculture in rainfed areas.

Only three per cent irrigation facility exists in Bastar district and thus the farmers cultivate crops in absence of irrigation and depend only on the rainfall.

This project is aimed at sustainable production of biomass of crops, fodder, fuel, and fibre, etc. Through scientific utilization of land, water, plant and animal resources in a watershed with twin objectives of restoration of ecological balance and socio-economic welfare of watershed community.

The Government initiative through watershed development is helpful to a great extent in changing the agriculture scenario in all the rainfed areas in the country. The state of Chhattisgarh has also been the recipient of the National Watershed Development Programme (NWDPRA) Project. The project was started in the year 1990-91. Baster district of Chhattisgarh state has 14 blocks, in each block NWDPRA programme was started during 1990-91 covering 52084.051 ha area of the district having 120 villages along with 16047 beneficiaries.

The National Watershed Development Programme for Rainfed Areas has completed its first phase of development. The impact of NWDPRA programme on socio-economic aspects, crop productivity in the project areas is important from the point of view of the increasing population pressure and huge amount of money spent by the government. Present study was carried out with following specific objectives.

(i) To assess the impact of NWDPRA on annual income among the tribals.
(ii) To study the impact of NWDPRA on productivity and cropping intensity among beneficiary and non-beneficiary respondents.

METHODOLOGY

Bastar district has largest tribal population in the state of Chhattisgarh and all of its blocks were covered

under NWDPRA programme because Bastar district has maximum areas under rainfed farming. For representation of all parts of the district, five blocks (one third of the total blocks) out of fourteen were selected on the basis of their geographical distribution in different directions viz., North, South, East, West and Central. These blocks are Keshkal, Narayanpur Potanar, Bakawand and Kondagaon. A total sample was comprised of 300 respondents; out of which 200 beneficiaries and one hundred non-beneficiaries were randomly selected .The impact was assessed with the help of following formula using the data of Pre-NWDPRA and Post-NWDPRA period of the project area.

Formula : $I = \frac{X_1 - X_2}{X_3}$

Where, I = Impact of technology

X_1 = Post-NWDPRA position

X_2 = Pre-NWDPRA Position

The 'Z' test was applied for comparison of two samples of respondents i.e. beneficiaries and non-beneficiaries.

RESULTES AND DISCUSSION

Data in Table 1 indicated that average annual income of beneficiaries was quite high as compared to non-beneficiaries. The major factors affecting increase in average annual income were animal husbandry, forest produces, services and liquor in addition to agriculture. The reason may be due to the awareness among the beneficiaries about the usefulness of animal husbandry, forest produces that generate additional income as a result of launching of NWDPRA programme.

Majority of beneficiaries (90 %) and non-beneficiaries (93%) respondents were growing crops only in *Kharif* season. More than 80 per cent area was covered by single crop i.e. Paddy and remaining area by other *Kharif* crops like pulses and minor millets, etc. in the Bastar district.

Table 1. Impact of NWDPRA on average annual income of the respondents

Source of income	Average annual income of the respondents					
	Beneficiaries			Non-beneficiaries		
	1996-97	2001-02	Change	1996-97	2001-02	Change
1. Agriculture	7983.30	10138.79	26.99	5317.30	6696.83	25.94
2. Animal husbandry	205.50	2788.44	1256.20	272.28	2114.79	676.69
3. Labour	1762.65	4309.08	144.46	1035.70	3700.88	257.33
4. Forest products	1950.30	5070.90	160.00	1872.25	2907.83	55.31
5. Services	738.70	1647.71	123.05	620.25	969.27	56.27
6. Business	135.05	380.24	181.13	102.50	440.58	329.83
7. Liquor	440.55	1013.97	130.16	450.20	793.04	76.15
Total	13216.25	25349.48	91.80	9670.50	17623.25	82.28

However, only four per cent respondents of both the categories were taking double crops and negligible (1.50 %) number of beneficiaries were taking more than two crops in a year.

Table 2. Distribution of respondents according to their cropping intensity

Cropping intensity %	Respondents				Z calc.
	Beneficiaries (N=200)		Non-beneficiaries (N=100)		
	No.	%	No.	%	
100	180	90.00	93	93.00	3.68**
100.1 - 150.00	9	4.50	3	3.00	
150.1 - 200.00	8	4.00	4	4.00	
Above 200.00	3	1.50	0	0.00	

*** Significant at 1 % level of probability*

Significant difference was found at one percent level of probability among the beneficiaries and non-beneficiary respondents regarding the impact of NWDPRA on cropping intensity. The main reason behind this was the source of irrigation had increased and demonstrations were also conducted very often in the watershed area.

After NWDPRA programme, the cropping intensity was increased by 8.98 per cent (103.00 to 112.25 %) in case of beneficiaries and by 4.28 per cent (100.73 to 105.05 %) in case of non-beneficiaries. Thus, the considerable impact of NWDPRA was observed on cropping intensity.

Table 3. Impact of NWDPRA on change in cropping intensity

Categories	1996-97	2001-02	Change (%)
Beneficiaries	103.00	112.25	8.98
Non-beneficiaries	100.73	105.05	4.28

Table 4 reveals that the maximum respondents in both the categories viz, beneficiaries (83.00 %) and non-beneficiaries (77 %) were under low productivity level (< 10q ha-1) while 14.50 per cent beneficiaries and 21 per cent non-beneficiaries had medium productivity level (10-20 q ha-1). However, a few number of respondents

(2.50 and 2.00 %) were under the high productivity level (<20 q ha-1) in case of both the categories.

Table 4. Distribution of respondents according to their crop productivity level

Level of crop productivity (q ha^{-1})	Respondents				Z calc.
	Beneficiaries (N=200)		Non-beneficiaries (N=100)		
	No.	%	No.	%	
Low (<10)	166	83.0	77	77.0	6.80**
Medium(10-20)	29	14.5	21	21.0	
High (>20)	5	2.5	2	2.0	

*** Significant at 1 % level probability*

Significant difference at one per cent probability level was recorded in both the categories of respondents. The reason may be the more use of high yielding varieties among beneficiaries than non beneficiary farmers.

The yield level of paddy had increased by same rate in case of both the beneficiaries (9.09-10.23 q ha^{-1}) and non-beneficiaries (9.10-10.34 q ha^{-1}) while yield of maize was slightly high i.e. 4.43 per cent increased among beneficiaries as compared to non-beneficiaries (1.37 % increased). But the yield level of other crops like Ragi, Kodo, Arhar, Urd, etc. were found almost similar in case of both beneficiary and non-beneficiary farmers.

Table 5. Impact of NWDPRA on change in crop productivity (q ha^{-1})

S.No.	Crops	Beneficiaries			Non-beneficiaries		
		1996-97	2001-02	Change (%)	1996-97	2001-02	Change (%)
1.	Paddy	9.09	10.23	12.54	9.10	10.34	13.62
2.	Maize	13.35	13.93	4.43	13.10	13.28	1.37
3.	Ragi	3.01	3.19	5.98	3.04	3.17	4.27
4.	Kodo/Kutko	2.25	2.68	19.11	2.43	2.98	22.63
5.	Niger	1.87	1.97	5.34	1.90	1.98	4.21
6.	Arhar	12.00	12.01	0.08	12.03	12.07	0.33
7.	Urd	4.11	4.42	7.54	4.10	4.40	7.31
8.	Wheat	9.75	11.62	19.17	5.43	6.27	15.46
9.	Mustard	3.50	4.06	13.72	3.51	4.00	13.96
10.	Gram	4.02	4.09	1.74	3.93	4.10	4.32
11.	Sunflower	0.00	10.00	10.00	0.00	0.00	0.00
12.	Pea	0.00	13.50	13.50	0.00	0.00	0.00
13.	Soybean	0.00	4.50	4.50	0.00	0.00	0.00

The result indicates that the yield level of paddy increased due to use of high yielding varieties and other agronomic practices. But creation of water resources and soil conservation structures in watershed area had not much impact on crop productivity. This was at the initial stage of the programme. At present, the beneficiaries have been benefited to some extent from watershed activities but in future they may use the created water resources for the improvement in productivity of crops. New crops like wheat, sunflower, pea, soybean, etc. were introduced in watershed area may be due to impact of NWDPRA programme.

CONCLUSION

It concluded from the results that average annual income of beneficiaries was recorded more as compared to non-beneficiary respondents. The major components viz, animal husbandry, forest produces, services, and liquor was affecting their annual income. In case of cropping intensity, the significant difference was found among both category of beneficiaries regarding the impact of cropping intensity due to watershed programme. However, in the productivity level of different crops, slightly increasing trend was recorded among beneficiaries as compared to non-beneficiaries. Mainly productivity level of paddy crop was increased among beneficiaries due to use of high yielding varieties and other agronomical practices, and productivity level of other crops was found more or less similar.

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