



Impact of Tribal Sub-Plan Project Interventions on the Household Food Security in Bihar, India

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Authors' contributions

This work was carried out in collaboration among all authors. Author SP designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors RKS and AKS managed the analyses of the study. All authors read and approved the final manuscript.

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ABSTRACT

In India, Tribal Sub-Plan (TSP) aims to bridge the gap between the Schedule Tribes (STs) and the general population with respect to all socio-economic development indicators in a time-bound manner. Ensuring household food security is one such issue area covered under TSP. The present study was conducted in the year 2019 to assess the impact of Tribal Sub-Plan (TSP) project interventions on the household food insecurity of tribal communities in the selected project area of Bihar. The *ex-post-facto* research design was adopted to assess the impact. Data was collected from a random sample of 120 project beneficiary households, drawn from a population of 1200 project beneficiary households, using semi-structured interview schedule. Findings of the study revealed that TSP project interventions have made significant impact on the household food security level among tribal communities. The major impact was observed on the diversity of food and its quality. However, sizeable impact was also observed on the households' anxiety for food and the quantity of food consumption as well.

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1. INTRODUCTION

With the progress made in recent years, the context of food security has shifted from mere ensuring production of adequate food at aggregate level to enabling access to and making affordable the adequate amount of quality food to meet nutritional requirement of individual member in household. Therefore the World Food Summit [1] has defined food security as a state in which all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life. This shift in focus from macro to micro level has highlighted the need to meet food and nutrition requirement of the society's deprived classes including scheduled tribes on priority basis.

Past studies and surveys have reported that issues related to health, education, income and employment opportunities are relatively more prevalent among scheduled tribes as compared to overall population [2]. The food and nutritional insecurity is relatively high among tribal households, especially in rural India. The recent reports have reported that more than 40 per cent of tribal population lives below poverty line against 21 per cent in case of non-tribal population; less than 11 per cent of the tribal population has access to tap water against 29 per cent in case of non-tribal population (International Institute for Population Sciences (IIPS) and ICF, [3]). On the front of health and nutrition it has been reported that half of the adolescent girls are underweight among tribal population; 65 per cent of the tribal women are anemic (International Institute for Population Sciences (IIPS) and Macro International, [4]); scheduled tribes population has relatively higher child mortality rate (57 per 1000 live births) (fourth round of NFHM survey) and highest per cent of children with low birth weight were recorded in tribal population (Ministry of Women and Child Development, [5]).

On the front of food consumption, it has been reported that food consumption of tribal population is far below the recommended daily allowances, only 29-32 per cent of children and 63-74 per cent of adult consume recommended diet to meet required protein and energy requirement. Whereas only one fourth of pregnant and lactating tribal women consuming adequate to meet required calories and protein

(Third Round Survey of National Nutritional Monitoring Bureau, 2009).

These disparities in family health and nutrition indicators can be attributed to low income and lack of access to quality food. To improve the nutritional status and to strengthen the nutritional security of the tribal communities there is need to implement interventions that emphasize on household food production systems enabling tribal households to utilize the available resources including homestead land to meet out their food and nutritional requirements with little investment.

1.1 Project Interventions

Keeping this rational in mind, the interventions like kitchen gardening, backyard poultry, staple crop varietal replacement and mushroom cultivation were introduced in the selected tribal dominated 33 villages of Banka, Katihar and Kishanganj districts of Bihar.

Kitchen gardening: To ensure year round availability of vegetables, the seasonal vegetable kits were developed and distributed among the tribal households during three season –*Rabi, Kharif and Ziad*. The household members were also trained to manage the kitchen garden. To increase the availability of fruits, package of fruit tree crops was also given to each household which consisted of one plant each of Mango, Banana, Guava and litchi.

Backyard poultry: To increase the availability of protein source in household diet, the poultry production system was promoted. Each household in the project area was provided with twenty five chicks of locally adoptable breed – Vanraja and Giriraj. The active members of household were also trained for the poultry bird management including feed and health.

Mushroom cultivation: Mushroom is not only a good source of protein but also a source for earning additional income. Considering the local climate as well as the resource availability with the households, the paddy straw mushroom cultivation was promoted in the project area. The household members were provided with training on mushroom cultivation. To ensure initial adoption, they were also provided with basic inputs for first time production including mushroom spawn, bags, fungicides etc.

Staple crop varietal replacement: The project area, especially the district of Banka is characterized by low rainfall which results in poor yields of paddy crop. To address this issue, early maturing Sahbhagi Dhan was introduced that can be harvested only in 105 days, as compared to the traditional varieties that with crop duration ranging between 130-150 days.

2. METHODOLOGY

The present study was conducted to assess the impact of aforementioned interventions on the household food security of tribal communities in TSP project area. The *ex-post-facto* research design was adopted to access the impact. A random sample of 120 project beneficiary households was drawn from a population of 1200 beneficiaries and data was collected from respondents using semi-structured interview schedule. The impact of intervention was measured as the difference between average score of respondent households before and after the implementation intervention on the Household Food Insecurity Access Scale (HFIAS) developed by Coates, Swindale and Bilinsky [6]. This scale emphasises on the four progressive stages of household food insecurity. First, uncertainty and concern about accessing food; Second stage of food insecurity where household compromises with food quality and variety; in the third stage, there occurs reduction in quantity of food consumption and the last severe stage of food insecurity hunger appears, initially appearing in adults and finally affecting children [7].

Further on the basis of food insecurity scores, the household were also classified into four categories namely, food secure, mildly food insecure, moderately food insecure and severely food insecure households. Results of the study are presented below.

3. RESULTS AND DISCUSSION

The impact of aforementioned interventions on the household food security was measured using the standardized Household Food Insecurity Access Scale (HFIAS) which emphasises on anxiety for food, size and number of meals consumed and food diversity. The results of the analysis are presented Table 1 through 2.

Table 1 depicts the position of tribal households on the various dimensions of food security before and after the implementation of TSP

interventions. As a result of intervention, we can notice change on all the three dimensions of food insecurity including anxiety for food, size and number of meals consumed as well as food diversity. The project interventions had moderate positive impact on the worrying of household for food (statement 1). However, the major impact was observed on diversity of food and food quantity consumed (statement 4 to 6). Statements 7 through 9 indicate the frequency of days for which any member in respondent household spent entire day without food or slept hungry. It can be observed that, there were very small number of households that were facing severe food insecurity issues both prior to and after the implementation of TSP project. However, the positive change was observed in such households also.

On the basis of response pattern to various stimuli of HFAI scale, the households were categorized into four progressive categories of food insecurity namely, food Secure, mildly food insecure, moderately food insecure and severely food insecure. The number of households in each food insecurity level category were counted and presented in Table 2 and corresponding percentage of households are also presented in Fig. 1.

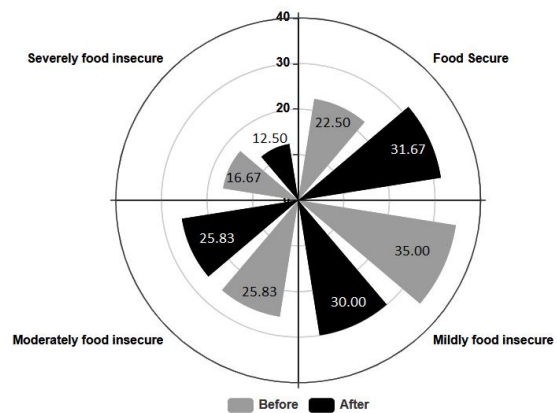


Fig. 1. Distribution of households under various food insecurity categories

Findings of the study revealed that, after implementation of TSP interventions, the post-intervention the of households in food secure category increased by 9.17 per cent (22.50 to 31.67 per cent), whereas the number of households with mild food insecurity have reduced from 35.00 to 30.00 per cent. Similarly, the percentage of households with severe food insecurity reduced from 16.67 to 12.50 per cent.

Table 1. Distribution of tribal households on HFIA scale before and after TSP intervention

HFIA statement	Before / After**	Frequency of occurrence*			
		Never	Rarely	Sometimes	Often
1. In the past four weeks, did you worry that your household would not have enough food	Before After	14 19	21 21	38 42	47 38
2. In the past four weeks, were you or any household member not able to eat the kinds of foods your preferred because of a lack of resources	Before After	27 38	46 44	20 17	27 21
3. In the past four weeks, did you or any household member have to eat a limited variety of foods due to lack of resources	Before After	43 57	41 40	9 11	27 12
4. In the past four weeks, did you or any household member have to eat some foods that you really don't want to eat because of lack of resources to obtain preferred food	Before After	65 74	29 25	10 14	16 7
5. In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food	Before After	69 73	32 34	10 9	9 4
6. In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food	Before After	76 80	28 31	10 7	6 2
7. In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food	Before After	100 105	9 10	6 3	5 2
8. In the past four weeks, did you or any household member slept hungry at night because there was not enough food	Before After	111 115	9 5	0 0	0 0
9. In the past four weeks, did you or any household member go whole day and night without eating anything because there was not enough food	Before After	118 119	2 1	0 0	0 0

* Frequency of occurrence was measured as rarely, sometimes and often if the frequency was 1-2 times month, 3-10 times a month and > 10 time a month, respectively.

** Before/after refers to time of measurement, i.e. before and after the implementation of TSP interventions

Table 2. Impact of TSP interventions on household food insecurity level

Food insecurity category	No. of households	
	Before	After
Food Secure	27	38
Mildly food insecure	42	36
Moderately food insecure	31	31
Severely food insecure	20	15

However, no change is observed in overall number of households facing moderate food insecurity. This does not imply that TSP intervention had no impact on food security of these households. However, the number of households that have moved from severe food insecurity category to moderate food insecurity category are same as number of households that

have moved upwards from latter category to upper categories.

4. CONCLUSION

Under TSP project low capital requiring interventions like kitchen gardening, backyard poultry, mushroom cultivation and varietal

replacement in staple food crop (paddy) were introduced. As a result of this, the productivity of the paddy crop has increased significantly resulting in the increased staple food availability. Further the planting of fruit tree crops as well as introduction of seasonal vegetable kits may be the reason for increased food diversity and created access to variety of food. Further the introduction of backyard poultry might have added to the increased availability of protein rich food like chicken meat and egg.

From the study it is evident that TSP project interventions have made significant impact on the household food security level among tribal communities. The major impact was observed on the diversity of food and its quality. However sizeable impact was also observed on the households' anxiety for food and the quantity of food consumption as well. Considering the impact of these interventions, it is recommended to introduce similar low input requiring and local resource utilizing interventions for improving food security in the other tribal dominated regions of the country.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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