

Assessment of Agricultural Livelihood Security of Tribal Farmers under Tribal Sub Plan in Meghalaya

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ABSTRACT

Livelihood security of an individual is the most important aspect of life. It is access to basic amenities such as food, income, habitat, etc. Therefore, the present study assesses the Agricultural Livelihood Security of tribal farmers under Tribal Sub Plan (TSP) project undertaken by Central Agricultural University, Imphal in Meghalaya. The study was conducted in Ri bhoi and West Garo Hill districts of Meghalaya. For the purpose of the present study, a total of 390 beneficiary farmers have interviewed such that 270 farmers from Ri bhoi district and 120 farmers from West Garo Hill district. Paired t-test for the test of significance of two dependent samples was applied to test the significance of mean difference before and after the intervention TSP. A significant difference was found in components such as food security, income security, social security, and environmental security before and after implementation of TSP. Whereas in components like habitat security, educational security, and health security, there was no significant change for before and after a period. Overall, considerable change was observed in the agricultural livelihood security of the farmers.

Keywords: Livelihood security; Tribal Sub Plan; Beneficiary farmers; Paired t-test;

The state Meghalaya which has Shillong as its capital lies at a latitude of 25° 07'N to 25° 41'N and longitude of 91°21'E to 92°09'E and is one of the seven sister states of North East India. Geographically, Meghalaya is blessed with hilly terrain with some valley portions. The state is occupied by a diverse ethnic group of people with some non-local group of people. The total population of the state is 29.67 lakh out of which 86.15 per cent belongs to Schedule Tribes (ST) (Government of Meghalaya, 2017). The diverse, intricate and risk-prone agriculture is the unusual characteristic of the livelihood of tribal farmers in the state. Both shifting (slash and burn, or jhum) cultivation and settled cultivation are practiced by the indigenous people in the region. Some of the principal crops that are grown in the state are rice (*Oryza sativa*), potato (*Solanum tuberosum* Linn.), turmeric (*Curcuma domestica* Valetton), ginger (*Zingiber officinale* Rosc.), arecanut (*Areca catechu*) etc.

and several other vegetable crops. Distinctive fruit crop of the state includes Khasi mandarin (*Citrus reticulata*), pineapple (*Ananas comosus*), banana etc. The state is also rich in the natural forest which serves as a purpose for the sustenance of various flora and fauna. The natural forests in turn provide nutritious food and also income opportunities for the livelihood of the people. In addition to this, the state is famous for its abundant rainfall, rich organic land, and favorable climate which ultimately enhance the food and nutritional security of the people. This significantly contributes to the potential to enhance farm income. But there are also other factors which are a hindrance to the hill agriculture. Some of them are poor infrastructure and underdeveloped institutions, lack of system-specific production technologies, notwithstanding the structural constraints imposed by difficult terrains, scattered and fragmented land holdings inaccessible habitations, diverse socio-cultural and

agricultural typologies, and small, (Brithal 2010). The people also face uncertain agricultural productivity due to vulnerability to drought, flood, heavy siltation and soil erosion and lack of market opportunities. Other factors for low agricultural productivity also comprise of low usage of the growth augmenting inputs such as chemical fertilizers, pesticides, irrigation, HYV seeds, positive measures, etc. (Vanlalmawia, 2016).

Therefore, assistance has been furnished through various projects, programs, and schemes. This will aid the farmers in becoming aware of their various natural opportunities and harness them accordingly. In order to include the tribal farmers in the growth process, the Government of India (GoI) and other external agency have made considerable efforts. One such effort is the Tribal Sub-Plan (TSP) project of College of Post Graduate Studies in Agricultural Sciences (CPGSAS), Umiam and College of Home Science (CoHSc), Tura (CAU, Imphal), Meghalaya funded by ICAR, New Delhi which was officially launched in the year 2016-2017. The broad objective of the sub-plan is to enhance livelihood and socio-economic conditions of the tribal farmers of North East Hill (NEH) states. The need to check the proper functionality of TSP will be helpful in policymaking. In a study, Kulkarni (1989) concluded that in Maharashtra the TSP had been poorly implemented hence, it was necessary to accelerate the pace of tribal development through the effective implementation of TSP in the State. On the contrary to this, Makwana (2014) reported that the developmental programs of TSP have brought about remarkable changes in the socio-cultural life of the tribals. Thus, it is very crucial to assess the TSP project in order to improve or brings changes, if required and to know whether it is going according to the objectives laid out.

Thus, the present paper discusses the assessment of agricultural livelihood security of the tribal farmers under TSP in Meghalaya. The main objective of the paper is to observe the changes before and after the implementation of TSP.

METHODOLOGY

The present study was conducted in Meghalaya where the TSP project of CAU (Imphal) was endorsed in CPGSAS, Umiam, and CoHSc, Tura, Meghalaya. The project covered two districts viz., Ri-Bhoi and West Garo Hill (WGH) districts of Meghalaya. It was operated

in 10 villages, 5 each under the supervision of the two institutes. The institutes have selected these villages based on the baseline survey and PRA exercises accomplished. The five agriculturally important villages which were selected from Umsning Community and Rural Development Block (CRDB) of Ri-Bhoi district are (i) Palwi, (ii) Mawlein Mawkhan, (iii) Liarkhla, (iv) Sumer No. 4 and (v) Khweng. While the names of the five agriculturally important villages under Rongram CRDB of WGH district are (i) Rangwalkamgre, (ii) Dumitdikgre, (iii) Galwang Chidekgre, (iv) Edenbari and (v) Sanchonggre. The selection of these villages was based on the former block and villages names because the project started before the change in the names of blocks and villages came out recently. Also, primary data collection for the present study began before the deployment of the current names of blocks and villages. A complete enumeration of respondents/beneficiaries of TSP project in the entire ten villages under different commodities/facilities was executed for the study giving rise 270 from Ribhoi district and 120 from WGH district, to a total of 390 beneficiary farmers. *Before-after* design was applied to assess agricultural livelihood security of the tribal farmers under. Recall method was used for this purpose. To measure the agricultural livelihood security of the farmers in the study area, a livelihood security index (LSI) developed by Gebremedhin, 2010 was adapted with few modifications.

The components included in the LSI were as follows:

Food Security: It is operationally defined as adequate availability and access to balanced food at the household level.

Income Security: It is access to steady and satisfying employment for the generation of income required to support the household.

Habitat Security: It is the basic housing facilities along with the basic amenities required for a settled life.

Educational Security: It is the access to various educational facilities including higher studies that can be afforded by the household.

Health security: It comprises of the family's health status and the ability to access to health care facilities.

Social Security: It comprises the social status and the social participation of the family.

Environmental Security: It is the access to a pollution-free environment, access to clean water resources,

eco-friendly farming system and defense from climate vagaries like floods and droughts. The Maximum and Minimum Obtainable Score Possible for each Component is presented in Table 1.

Table 1. Maximum Obtainable Score (MaOS) and Minimum Obtainable Score (MiOS) Possible for each Component

Components	MiOS	MaOS
Food security	22	66
Financial security	0	3
Habitat security	0	6
Educational security	0	5
Health security	0	3
Social security	0	3
Environmental security	0	8

Table 2 presents the weights or scale values of Agricultural Livelihood Security Index (ALSI) across seven identified components as recommended by Gebremedhin (2010). The component of food security appeared as the most important component, followed by income security. This was immediately followed by Social security and health security with equal scale values. After this, Educational security, habitat security, and environmental security were listed.

Table 2. Weights or scale values of ALSI

Components	Weights/Scale values
Food security	11.25
Income security	9.13
Habitat security	5.71
Educational security	6.54
Health security	7.13
Social security	7.13
Environmental security	5.36
Total Scale value	52.25

The ALSI was calculated for each respondent using the following formula

$$ALSI_i = \frac{\sum U_{ij} \times S_i}{\text{Total scale value}}$$

Where:

i=1-390 and j=1-7

ALSI=Agricultural Livelihood Security Index

S_i=Scale value of jth component

$$U_{ij} = \frac{Y_{ij} - Y_{min}}{Y_{max} - Y_{min}}$$

U_{ij}=unit score of the ith respondent on jth component

Y_{ij}=Value of the ith respondent on jth component

Y_{max}=Maximum score on the jth component

Y_{min}=Minimum score on the jth component

RESULTS AND DISCUSSION

The mean score obtained by the respondents on the different components of ASLI and the overall ALSI has been thoroughly discussed in the following subheads. Table 3 revealed the mean score attained by the respondents on the components of ASLI. From the table, it is apparent that there was a change in the mean score for every component of livelihood security index except for habitat security before TSP and after TSP which indicated to some extent that there might be a significant change in the livelihood security of the farmers. The table also indicated the normalized scores of the different components in which a slight change could be seen in all the components except for the environmental security index.

Table 3. Mean score attained by the respondents on the components of ASLI

Particulars	Mean score		Normalized Mean score	
	Before TSP	After TSP	Before TSP	After TSP
Food security	38.25	44.73	0.51	0.54
Income security	1.63	1.88	0.54	0.63
Habitat Security	5.04	5.04	0.66	0.68
Educational Security	2.97	2.98	0.49	0.50
Health Security	2.39	2.40	0.39	0.40
Social Security	2.21	2.39	0.61	0.69
Environmental Security	5.90	5.93	0.48	0.48

In order to analyze further, the index values of the different components and the overall index of ALSI was worked out.

Components of ALSI : Table 4 it could be stated that there is a slight difference in the mean index score before and after TSP in some of the components of ASLI. Changes in the mean index were seen regarding the food security index, income security index, the social security index, and environmental security index. The table also gives the paired mean difference between the different components of ALSI. It can be seen that there is not much change in the paired mean difference of the different components of ASLI, but to confirm if the mean difference before and after TSP was significant or not, paired t-test for the test of significance of two dependent samples was applied. The result of the test indicates that

Table 4. Difference in the mean index score before and after TSP in some of the components of ALSI

Particulars	Mean Index score		Paired difference		t-value	Confidence interval
	Before TSP	After TSP	Mean	SD		
Food security	0.11	0.12	0.006	0.031	3.91**	0.002 – 0.010
Income security	0.09	0.11	0.015	0.025	11.43**	0.011 – 0.018
Habitat security	0.07	0.07	0.0003	0.003	1.74	-3.7e-05 – 5.97e-04
Educational security	0.06	0.06	0.0002	0.003	1.74	-3.18e-05 – 5.13e-04
Health security	0.05	0.05	0.0001	0.002	1.74	-0.0001 – 0.002
Social security	0.08	0.09	0.012	0.027	9.07**	0.009 – 0.016
Environmental security	0.05	0.06	0.001	0.004	3.36**	0.0001 – 0.0013

**The difference is significant at 0.01 per cent level of significance

there were significant changes in the means before and after TSP in the components viz., food security index, income security index, social security index and environmental security index at 0.01 level of significance. The values of the provided by the confidence intervals in Table 4 also illustrated that the true mean difference will fall in that particular interval in 99 per cent of cases. For all the significant changes with a positive confidence interval, it revealed a positive change in mean after TSP. *Agricultural livelihood security index (ALSI)* : From the above scenarios, it was evident that there might be a change in the overall ALSI of the beneficiary farmers of TSP. Therefore, the overall distribution of the index was observed with the help of a box plot presented in Figure 1.

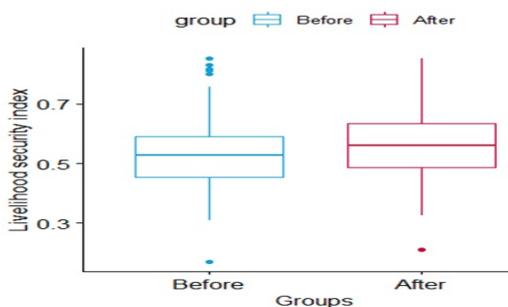


Fig.1. Distribution of ALSI before and after TSP

Figure 1 helps to clearly visualize the distribution of ALSI before and after the intervention of TSP. From the figure, it could be distinguished that there is a slight change in the ALSI.

From Table 5 it is evident that there is a significant change in the mean index at 0.01 level of significance with a t-value of 13.769. The mean difference between the paired difference is 0.035 with a standard deviation of 0.05. The values of the confidence intervals in the table also reflected that the true mean difference will fall in that interval 0.028 to 0.048 in 99 per cent of cases and as it is positive, it can be stated that the change in ALSI is positive after the intervention of TSP. The findings are in line with the findings of Swamy (2015) who in her study to assess the impact of tribal welfare and development programs on the scheduled tribes revealed that majority of the homogeneous habitation and heterogeneous habitation respondents declared that there is a marginal increase in income generation due to tribal developmental programs

In light of the above findings, it could be stated that changes have happened in the study area concerning the food habit of the beneficiaries. The respondents have received inputs such as seedlings, seeds, poultry chicks, fishery piglets, goats, etc., free of cost which in the course of time the beneficiary farmers have either generated income from them or consumed it. The provision of inputs free of cost also benefited the farmers economically as it reduced their cost of expenditure. In addition to this, the vocational training received under TSP provided a platform for the farmers to start new enterprises for income generation. The interaction among the farmers

Table 5. Paired t-test to test the significance of the mean difference of ALSI before and after TSP (N = 390)

Particulars	Mean Index score		Paired difference		t-value	Confidence interval
	Before TSP	After TSP	Mean	SD		
Agricultural livelihood security	0.53	0.56	0.035	0.05	13.769**	0.028 – 0.048

**The difference is significant at 0.01 per cent level of significance

also increased through regular meetings, training, and input generation programs provided under TSP. Farmers not only interacted with their local fellow farmers but with farmers from different villages. Farmers begin to gain confidence through regular expert consultation and they began to gain knowledge about the importance of nature. The use of more environmentally friendly products began such as vermicompost. Thus, this all contributed to the positive significant difference in the food security, income security, social security, environmental security and overall ALSI of the beneficiary farmers of the study area. However, there are some changes which are not significant. This may be attributed to the time constraint. As not much time has passed since the program initiated, some of the inputs are yet to give visible outputs say, seedlings of Litchi, Assam Lemon. While other inputs in the form of equipment such as a sprayer, water pump, paddy weeder, *etc.*, do not give direct economic yield. In addition to this the components habitat security, educational security, and health security will require more time, efforts and resources to bring a significant change. Nevertheless, this can be achieved through continued support from TSP in the long run.

CONCLUSION

Livelihood security is the access to the adequate and sustainable basic needs of life such as food, income and habitat. The present study elaborated the study on the livelihood security of the tribal farmers under TSP with respect to the state Meghalaya. The study included seven livelihood components *viz.*, food security index, income security index, habitat security index, educational security index, health security index, social security index and environmental security index under Agricultural Livelihood Security Index. The findings of the study reported that there was significant change in the component food security index, income security index, social security index, environmental security index and overall Agricultural Livelihood Security Index of the beneficiary farmers in the study area. From all these findings it can be concluded that TSP has brought an impact on the livelihood security of the tribal farmers of Meghalaya. With more aid from TSP, positive change can be observed in all the components of livelihood security. More support to the farmers through such projects by policymakers can be a vast change to the livelihood security of the farmers and ultimately improve the socio-economic status of the farmers.

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