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Impact of agricultural technology management agency (ATMA) on crop diversification and income of beneficiaries farmers in Chhattisgarh state

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Abstract

The ATMA (Agricultural Technology Management Agency) scheme is a centrally sponsored scheme launched by the Government of India in 1998-99. The objective of the scheme is to promote sustainable agriculture and enhance the productivity and income of farmers by providing them with the necessary information, knowledge, and technology. The scheme also aims to promote convergence and coordination among different agencies involved in agricultural development, including research and extension agencies, input dealers, NGOs, and farmer organizations. It is expected that the ATMA scheme will help in transforming the agriculture sector in India by empowering farmers with the latest knowledge and technology and making them more self-reliant. The key objectives of the ATMA scheme are to promote the adoption of modern and innovative agricultural technologies, improve productivity and profitability of farming operations, promote sustainable agriculture practices, enhance the income of farmers, and strengthen the agricultural extension system in the country. Farmer's area as well as behavior of farming practices influences agriculture sector in the Raipur area of Chhattisgarh, according to the study. The goal of this research is to record and describe various dimensions of ATMA scheme and its beneficial farmer. The purpose of this research is to determine how Agriculture Technology Management Agency gives impact in beneficial farmer's income. The research also valuable to me because it broadens my understanding of various way for ATMA scheme. The study aids in the presentation of an overview of the Agriculture Technology Management Agency impact in beneficiaries farmer farming behavior. The research was carried out in Raipur district of Chhattisgarh. The specific objective of the present study was to examine the impact of ATMA on income and employment of beneficiaries' farmers in the study area. Overall net return was increased 38.84 percent. In case of Kharif season the net income increased higher as compared to summer and Rabi season. Overall employment was increased 14.38 percent. In case of Rabi season the employment days was higher as compared to Kharif and summer season.

Keywords: Agricultural technology management agency, crop diversification, beneficiaries farmers

Introduction

Agriculture is the backbone of Indian economy. Agriculture sector represents the main form of income for a majority of families in rural India and increasing income of the rural population is an important objective of Agricultural Policy. The ATMA (Agricultural Technology Management Agency) scheme is a centrally sponsored scheme launched by the Government of India in 1998-99. The objective of the scheme is to promote sustainable agriculture and enhance the productivity and income of farmers by providing them with the necessary information, knowledge, and technology. Under the scheme, the Government provides financial assistance to the States for setting up ATMA units at the district level. The ATMA units are responsible for implementing various agricultural extension activities such as training and capacity building of farmers, demonstrations of new technologies, dissemination of information on crop management practices, and providing support for the development of agriculture-related infrastructure. It is expected that the ATMA scheme will help in transforming the agriculture sector in India by empowering farmers with the latest knowledge and technology and making them more self-reliant.

The key objectives of the ATMA scheme are to promote the adoption of modern and innovative agricultural technologies, improve productivity and profitability of farming operations, promote sustainable agriculture practices, enhance the income of farmers, and strengthen the agricultural extension system in the country.

Methodology

The study was conducted in Chhattisgarh state. From this state, Raipur district was purposively selected based on a Bayes and good percentage of implementation of ATMA scheme on the basis of Agricultural point of view. There were 4 blocks in Raipur district *viz*., Arang, Abhanpur, Tilda and Dharsiwa Out of which Dharsiwa and Abhanpur block were selected purposively based nearest location and on major number of beneficiaries of farmer from the blocks. Two villages were selected purposively from each block, thus a total of 4 villages were selected for the present study. 50 farmers were selected randomly to the sample of 200 for study. The entire number of beneficiaries of farmer was divided into four groups based on the magnitude of their holdings. The data was obtained utilizing the personal interview approach after the research design and interview

schedule were finalized. The field survey approach was used to attain the given goals. Both primary and secondary data were collected for the study.

Results and Discussion

Socio economic profile of ATMA beneficiary farmers

Socio economic profile of selected beneficiaries is presented in table1. The family size of marginal, small, semi-medium and medium farmers was found to be 3.32, 3.29, 4.29 and 5.93 respectively. Overall family size was to be 3.75 overall literacy percentages was found to be 82.43 percent.

Age wise distribution of sample households in the study area

Age wise distributions of respondent are presented in table 2. Majority of the respondent belong to age group 25 to 60 years followed by age group above 60 years.

Table 1: Socio economic profile of ATMA beneficiary farmers

Particulars	Farms size of beneficiaries' farmer				Total
	Farms size				
	Marginal	Small	Semi- Medium	Medium	
Beneficiaries' farmer (n=200)	63	69	54	14	200
Number of family members	209	227	231	83	750
Average family size	3.32	3.29	4.28	5.93	3.75
Literacy of households (Numbers)	**Marginal**	**Small**	**Semi- Medium**	**Medium**	**Total**
a. Illiterate	9 (14.29)	8 (11.59)	5 (9.26)	0 (0.00)	22 (11.00)
b. Primary school	20 (31.75)	9 (13.04)	12 (22.22)	3 (21.43)	44 (22.00)
c. Middle school	13 (20.63)	18 (26.09)	13 (24.07)	3 (21.43)	47 (23.50)
d. Higher secondary school	11 (17.46)	21 (30.43)	16 (29.63)	7 (50.00)	55 (27.50)
e. University/college (UG/PG) and above	10 (15.87)	13 (18.84)	8 (14.81)	1 (7.14)	32 (16.00)
Literacy %	85.71	88.41	90.74	100.00	82.43
Total literate	54	61	49	14	178
Total	63	69	54	14	200
	100.00	100.00	100.00	100.00	100.00

Note: Figures in parenthesis indicate percentage to total.

Table 2: Age wise distribution of sample households in the study area

Age Group (years)	Marginal (63)	Small (69)	Semi- Medium (54)	Medium (14)	Total
a. 18 to 25 years	6 (9.52)	6 (8.70)	2 (3.70)	0 (0.00)	14 (7.0)
b. 25 to 60 years	42 (66.67)	48 (69.57)	38 (70.37)	3 (21.43)	131 (65.50)
c. Above 60 years	15 (23.81)	15 (21.74)	14 (25.93)	11 (78.57)	55 (27.50)
%	100.00	100.00	100.00	100.00	100.00
Total	63	69	54	14	200

Note: Figures in parenthesis indicate percentage to total.

Caste wise distribution of sample households

Caste wise details of sample household is presented in table 3

Table 3: Caste wise distribution of sample households in the study area

Caste Categories	Category wise size of Beneficiaries Farmer (n =200)				Total in Number
	(Below 1.00 hectare)	(1.00-2.00 hectare)	(2.00-4.00 hectare)	(4.00-10.00 hectare)	
	Marginal (63)	Small (69)	Semi- Medium (54)	Medium (14)	
a. Schedule Tribe	4 (6.35)	1 (1.45)	2 (3.70)	0 (0.00)	7 (3.50)
b. Scheduled Caste	5 (7.94)	3 (4.35)	2 (3.70)	0 (0.00)	10 (5.00)
c. Other Backward Caste	51 (80.95)	61 (88.41)	46 (85.19)	14 (100.00)	172 (86.00)
d. General	3 (4.76)	4 (5.80)	4 (7.41)	0 (0.00)	29 (5.50)
Total	63	69	54	14	200

Note: Figures in parenthesis indicate percentage to total.

Cropping pattern of selected households

Kharif season: Cropping pattern of selected households is presented in table 4. It was observed that the after introduction / adopted of ATMA the area under paddy crop was decrease 396 hectares to 282 hectare and area under maize, pigeon-pea, green gram, black gram and scented rice was increased. Maize crop was increased from 50 to 81-hectare, pigeon-pea was increased from 16 to 47-hectare, green gram was increased from 7 to 27-hectare, black gram was increased from 0 to 13-hectare and scented rice was increased 0 to 8 -hectare. It was observed that the after introduction / adopted of ATMA the area under paddy crop was decrease and under maize, pigeon-pea, green gram, black gram, scented rice was increased.

Table 4: Cropping pattern (Kharif Crop) at sample farms in the study area (In % change) in hectare

Kharif crop	Before ATMA (a) hectare				After ATMA (b) hectare				Before ATMA Total (a)	After ATMA Total (b)	Absolute Change (b-a)	Relative Change % (b-a)/b*100
	Marginal (63)	Small (69)	Semi-Medium (54)	Medium (14)	Marginal (63)	Small (69)	Semi-Medium (54)	Medium (14)				
1. Paddy area in %	50 (94.87)	105 (90.41)	149 (82.17)	91 (77.54)	39 (72.90)	78 (66.86)	106 (58.47)	59 (50.24)	396	282	-114	-28.83
2. Maize area in %	3 (5.13)	9 (7.80)	21 (11.55)	17 (14.91)	6 (11.95)	16 (13.92)	30 (16.78)	28 (24.29)	50	81	31	62.24
3. Pigeon-peav area in %	0 (0.00)	2 (1.79)	7 (4.04)	6 (5.43)	6 (10.85)	14 (12.29)	19 (10.72)	17 (14.84)	16	57	41	261.16
4. Green gram area in %	0 (0.00)	0 (0.00v)	4 (2.24)	2 (2.12)	1 (2.35)	3 (2.49)	17 (9.17)	7 (5.60)	7	27	21	317.63
5. Black gram area in %	0 (0.00)	0 (0.00v)	0 (0.00)	0 (0.00)	1 (1.95)	3 (2.52)	6 (3.29)	3 (2.54)	0	13	13	13.00
6. Sugandhit Dhan area in %	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.91)	3 (1.57)	3 (2.48)	0	8	8	8.00
Total area (hec.)	53.23 (100.00)	116.56 (100.00)	181.43 (100.00)	116.98 (100.00)	53.23 (100.00)	116.56 (100.00)	181.43 (100.00)	116.98 (100.00)	468.20	468.20	0.00	633.19
Total %									100.00	100.00	100.00	100.00
average	0.84	1.69	3.36	8.36	0.84	1.69	3.36	8.36	2.34	2.34	0.00	3.17

Note: Figure in parenthesis indicates percentage to total.

Cropping pattern Rabi Crop at sample farms in the study area

Cropping pattern Rabi Crop at sample farms in the study area is presented in table 5. It was observed that the after introduction / adopted of ATMA the area under Wheat crop was decrease 247 hectares to 216 hectare and under Chickpea, Mustard, Lathyrus (Tiwada), Finger Millet (Ragi), Summer paddy was increased. Chickpea crop was increased from 48 to 106-hectare, Mustard was increased from 14 to 49-hectare, Lathyrus (Tiwada) was decreased from 62 to 33-hectare, Finger Millet (Ragi) was increased from 0 to 14-hectare and summer paddy was decreased 7 to 6 -hectare. In case of Rabi crop area under wheat was decreased and the area under chickpea, maize, mustard finger millet was increases. Total area under Rabi crop was increased by 12% at it is evident from the result that there is good and positive impact found in ATMA respondent in terms at increasing area of Rabi crop.

Cropping pattern Summer Crop at sample farms in the study area: Cropping pattern Summer Crop at sample farms in the study area is presented in table 6. It was observed that under summer paddy crop was decrease 32 hectares to 31 hectare and under maize, green gram, black gram, small millet was increased. Maize crop was increased from 22 to 33 -hectare, green gram was increased from 3 to 11-hectare, black gram was increased from 5 to 9-hectare and small millet was increased 7 to 16 -hectare. In case of summer crop area under Rice was shelty decrease and the area under maize, mustard and small millet were increases.

Table 5: Cropping pattern (Rabi Crop) at sample farms in the study area (In % change) in hectare

Rabi crop	Before ATMA (a) hectare				After ATMA (b) hectare				Before ATMA Total (a)	After ATMA Total (b)	Absolute Change (b-a)	Relative Change % (b-a)/b*100
	Marginal (63)	Small (69)	Semi-Medium (54)	Medium (14)	Marginal (63)	Small (69)	Semi-Medium (54)	Medium (14)				
1. Wheat	13	57	105	71	12	48	95	60	247	216	-31	-12.65
%	31.42	59.20	75.41	72.48	27.46	44.03	59.82	54.31	-	-	-	-
2. Chickpea	7	14	10	17	15	32	31	28	48	106	58	120.93
%	15.81	14.92	7.46	16.89	32.54	29.58	19.35	25.86	-	-	-	-
3. Mustard	0	0	7	6	6	8	20	14	14	49	36	262.40
%	0.00	0.00	5.24	6.37	14.45	7.45	12.71	12.98	-	-	-	-
4. Lathyrus (Tiwda)	23	25	14	0	10	18	4	0	62	33	-29	-46.84
%	52.77	25.88	10.15	0.00	23.33	16.68	2.55	0.00	-	-	-	-
5. Finger Millet (Ragi)	0	0	0	0	1	2	6	4	0	14	14	14.00
%	0.00	0.00	0.00	0.00	2.22	2.26	4.03	3.78	-	-	-	-
6. Summer paddy	0	0	2	4	0	0	2	3	7	6	-1	-12.25
%	0.00	0.00	1.74	4.26	0.00	0.00	1.53	3.06	-	-	-	-
Total area (hec.)	42.89	96.19	139.77	97.95	44.77	109.65	159.38	109.87	376.80	423.68	0.00	325.59
Total (%)	80.57	82.53	77.04	83.73	84.10	94.07	87.85	93.93	80.48	90.49	0.00	86.41
average	0.68	1.39	2.59	7.00	0.71	1.59	2.95	7.85	1.88	2.12	0.00	1.63

Note: Figure in parenthesis indicates percentage to total.

Table 6: Cropping pattern (Summer crop) at sample farms in the study area

Summer crop Cropping pattern at sample farms in the study area (In % change) In hectare												
Summer crop	Before ATMA (a) hectare				After ATMA (b) hectare				Before ATMA Total (a)	After ATMA Total (b)	Absolute Change (b-a)	Relative Change % (b-a)/b*100
	Marginal (63)	Small (69)	Semi-Medium (54)	Medium (14)	Marginal (63)	Small (69)	Semi-Medium (54)	Medium (14)				
1. Summer paddy	3.97	9.10	11.22	7.94	4.17	8.95	11.36	6.90	32	31	-1	-2.6
%	55.37	59.14	48.88	34.51	33.85	40.97	32.28	22.57	-	-	-	-
2. Maize	1.17	3.81	6.29	10.67	3.70	6.57	11.52	11.34	22	33	11	51.0
%	16.27	24.73	27.40	46.39	30.00	30.09	32.74	37.06	-	-	-	-
3. Green gram	0.00	0.00	1.37	1.50	0.81	1.18	5.28	3.44	3	11	8	273.7
%	0.00	0.00	5.96	6.51	6.57	5.39	15.01	11.25	-	-	-	-
4. Black gram	0.00	1.06	1.71	1.78	0.81	1.19	2.21	4.86	5	9	5	98.9
%	0.00	6.92	7.46	7.74	6.57	5.45	6.28	15.88	-	-	-	-
5. Small millet	2.03	1.42	2.36	1.11	2.83	3.95	4.82	4.05	7	16	9	125.9
%	28	9	10	5	23	18	14	13	-	-	-	-
Total area (hec.)	7.17	15.39	22.96	23.00	12.32	21.84	35.19	30.59	100	69	31.42	546.94
Total (%)	100	100	100	100	100	100	100	100	100	100	100	100
Average	0.11	0.22	0.43	1.64	0.20	0.32	0.65	2.18	0.50	0.34	0.16	2.73

Note: Figure in parenthesis indicates percentage to total.

Net Return from crop (per hectare) of sample farmers in the study area

Net Return from crop (per hectare) of sample farmers in the study area is presented in table7. Overall net return was increased 38.84 percent. In case of Kharif season the net income increased higher as compared to summer and Rabi season.

Table 7: Net Return from crop (per hectare) of sample farmers in the study area Net Return from crop (per hectare)

S. No	Income from crops	Before ATMA total net return (A)	After ATMA total net return (B)	(A-B)	% in income increase
1.	Kharif season	70388.03	153580.15	83192.12	54.17
2.	Rabi season	75,688.35	1,01,205.26	25516.91	25.21
3.	Summer season	72550.01	102690.21	30140.2	29.35
	Overall Net Return	2,18,626.39	3,57,475.62	1,38,849.23	38.84

Note: Figures in parenthesis indicate percentage to total net return of sample farmers.

Impact of ATMA on Employment of beneficiaries' farmers (Per hectare)

Impact of ATMA on Employment of beneficiaries' farmers. (Per hectare) is presented 8. Overall employment was increased 14.38 percent. In case of Rabi season the employment days was higher as compared to Kharif and summer season.

Table 8: Impact of ATMA on Employment of beneficiaries' farmers. (per hectare/days)

S. No	Employment of beneficiaries' farmers	Before ATMA (A)	After ATMA (B)	(A-B)	% change in employment
1	Kharif season	56	72	16	22.22
2	Rabi season	40	56	16	28.57
3	Summer season	35	25	-10	-40.00
	Overall Net Return	131.00	153.00	22.00	14.38

Conclusions

Overall family size was to be 3.75 overall literacy percentages was found to be 82.43 percent. Majority of the respondent belong to age group 25 to 60 years followed by age group above 60 years. Majority of selected farmers are belonging to other backward caste followed by scheduled caste.Overall average size of holding was about 2.34 hectare.It was observed that the after introduction / adopted of ATMA the area under paddy crop was decrease and under maize, pigeon-pea, green gram, black gram, scented rice was increased. Total area under Rabi crop was increased by 12% at it is evident from the result that there is good and positive impact found in ATMA respondent in terms at increasing area of Rabi crop. In case of summer crop area under Rice was shelty decrease and the area under maize, mustard and small millet was increases. It was observed that the after introduction / adopted of ATMA project cost and returns of all the crops were increased. The net return was increase in almost all the crops. It was observed that the after introduction / adopted of ATMA project the net returns of the Rabi crops are increased. However, the input-output ration was decreased in almost all crops. It was observed that the net returns are increased after the adopted of package of practise in all the summer crops However, the input-output ratio was decreased slightly in all the crops. Overall net return was increased 38.84 percent. In case of kharif season the net income increased higher as compared to summer and Rabi season. Overall employment was increased 14.38 percent. In case of Rabi season the employment days was higher as compared to kharif and summer season.

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