Success Story

ENHANCEMENT OF LIVELIHOOD SECURITY OF TRIBAL FARM FAMILIES OF WEST BENGAL: A SUCCESS STORY

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ABSTRACT

The district of Dakshin Dinajpur of West Bengal has higher Scheduled Tribe (ST) population (16.4%) as compared to state average (5.8 %) and the district is economically backward as there is no big industry, and peoples' economy solely depends on traditional agriculture and other smaller ventures. So three blocks namely Tapan, Kumarganj and Hili blocks of the district were selected for the livelihood security enhancement efforts under Tribal Sub Plan (TSP) for 4 years during 2013-14 to 2016-17. Interventions on agriculture, animal husbandry, bird rearing and fishery were executed based on the local suitability of technology and farmers' preference. Improved production technology of jute comprising of certified seed of improved variety (JRO 204), line sowing by seed drill, weed management by CRIJAF nail weeder, balanced fertilizer use and microbial retting using CRIJAF Sona gave a high profit of Rs. 9,900 per bigha (0.134 ha). Introduction of lentil (cv. WBL-77) gave a profit of Rs. 4,800 per bigha and increased availability of pulses in their diet. Among the animal husbandry and fishery activities, improved goat rearing (Black Bengal breed) gave the highest Net Return Per Rupee Investment (NRPRI) of 3.84 closely followed by duck rearing (3.56). Introduction of desi magur (*Clarius batrachus* L.) cultivation improved farmers' income by Rs. 20,220 from a small pond (40 m^2) within 6 months and added quality protein to the diet of the tribal farm families especially for the growing children. Majority of the tribal farmers (96%) were happy about the improved method of cultivation as the interventions increased their income and enhanced livelihood security. The farm women expressed satisfaction in the animal rearing activities as the additional income from such activities helped them to spend for their children's education, clothing and health.

INTRODUCTION

Dakshin Dinajpur is a smaller rural (86% village population) district having 2.5% of area and 1.83% of population of West Bengal but having higher Scheduled Tribe (ST) population (16.4%) as compared to state average (5.8 %) and National average (8.6 %) of ST population. The district comprises of 8 community development blocks and all the blocks are inhabited by the tribal population. The general sex ratio is 956, and the ST sex ratio is higher (995) which is a sign of appropriate demographic balance in that community. The district is economically backward as there is no big industry and peoples' economy solely depends on agriculture and other smaller ventures. Out of the total working population, 27.5% are direct cultivator and 39.8% are agricultural labourers, so more than 67% of the work force depends on agriculture for their livelihood. The district of Dakshin Dinajpur was selected for the livelihood security enhancement effort under Tribal Sub Plan (TSP) because of its sole dependency on agriculture, lower per capita income (Rs. 44,527) as compared to the state (Rs. 61,352) and having larger ST population. Out of the 8 community development blocks, 3 blocks were identified based on their respective size, such as big (Tapan- having 20.2% area), medium (Kumarganj- having 12.9% area) and small (Hili- having 4.1% area) blocks of the district (Fig. 1.) having higher ST population (19.2%) than the district average (16.4%). The demographic and other relevant important information of the considered blocks is given in Table 1.

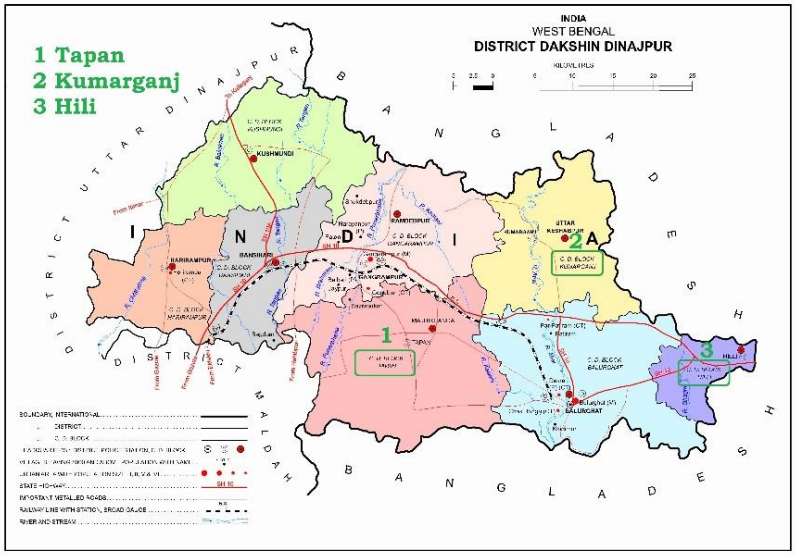

Fig. 1. Map of the studied blocks of Dakshin Dinajpur district

Table 1. Demographic and other relevant information of the studied blocks

Parameters	**Community Development Blocks**		
	Tapan	*Kumarganj*	*Hili*
Area of the block (ha)	44047	28080	8917
Percentage area (of the district)	20.20	12.88	4.09
Number of inhabited villages	271	208	79
Population of the block (lakh)	2.51	1.69	0.84
Total Population (% of district)	14.95	10.12	5.01
ST population (% of block population)	22.34	17.01	18.26
Literacy rate (%)	60.87	66.29	68.53
Cultivator (% of total work force)	33.15	30.68	23.16
Agril Labourers (% of total work force)	49.76	48.65	34.17
Soil groups	75% Laterite 25% Alluvium	80% Old Alluvium 20% Alluvium	60% Old Alluvium 40% Alluvium
Soil pH	5.3 - 6.7	5.4 - 7.5	5.5 - 7.0
Percentage of cultivable area (ha)	55.75	72.03	73.29
Percentage of irrigated area (of cultivable area)	52.28	53.84	21.12

Sources: http://www.ddinajpur.nic.in/Land/land.html

INTERVENTIONS CONSIDERED

To enhance the income of farm families and for enhancement of livelihood security of tribal farm families, interventions on agriculture, animal husbandry, bird rearing and fishery were executed during last four years (2013-14 to 2016-17) based on the local suitability of technology and farmers' preference. In this endeavour, the technology providers were ICAR-Central Research Institute for Jute and Allied Fibres (CRIJAF) and Dakshin Dinajpur Krishi Vigyan Kendra (of UBKV). A local NGO (DCRAS, Balurghat) took the lead role for coordination between the technology providers and the beneficiary tribal farm families.

AGRICULTURE

In agriculture majority of farmers prefer to follow jute-paddy-rabi crops in rotation. The jute and mesta are important pre-kharif season crops. The considered 3 blocks occupy about 34% jute area of the district. Although the jute fibre productivity is about 27.4 q/ha which is quite near to state jute productivity (27.9 q/ha), but there is ample scope to increase jute fibre productivity, improve fibre quality and reduce manual cost, which otherwise adds to the total cost of production. To do so, technologies like improved *tossa* jute variety (cv. JRO 204, popularly known as '*Suren'*), line sowing deploying multi row jute seed drill, weeding by CRIJAF nail weeder, balanced nutrition (along with micronutrients especially Zn and B) of jute and use of microbial retting formulation (popularly known as CRIJAF Sona) were introduced. For introduction of the technologies among the tribal farmers of Tapan, Kumarganj and Hili blocks of Dakshin Dinajpur, awareness camps, farmers' training,

demonstrations, farmers' field school etc. were organized throughout the studied period in the considered blocks.
As a result, the jute fibre yield obtained was higher (33.6 q/ha) in the farmers participatory mode as compared to the farmers' own practice (22.4 q/ha). Profit from improved practice was Rs. 66,333/ha which was much higher than farmers' practice (Rs. 8,028/ha). Unlike pre-intervened period, the jute crop totally escaped stem rot disease, might be due to application of Zn and B in soil which are deficient in the soils of Dakshin Dinajpur district.

Fig. 2. Sowing of jute in line by seed drill at Dakshin Dinajpur

Fig. 3. Weed management in line sown jute by CRIJAF nail weeder at Tapan block

Fig. 4. Jute field of tribal farmers at Dakshin Dinajpur

Improved microbial retting of jute by 'CRIJAF Sona'
With an aim to get better quality jute fibre, improved microbial retting technology using 'CRIJAF Sona' was introduced among the tribal jute farmers of the studied 3 blocks of Dakshin Dinajpur. The retting technology could able to complete the jute retting within 11-13 days, which was about 6-8 days less than the conventional jute retting method. The jute fibre so obtained was at least 1-2 grade higher and the farmers earned additional amount of Rs. 1350 per bigha (i.e., Rs. 10,090/ha) by selling the quality fibre in the local market. Analysis of the farmers' feedback data revealed that about 90% of the farmers were satisfied with the efficiency and ease of the improved retting technology.

Fig. 5. Luxuriant jute crop in a tribal farmer's field at Kumarganj block

Fig. 6. Training on improved microbial retting by 'CRIJAF Sona'

Fig. 7. Demonstration on improved microbial retting of jute

As the paddy productivity of the district (2.8 t in *Aus*, 4.2 t in *Aman* and 4.9 t in *Boro*) are very close to states average (3.5 t for *Aus*, 3.9 t for *Aman* and 5.1 t for *Boro*) and the farmers are already following improved production technologies for paddy crop, so paddy was not considered under this programme for the district. After harvest of jute and paddy, farmers of Dakshin Dinajpur prefer to grow mustard in *rabi* season as their main source of vegetable oil for their own use and for sale. To continue their economic progress from cultivation, improved production technology of mustard was provided to the farmers of Dakshin Dinajpur. Very essential inputs like certified seed of mustard, fertilizers and plant protection chemicals were made available to the poor tribal farmers. At the same time to empower the tribal farmers with the modern technology of improved mustard production technology, training programmes were also organized. In this improved method the tribal farmer got at least 30.5% higher yield (1423 kg/ha) as compared to districts average yield (1090.7 kg/ha). Improved cultivation practices of *rabi* season pulse crop such as lentil (cv. WBL-77 or Moitree) produced about 1200 kg/ha and in economic term (net return per rupee investment or NRPRI) it was marginally better (1.33) than jute.

Fig. 8. Training of tribal farmers on improved mustard production technology

Fig. 9. Distribution of certified seed of mustard among the tribal farmers of D. Dinajpur

Fig. 10. Mustard field of tribal farmer at Hili block

Table 2. Comparison of different economic activities based on Net Return Per Rupee Investment

Activity	*Unit**	*Cost*	*Total output value*	*Profit*	*NRPRI*
Jute	bigha (0.134 ha)	8,500/-	18,400/-	9,900/-	1.16
Lentil	Bigha (0.134 ha)	3,600/-	8,400/-	4,800/-	1.33
Duck rearing	10 nos.	851/-	3,886/-	3,035/-	3.56
Chicken rearing	20 nos.	2,120/-	2,722/-	602/-	0.28
Goat rearing	2 nos.	5,100/-	24,685/-	19,585/-	3.84
Fish (*desi magur*)	1000 nos.	9,780/-	30,000/-	20,220/-	2.07

***** unit used by a tribal family for the concerned economic activities

ANIMAL HUSBANDRY

Besides agriculture, animal husbandry is an important enterprise for the economic development of farming community and the same holds good for the tribal farmers also. So in the livelihood security enhancement programme for the tribal farm families, animal husbandry comprising of improved method of cattle & goat rearing, poultry bird & duck rearing were included.

Rearing of cattle

For majority of the tribal farm families of Dakshin Dinajpur, cattle and goats are very much valuable enterprise for various house hold use to supplement family nutrition and other agricultural field work. Besides, cow dung have multipurpose use in agriculture as manure as well as house hold by making cow dung cake to cook for the tribal families. On survey in the district by experts it was observed that the general health and production performance of the existing cattle and goats are not up to the mark. Veterinary officers of the respective blocks suggested to incorporate scientific package of practice for improving the health condition of the cattle and goats for increasing the economic output from the animals which will ultimately enhance livelihood security of the poor tribal families of Dakshin Dinajpur, so the animal rearing components were included. Mineral mixture were procured from ICAR-NDRI (ERS), Kalyani and distributed among the cattle owned tribal families for restoration of health of their cattle. Appropriate vaccines were given to the cattle for all major epidemic animal disease and sufficient amount of medicines were distributed among the tribal families along with proper guidance and instructions for use in case of diseased situation of their cattle. Number of '*Interface meeting cum animal health camp*' and '*Awareness cum vaccination camp*' were conducted with technical assistance from Dakshin Dinajpur KVK and Block Veterinary Officers in the concerned tribal blocks of Dakshin Dinajpur.

Improved goat rearing

Black Bengal breed of goat is predominantly reared by the tribal farm families in the studied area. But the general health condition and productivity is poor particularly due to unhealthy goat housing and diseases. Regular vaccination cum awareness camps were organized in the tribal villages of the 3 blocks. In the camps goats of the tribal families were vaccinated to prevent deadly disease of goat namely *Peste Des Petits Ruminants (*PPR) prevailing in the district. Farmers of nearby villages made aware about the clinical signs, mode of transmission, preventive measures of the disease and essentiality of regular vaccination to prevent huge economic losses of the goat raisers. Moreover, appropriate housing facilities were created using locally available materials (bamboo) for the goats so that healthy and congenial housing condition is provided to the goats which reduced disease incidence. This Black Bengal goat

rearing activity was the most profitable venture among all the considered technological interventions for the tribal farm families as the same given the highest NRPRI (3.84).

Fig. 11. Goat vaccination camp at Tapan block

Fig. 12. Duck vaccination and educating the tribal women about vaccination

Improved duck and poultry bird rearing

Khaki Campbell breed of ducklings were introduced and distributed among the poor tribal women for nutritional security and economic self-sufficiency of women through income generation. Body weight gain of newly introduced Khaki Campbell ducks were measured and average weight of duck was 1.30 kg at the age of 60 days old. Survivability rate was very good (96%), as only 4 % death was noticed due to attack by predators like fox and wild cats. It is known that duck plague is the most devastating disease of duck in the country. So to keep the ducks healthy, they were vaccinated against duck plague at suggested intervals (8 and 22 week's age) through participation of tribal farm women. In addition to ducks, poultry birds (RIR breed) were also provided to other sets of tribal farm women. To keep the poultry birds healthy, all the growing chicks of the improved rural breed were vaccinated against Rani Khet disease with F-strain live vaccine. To empower the tribal women in this line, they were also trained number of times about poultry vaccination schedule, dose and its application. From such small scale duck rearing activity the tribal farm women added the family income by Rs. 3495. The family members consumed about 193 eggs from their own produce. The NRPRI was quite high (3.56) in case of duck rearing by the tribal farm women.

Fig. 13. Distribution of mineral mixture among the tribals for their cattle

Fig. 14. Animal health camp and vaccination camp

Fig. 15. Khaki Campbell breed of ducks was introduced

AIR-BREATHING FISH FARMING

Tribal farm families often suffer from protein deficiency in their diet because of high price of those commodities and their economic inability to purchase it from the market. With an aim to add quality protein to the diet of the tribal farm families especially for the growing children and for additional income generation, air-breathing fish farming of desi Magur (*Clarius batrachus* L.) was introduced among the tribal farm families of the district having at least 10 decimal pond (40 m^2). In the said pond, they reared 1000 pieces of magur fish lings which grown to a mean body weight of 80 g or more within 6 months and thereby the fish yield was about 80 kg/pond (1977 kg/ha). In the prevailing market price, the total value of their produce was Rs. 30,000 per pond (of 40 m^2). About 10% of the fish produced was consumed by the family members and the remaining was sold to the market for additional income from this endeavour.

Fig. 16. Local tribal youths were educated on animal health management

Fig. 17. Destitute tribal farm women are happy with her goats provide under TSP activity

CONCLUSION

Majority of the tribal farmers (96%) were happy about the improved method of jute and *rabi* crops cultivation as the interventions increased their income and enhanced livelihood security. The farm women expressed satisfaction in the animal rearing activities and informed that their additional income from such activities helped them to spend for their children's education, clothing and health. They also told that they are not selling all the eggs produced; whereas, some numbers are consumed by their children, which surely improving quantum of protein intake by the tribal children. It was learnt from the beneficiary tribal families that with the implementation of agricultural and allied activities in the said tribal dominated area created a better communication environment with the state developmental departments. The beneficiary farmers informed that the Assistant Directors of Agriculture of the concerned blocks and the Block Veterinary Officer visiting and assisting the farmers and farm women at the time of need. Moreover, District Development Manager of NABARD also assisting the beneficiary farmers for fund and HRD related assistance for the productive activities by the tribal farm families.

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