



IMPACT OF AGRICULTURAL TECHNOLOGY MANAGEMENT AGENCY ON RURAL ECONOMY OF NAGALAND, INDIA

Imtiwalling*, Amod Sharma, Mukesh Kumar Yadav, Arun Kumar Rajbhar and Kankabati Kalai

Nagaland University, SASRD Medziphema Campus, Dimapur - 797 106 (Nagaland), India.

Abstract

The study was conducted in Mokokchung and Peren Districts of Nagaland. A sample size of 160 (80 beneficiaries and 80 non-beneficiaries) were selected from 8 villages based on proportionate random sampling procedure. The present study indicates that annual income for beneficiaries was found to be higher than non-beneficiaries. For both beneficiaries and non-beneficiaries highest employment was found out to be for crop production and least for fishery. It also highlights that Impact of ATMA on average income was highest at Forest and Plantation and least on Service. The study further reveals that average per year family income and employment in mandays generation of the beneficiaries after ATMA has increased.

Key words : Impact, beneficiaries, ATMA, non-beneficiaries.

Introduction

The basic extension machinery in India is the outcome of the short-lived Grow More Food (GMF) campaign that was started by the then Food Minister Shri K.M. Munshi in 1947. In 1948, Albert Mayer spearheaded the first post-independence extension program in the district of Etawah, in Uttar Pradesh. This was the first example of peoples' participation in rural development. The introduction of the Training-and-Visit (T&V) Extension system was an important milestone in the history of extension in India but there were problem and constraints in its implementation. During the mid-1990s, the Government of India and the World Bank began exploring new approaches to extension that would address these system problems and constraints. The National Agricultural Technology Project (NATP) was initiated in India with World Bank support in year 1998 and phase wise ATMAs were established in pilot project districts. The successful experiment served as a basis to launch the scheme "Support to State Extension Programmes for Extension Reforms" in its first phase since 2005-06. The scheme was scaled to 252 districts in the country during the 10th plan. ATMA is a unique district level institution, which caters to activities in agriculture and allied departments adopting a Farming System Approach. ATMA, a registered society of key stakeholders involved in

agricultural activities for sustainable agricultural development in the district is responsible for technology dissemination at the district level. Consequently, in 2010 the scheme has been modified and strengthened with a strong manpower, infrastructure and activities such as provision of specialist and functionary and supporting staff, innovative support through a "Farmer Friend" at village level, revision in ATMA cafeteria, delegation of power to State Level Sanctioning Committee (SLSC) set up under Rashtriya Krishi Vikas Yojana (RKVY) etc. In Nagaland the ATMA programme was launched in 2005-06 in three districts, viz., Dimapur, Kohima and Mokokchung and it was continued as such in 2006-07 also. ATMA programme was extended in all other eight districts of Nagaland in 2008-09 ie., Wokha, Peren, Kipheri, Zunheboto, Tuensang, Mon, Longleng and Phek, and covered the entire State of Nagaland. Realizing the need of studying the progress and impact of the Agricultural Technology Management Agency, a study was conducted on "Impact of Agricultural Technology Management Agency on Rural Economy of Nagaland" with the following objectives:

1. To assess the changes in income of beneficiaries over the non-beneficiaries.
2. To analyze the changes in volume and pattern of employment.

**Author for correspondence* : E-mail : arun73046@gmail.com

Methodology

The present study was conducted in the state of Nagaland. Two districts Mokokchung and Perenwere selected purposively with the fact that it is expected to provide all the relevant information and hence conveniently been obtained for conducting the present study. Three stage stratified random sampling technique was used for the selection of blocks, villages and respondent. In first stage of sampling, two blocks from each district was randomly selected; in second stage from each block two villages were selected randomly; in third stage from 8 randomly selected villages 160 respondents were selected randomly, out of which 80 were beneficiaries of ATMA and 80 were non-beneficiaries of ATMA.

Results and Discussion

To assess the changes in income of beneficiaries over the non-beneficiaries

The income of the families of beneficiaries on an average per year before ATMA and after ATMA is presented in table 1. The beneficiaries before ATMA animal husbandry (36.67%) ranks first for the source of income, followed by crop production (22.58%), service (22.13), others (8.27), fishery (4.02%), forest and plantation crops (3.25%) and lastly from business (2.78%). On an average before ATMA the annual income of the beneficiaries was Rs. 173960.80/-.

The beneficiaries after ATMA animal husbandry (32.92%) ranks first for the source of income, followed by crop production (22.28%), service (18.74%), others (9.34%), forest and plantation crops (7.02%), fishery (6.44%) and lastly from business (3.25%). On an average after ATMA the annual income of the beneficiaries was reported Rs.209563.75/-.

The impact of ATMA to the beneficiaries on average income was found highest at forest and plantation crops (Rupees 8593.75/-) on average per year, followed by crop production (Rupees 7410.75/-), fishery (Rs.6500/-), animal husbandry (Rupees 5186/-), others (Rupees 5175/-) on average per year, followed by business (Rupees 1962.50/-). The least impact was on service (Rs.750/-) on an average per year.

The impact was highest on forest and plantation crops and crop production due to the fact that climatic condition was conducive and suitable for agriculture and plantation crops and the soil is fertile. On an average family income of the beneficiaries increased by Rupees 35127.98/- which reveals that ATMA had a positive impact to the beneficiaries on income generation and consequently increasing their living standard. Negligible impact was

Table 1 : Impact of ATMA on income.

Item	Before ATMA		Total average	Percentage	After ATMA		Total average	Percentage	Impact		Total average	Percentage
	Mokokchung	Peren			Mokokchung	Peren			Mokokchung	Peren		
Crop production	40570.25	38000.75	39285.50	(22.58)	48618.13	44774.38	46696.25	22.28	8047.88	6773.63	7410.75	(20.82)
Animal Husbandry	69550.00	58050.50	63800.25	(36.67)	75162.50	62810.00	68986.25	32.92	5612.50	4759.50	5186.00	(14.57)
Fishery	7500.00	6500.00	7000.00	(4.02)	13750.00	13250.00	13500.00	6.44	6250.00	6750.00	6500.00	(18.26)
Forest & Plantation	5700.00	6550.00	6125.00	(3.52)	14637.50	14800.00	14718.75	7.02	8937.50	8250.00	8593.75	(24.15)
Service	38000.00	39000.00	38500.00	(22.13)	38600.00	39950.00	39275.00	18.74	600	900	750	(2.10)
Business	5200.00	4500.00	4850.00	(2.78)	7887.50	5737.50	6812.50	3.25	2687.50	1237.50	1962.50	(5.51)
Others	12000.00	16800.00	14400.00	(8.27)	17300.00	21850.00	19575.00	9.34	5300.00	5050.00	5175.00	(14.54)
Grand total	178520.30	170351.3	173960.8	(100)	215955.63	203171.88	209563.75	100	37435.38	32820.58	35127.98	(100)

Table 2 : Income from different source.

Groups ↓	Crop production	Animal Husbandry	Fishery	Forest & Plantation	Service	Business	Others	TOTAL	
sárádrene B	Small	60000.00 (37.86)	0.00 (0.00)	10125.00 (6.39)	32500.00 (20.51)	11250.00 (7.10)	27500.00 (17.35)	158487.50 (100)	
	Medium	40042.86 (19.70)	74428.57 (36.62)	11428.57 (5.62)	13321.43 (6.55)	40285.71 (19.82)	7892.86 (3.88)	15857.14 (7.80)	203257.14 (100)
	Large	59803.41 (25.50)	78386.36 (33.43)	17727.27 (7.56)	16295.45 (6.95)	38636.36 (16.48)	7272.73 (3.10)	16363.64 (6.98)	234485.23 (100)
	Average	48618.13 (22.51)	75162.50 (34.80)	13750.00 (6.37)	14637.50 (6.78)	38600.00 (17.87)	7887.50 (3.65)	17300.00 (8.01)	215955.63 (100)
gnúhkkoko M	Small	15740.00 (9.72)	54350.00 (33.55)	0.00 (0.00)	12416.67 (7.66)	54833.33 (33.85)	6166.67 (3.81)	18500.00 (11.42)	162006.67 (100)
	Medium	35325.00 (18.74)	57175.00 (30.34)	14687.50 (7.79)	13187.50 (7.00)	35875.00 (19.03)	7093.75 (3.76)	25125.00 (13.33)	188468.75 (100)
	Large	62851.94 (27.33)	70638.89 (30.72)	16388.89 (7.13)	17027.78 (7.40)	38611.11 (16.79)	4388.89 (1.91)	20055.56 (8.72)	229963.06 (100)
	Average	44774.38 (22.04)	62810.00 (30.91)	13250.00 (6.52)	14800.00 (7.28)	39950.00 (19.66)	5737.50 (2.82)	21850.00 (10.75)	203171.88 (100)
sárádrene B no N	Overall average	46696.25 22.28	68986.25 32.92	13500.00 6.44	14718.75 7.02	39275.00 18.74	6812.50 3.25	19575.00 9.34	209563.75 100
	Small	17430.00 (19.20)	43840.00 (48.30)	0.00 (0.00)	4100.00 (4.52)	13000.00 (14.32)	0.00 (0.00)	12400.00 (13.66)	90770.00 (100)
gnúhkkoko M	Medium	28590.91 (22.87)	8081.82 (6.46)	21363.64 (17.09)	4863.64 (3.89)	43818.18 (35.04)	2590.91 (2.07)	15727.27 (12.58)	125036.37 (100)
	Large	60191.67 (33.35)	58100.00 (32.19)	3125.00 (1.73)	7166.67 (3.97)	29250.00 (16.20)	3250.00 (1.80)	19416.67 (10.76)	180500.00 (100)

Table 2 continued...

Table 2 continued....

Average	46156.25	53675.00	7750.00	6150.00	31225.00	2662.50	17525.00	165143.75
	(27.95)	(32.50)	(4.69)	(3.72)	(18.91)	(1.61)	(10.61)	(100)
Small	16162.86	41442.86	0.00	4785.71	36142.86	9142.86	25714.29	133391.43
	(12.12)	(31.07)	(0.00)	(3.59)	(27.10)	(6.85)	(19.28)	(100)
Medium	20875.00	44228.57	10714.29	6392.86	25285.71	4714.29	19071.43	131282.14
	(15.90)	(33.69)	(8.16)	(4.87)	(19.26)	(3.59)	(14.53)	(100)
Large	57604.47	50815.79	3947.37	7105.26	39157.89	3921.05	16052.63	178604.47
	(32.25)	(28.45)	(2.21)	(3.98)	(21.92)	(2.20)	(8.99)	(100)
Average	37496.88	46870.00	5625.00	6450.00	33775.00	5112.50	18800.00	154129.38
	(24.33)	(30.41)	(3.65)	(4.18)	(21.91)	(3.32)	(12.20)	(100)
Overall average	41826.56	50272.50	6687.50	6300.00	32500.00	3887.50	18162.50	159636.56
	(26.20)	(31.49)	(4.19)	(3.95)	(20.36)	(2.44)	(11.38)	(100)

observes for business and services as ATMA is a agency for agriculture and its allies sector and since both business and service is not under the jurisdiction of agriculture and its allied sector.

The income of the families of beneficiaries and non-beneficiaries on an average per year is presented in table 2. For beneficiaries highest income earning was observed from animal husbandry (32.92%) followed by agriculture (22.04%), service (18.74%), others (9.34%), forest and plantation crops (7.02%), fishery (6.44%) and least from business (3.25%). Average beneficiaries income per annum for Mokokchung was Rupees 215955.63/- and Peren was Rupees 203171.88/-. Overall average per annum a beneficiary family income was observed Rupees 209563.75/-.

For non-beneficiaries too highest income earning was observed from animal husbandry (31.49%) followed by agriculture (26.20%), service (20.36%), others (11.38%), fishery (4.19%), forest and plantation crops (3.95%), and least from business (2.44%). Average annual income non-beneficiaries for Mokokchung and Peren was Rupees 165143.75/- and Rupees 154129.38/- respectively. On average per annum a non-beneficiary family income was observed Rupees 159636.56/-.

Beneficiaries annual income was more to non-beneficiaries with a difference of Rupees 49927.19/-. It showed better return of beneficiaries as compared to non-beneficiaries.

To analyze the changes in volume and pattern of employment

Impact of beneficiaries of ATMA on employment (in numbers)

The employment of the beneficiary and their family on an average per year before ATMA and after ATMA is presented on table 3. The sample population (comprising of the beneficiary and family members) before ATMA highest employment was found in agriculture (3 numbers), followed by others (1.81 numbers), animal husbandry (1.75 numbers), fishery and plantation crops (0.75 number each). After ATMA highest employment was found in agriculture (3.65 numbers), followed by others (3.36 numbers), animal husbandry (2.43 numbers), plantation (1.60 number) and fishery (1.09 numbers).

Highest impact of ATMA on employment was for plantation (25.91%) followed by others (23.17%), animal husbandry (20.73%), crop production (19.81%) and least impact was for fishery (10.36%). In all the enterprise there had been impact of employment in numbers has been positive which reveals that ATMA had a positive impact

Table 3 : Impact on employment in numbers.

Items	Average number of employment of beneficiary family									Percentage
	Before ATMA			After ATMA			Impact on employment			
	Male	Female	Total	Male	Female	Total	Male	Female	Total	
Crop production	2	1	3	2.26	1.39	3.65	0.26	0.39	0.65	19.81
Animal husbandry	0.75	1	1.75	1.29	1.14	2.43	0.54	0.14	0.68	20.73
Fishery	0.5	0.25	0.75	0.55	0.54	1.09	0.05	0.29	0.34	10.36
Plantation	0.25	0.5	0.75	0.89	0.71	1.60	0.64	0.21	0.85	25.91
Others	1.5	1.1	2.6	1.81	1.55	3.36	0.31	0.45	0.76	23.17
Total	5	3.85	8.85	6.80	5.33	12.13	1.8	1.48	3.28	100

Table 4 : Impact of ATMA on Employment in Mandays.

Item	Before ATMA		Average	Percentage	After ATMA		Average	Percentage	Impact		Average	Percentage
	Mokok-chung	Peren			Mokok-chung	Peren			Mokok-chung	Peren		
Crop production	197.00	(175.00)	186.00	(44.05)	213.75	182.63	198.19	(40.46)	16.75	7.63	12.19	(18.01)
Animal husbandry	101.50	(90.45)	95.97	(22.73)	115.25	101.50	108.3	(22.13)	13.75	11.05	12.40	(18.32)
Fishery	30.00	(15.00)	22.50	(5.32)	48.75	16.50	32.63	(6.66)	18.75	1.50	10.12	(14.96)
Forest & plantation	49.75	(21.50)	35.62	(8.43)	68.0	31.50	49.75	(10.16)	18.25	10.00	14.12	(20.87)
Others	88.25	(75.88)	82.06	(19.43)	114.75	87.00	100.88	(20.59)	26.50	11.12	18.81	(27.80)
Grand total	466.5	(377.83)	422.16	(100)	560.50	419.13	489.81	(100)	94.00	41.30	67.65	(100)

on employment generation of the beneficiaries and there family.

Impact of ATMA on employment (in mandays)

In table 4 the impact of ATMA to beneficiaries in employment in mandays is given. According to the mandays generated by beneficiaries and family before ATMA highest was agriculture (44.05%), followed for animal husbandry (22.73%), others (19.43), forest and plantation crops (8.43%) and least for fishery (5.32%).

After ATMA the mandays increased for all the enterprise. Highest impact was on others (27.80%) followed by forest and plantation crops (20.87%), animal husbandry (18.32%), agriculture (18.01%) and least was for fishery (14.96%). Average mandays employed of a beneficiary family annually was 422.16 mandays before ATMA and after ATMA, it was increased to 489.13 mandays. The average mandays employment increased was found 67.65 mandays which reveals that ATMA had a positive impact on employment in mandays.

Conclusion

Based on the results presented above, it could be

concluded that the impact of ATMA to the beneficiaries on average income is found to be highest at Forest and Plantation (Rupees 8593.75/-) followed by Crop production (Rupees 7410.75/-), Fishery (Rs.6500/-) Animal Husbandry (Rupees 5186/-) others (Rupees 5175/-), and Business (Rupees 1962.50/-), on average per year. The least impact was on Service (Rs.750/-) on an average per year. On an average family income of the beneficiaries increased by Rupees 35127.98/-. The study reveals that on an average beneficiary family have a total income of Rs.209563.75/- per annum whereas for a non-beneficiary it was found out to be Rs. 159636.56/-. This indicates that beneficiaries have better income compared to non-beneficiaries. The study indicates that highest impact of ATMA for employment was in Plantation with an increase by 25.91% and least impact was for fishery (10.36%). In all the enterprise there had been impact of employment in numbers has been positive which reveals that ATMA had a positive impact on employment generation to the beneficiaries and there family. The study also revealed that impact of employment in mandays generation highest impact was on others with an increase of 27.80% and least was for fishery (14.96%). Average mandays

employed of a beneficiary family annually was 422.16 mandays before ATMA and after ATMA it was increased to 489.81 mandays.

References

- Barathan, D. (2001). Economic growth and decline of poverty in the post reform period. *Southern Economist*, **40(15-16)** : 7.
- Bhalla, G. S. and P. Hazell (2003). Rural employment and poverty: strategies to eliminate rural poverty within a generation. *Economic and Political Weekly*, **38(33)** : 3473-3484.
- Borde, S. A. and U. U. Rajput (2010). Knowledge gain by trainees through national training courses on dryland Agriculture Technology. *Agriculture Update*, **5(3/4)** : 356-359.
- Govindadass, J. (2003). Effects of education in the adoption of agricultural technologies in Tamil Nadu. *National and sub-Nationaleconomic Development Post-economic Reforms*, **4** : 188-196.
- Govindadass, J. (2003). Effects of education in the adoption of agricultural technologies in Tamil Nadu. *National and sub-Nationaleconomic Development Post-economic Reforms*, **4** : 188-196.
- Khan, N. M. (1998). Extension services and agricultural development in FATA. *Sarhad Journal of Agriculture*, **14(5)** : 493-495.
- Ngullie, C. (2011). A study on Performance of ATMA in Dimapur District of Nagaland. A proposed study for Master of Science (Agricultural Economics).
- Sahu, Bhedu Prasad, M. K. Chaturvedi and Kedar Nath Yadaw (2013). Impact of agricultural technology management agency (ATMA) on socio-economic status of tribal farmers. *Agric. Update*, **8(1&2)** : 1-7.
- Siag, R. K., R. B. Gaur, Vichiter Singh, Vijay Prakash and R. S. Verma (2005). Studies on technology transfer through front line demonstration on mungbean in semi arid region of Rajasthan. *Indian Journal of Pulses Research*, **18(1)**: 64-66.
- Singh, K. M. and B. Swanson (2006). Developing market-driven extension system in India. *Proceedings of the Association for International Agricultural and Extension Education*, ed. J. R. Vreyens. AIAEE 22nd Annual Conference, Clearwater Beach, Florida, U.S.A.
- Sivanarayana, G., P. R. Reddy and T. B. Reddy (2002). A study or evaluation of farmer's training programmes conducted by Farmer's Training Centre, Warangal. *Journal of Research ANGRAU*, **30(1)**: 92-97.
- Swanson, B. (2006). The changing role of agricultural extension in a global economy. *Journal of International Agricultural and Extension Education*, **13(3)** : 5-17.