SOCIO ECONOMIC UPLIFTMENT OF TRIBAL COMMUNITY
THROUGH ADOPTION OF CLIMATE RESILIENT TECHNOLOGIES
UNDER TSP PROGRAMME
AT JALAKIASUTI VILLAGE OF DHEMAJI DISTRICT OF ASSAM

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ALL INDIA COORDINATED RESEARCH PROJECT FOR DRYLAND AGRICULTURE
BISWANATH CHARIALI CENTRE, BN COLLEGE OF AGRICULTURE
ASSAM AGRICULTURAL UNIVERSITY
Socio economic upliftment of tribal community through adoption of Climate Resilient technologies under TSP programme at Jalakiasuti village of Dhemaji district

Dhemaji district is one of the most disadvantaged Districts of Assam situated in the remote corner of North East India on the North Bank of Brahmaputra. (Census Handbook Dhemaji, 2011). The farmers of the district are small and marginal and subjected to vagaries of climatic aberrations like flood, erosion, sand casting and prolonged dry spells during winter. Due to these adverse conditions, villagers gradually shifted their occupation to daily wage earners instead of traditional farming activities. This necessitated the proper interventions to retain and uplift the tribal farming community towards remunerative agriculture and allied sectors and also to enhance adaptive capacities and skill development of the tribal farmers/youth. Therefore, the project was conceptualized and implemented considering the socio economic and agro climatic condition of the village towards sustainable agriculture and livelihood promotion. The extension work was based on experiences from implementation of AICRP for Dryland Agriculture (AICRPDA) and technology demonstration component of AICRPDA-NICRA (National Innovations on Climate Resilient Agriculture) in the adopted village in North Lakhimpur district of Assam.

The TSP programme by AICRPDA centre, Biswanath Chariali was implemented in one villages i.e. Jalakiasuti (Latitude and longitude: 27.6083\(^{0}\) N & 94.7550\(^{0}\) E), Sissiborgaon block, Dhemaji district, Assam in collaboration with KVK, Dhemaji. The village has 160 households out of which 47 are marginal, 57 are small, 28 are medium, 8 are large
and 20 belong to landless with no exposure to the modern agricultural technologies. The total cultivated area is 175.4 ha out of which 96.8% is rainfed with 120% cropping intensity. The major crops cultivated during kharif are Sali rice, maize, blackgram and greengram and during rabi is rapeseed and under irrigated condition is bao paddy. The major soil type is sandy loam. The major source of irrigation is bore wells. The homestead gardens comprise of Assam lemon, arecanut, coconut, banana, jackfruit, mango, turmeric, ginger, betelvine, bamboo and vegetables. Indigenous cattle pig, goat, backyard poultry and duckery comprise of major animal population.

After selection of the village, a socio economic survey was conducted through PRA to assess the constraints faced by the farming community and to formulate an action plan for economic upliftment of the framers. A village level committee was formed to facilitate linkage between the farmers and implementing agencies for situation specific interventions. Accordingly, the need and prospects of the villagers were analyzed and suitable interventions were prioritized.

The major interventions in TSP villages were focused on a) Natural resource management (NRM) based, b)Crop based, c) Creation of physical assets, d) Livelihood based and e) Capacity building. For this, the doable rainfed technologies/practices/expertise at AICRPDA centres and respective SAUs were demonstrated/utilized in TSP villages.

a. NRM based interventions: The NRM based interventions focused on demonstration of improved practices of soil moisture (In-situ conservation, water (rainwater harvesting in farm ponds etc. and efficient utilization) and nutrient (soil fertility) management.
b. **Crop based interventions:** The crop based interventions focused on demonstration of improved/drought tolerant varieties of rainfed crops, cropping systems, plant protection and other crop management practices.

c. **Creation of physical assets:** In TSP village, efforts were made to create physical assets such as water harvesting structures (farm ponds etc.), repair of water harvesting structures (fish gate in the fisheries cum water harvesting structure etc.), animal sheds, and improved implements for various agricultural operations.

d. **Livelihood based interventions:** The livelihood based interventions include pisciculture, improved breeds of goatery, piggery, poultry, duckery, betel buck, vermicomposting, apiculture, *Azolla* units, sewing machines, spinning machines etc for improving the livelihood of farmers particularly farm women.

e. **Capacity building:** The capacity building focused on skill development, enhancing knowledge and livelihoods etc. for both for tribal men and women and included activities such as trainings, exposure visits, scientist-farmer interaction field days etc.

**Principal milestones reached**

Improvements in socio economic condition of the tribal community of Jalakiasuti village have been observed through implementation of different programmes under TSP. Some of them are as follows:

a) **Skilled Manpower:**

Twenty six numbers of training including five vocational trainings and six numbers of exposure visits were organized covering six hundred and forty five rural youths and farmers on agriculture and allied sector. Rural youths were deputed to State Institute for Rural Development (SIRD) Guwahati and Farm Machinery Training and Testing Institute (FMTTI), Biswanath Chariali for training on operation and maintenance of farm machinery. For empowerment of women, four women farmers were imparted training on Textile, dying and printing at Assam
Agricultural University, Jorhat for a period of three months. Skill imparted during the training enabled the women folk to produce value added textile products as well as to train other women of the village and nearby areas. Training and exposure visits encouraged the farmers to adopt modern techniques in agriculture and allied activities.

b) Natural Resource Management issues:
Under the intervention of natural resource management, the abandoned community pond covering 2 hectare was renovated and converted to fish pond and water harvesting structure leading to rearing of fish on community basis enhancing nutritional security. The water harvesting structure also helped in making water available to the livestock during winter season.

- Demonstration of seed coating was done with bio-fertilizers *Rhizobium* and PSB each @ 1.5 kg/ha along with basal application of 50% recommended N (7.5 kg N) and P (17.5 kg P) and full dose of K (10.0 kg K) for blackgram was done on 60 farmers’ fields (10 ha) and resulted in an improvement of yield by 1000 kg/ha against farmers’ practice (600 kg/ha). Similarly, seed coating with biofertilizers (*Azotobacter* and PSB @ 40 g each/kg of seed) along with 75% recommended dose of inorganic fertilizers NP and full K
(RDF 40:35:15 N: P₂O₅: K₂O kg/ha) for toria was demonstrated in 33 farmers’ fields in an area of 20 ha.

- Improved varieties of sali rice, maize, blackgram, toria, sesame, turmeric, ginger, tomato, potato and cabbage were introduced in the village for improving crop productivity and profitability. All the improved varieties performed better than farmers’/local varieties and the farmers realized additional income ranging from Rs. 15000/ha in toria (TS-36, TS-38) to Rs. 60000/ha in tomato (Rocky) and ginger (Nadia).

- **Rainwater management**

  One of the major emphasis during the period was on augmenting rainwater availability through efficient use by adopting site-specific rainwater harvesting strategies. Mulching with paddy straw was demonstrated in farmers’ fields of Jalakiasuti, Dhemaji district. The ginger yield increased by 60% (16000 kg/ha) and gave additional income of Rs. 60,000/ha compared to farmers’ practice (no mulching).
• **Nutrient management**
  At village Jalakiasuti of Dhemaji district, INM in blackgram involving use of biofertilizers and chemical fertilizers enhanced seed yield by 67% and gave additional returns of Rs. 17533/ha.

c) **Food and nutritional security:**
  Introduction of HYV paddy, toria, black gram, potato, sugarcane, banana, ginger, turmeric and vegetable crops led to higher productivity and food and nutritional security of the farmers and enhanced farm income. Introduction of HYV varieties like *Ranjit* and *Gitesh* (staggering ability) resulted in yield of 6.0 and 5.85 ton/ha with as increase of 66.67 and 62.5 percent respectively over traditional practice. Improved varieties of oilseeds crop (TS -36, TS-38) resulted in yield increase of 40 percent (1050 kg/ha against 750 kg/ha) compared to traditional varieties. To ensure fruit production in every household for nutritional security 2223 nos. of banana sapling var *Borjahaji* were distributed in the village. Sell of banana sapling as planting material to nearby villages resulted in horizontal spread of improved varieties.
Introduction of improved banana cultivars resulted yield of 18000 kg/ha against yield from farmer’s practice of 12000 kg/ha. Intercropping of improved cultivars of ginger, turmeric and pineapple in citrus and arecanut based homestead garden (Bari development) was introduced and popularized in form of small, medium and large homestead garden to demonstrate how a small plot can augment the income of farmer.

d) **Large scale adoption of vermicomposting technology for sustainability of soil health:**

Introduction of low cost vermicomposting technology led to efficient recycling of farm and animal waste harnessing sustainability of soil health as well as economic and environmental benefits. The low cost vermicomposting tanks have been fabricated in the village under the guidance of KVK Dhemaji with technological knowhow provided by AICRPDA, Biswanath Chariali Center. A total of 22 units are in operation at present. The production of vermicompost was started from July, 2014 onwards.

To be successful in an activity, a constant and serious effort is vital. “Vermicompost production is very easy and lucrative activity” - is
the observation of Mr. Lohit Sonowal, a village youth leader and secretary of village management committee. By the end of December 2016, a total of 43 ton vermicompost have been harvested for sale and it has generated an income of Rs.3,62,992.00 (Rupees three lakhs sixty two thousand and nine hundred ninety two only) in addition to their personal use for crop production. Moreover, selling of earth worms have become very lucrative additional incentives for the farmers as 25 kg earthworm have been sold at a rate of Rs. 1500 per kg with additional income of 37,125.00. Getting encouraged by the income generation potential as well as benefit of vermicompost application in their own field, farmers started to construct permanent tanks using their own resources. This intervention led to long term sustainability of soil health and higher return from farm enterprise.

![Image of people working on vermicompost]

### e) Scientific way of livestock production

Introduction of improved dual purpose poultry (Vanaraja), duck (Khaki Campbell) were found profitable by farmers as annual egg production increased to 150% in poultry and 135% in duck. Two bucks of improved crossbreed was introduced in TSP village in order to upgrade local goat population of the village through natural service. More than 40 nos. of upgraded Beetal kids were obtained in and around the village through natural service. Further, improved breeds of pig (Hampshire) were also introduced for breed improvement. To control incidences of disease Animal Health Camps were organized from time to time against Ranikhet in poultry, Duck Plaque in Ducks and FMD vaccination in cattle. Periodic de-worming in regular intervals and supplementations of
minerals and vitamins was adopted for maintaining proper health of the livestock.

f) **Fishery, mushroom, sericulture and apiary interventions**

To encourage scientific fish rearing and production, fourteen existing ponds with total area of 2.55 ha belonging to 14 tribal farmers were renovated with digging and maintaining adequate side bund. Farmers were provided with quality fish fingerling as well as fish feed and lime. To impart scientific knowledge on fish rearing a two days training programme was organized in the village and an exposure visit was carried out. Farmers were sent to Mini Hatchery Farm at Nowboisha, Lakhimpur to have an eye exposure and practical learning. Apart from fish production, these fisheries also help the farmers for duck rearing and plantation of various horticultural crops on the bank. The community pond (2.00 ha) of the village was also renovated to facilitate fish rearing and water harvesting structure.

- Mushroom cultivation was adopted by 80 farmers and generated an income of Rs.6500.
- Sericulture is being practiced by 26 farmers and the produce is being used for traditional handlooms.
- Apiary was adopted by 5 beneficiaries and could be able to generate an income of Rs.6700 per year.
g) **Mechanization of Agriculture:**

Lack of farm mechanization is another important factor of low agricultural productivity due to inability of farmers to complete farm operations on time using the traditional method of cultivation. For enhancing the productivity a CHC was established in the village in 2013-14 with two (2) numbers of power tillers, five (5) numbers of diesel operated pump set for lift irrigation, one (1) set of sprinkler irrigation, one (1) power sprayer, two (2) numbers of foot sprayers, ten (10) numbers of knapsack sprayers, fifteen (15) numbers of Eri spinning and three (3) numbers of sewing machines, textile loom (4), one seed drill and one power weeder. The required training and demonstration were provided to the member of the committee constituted by the villagers for smooth functioning of the CHC.

All the farmers of the village and nearby areas started using the machineries of the CHC at subsidized rate. The activity of the CHC started during Kharif, 2014 following handing over of implements to the village management committee. A bank account was opened for financial transactions of the CHC. By the end of December, 2016 the total income of the CHC was Rs. 97,365.00 (Rupees Ninety seven thousand three sixty five) only which is encouraging not only in terms of net incom but also availability of implements for crop diversification. Farm mechanization also added in adopting double cropping through cultivation of Toria after harvest of Sali paddy (winter rice) in 25 hectare. Similarly, different types of vegetables were introduced in 5.75 ha area after harvest of Sali paddy as a measure of nutritional security of the rural population. The CHC generated revenue of Rs. 5195.00, Rs. 44,160.00, Rs.30930.000, Rs.17,080.00 during 2013-14, 2014-15,2015-16 and 2016-17 respectively.
h) Empowerment of Rural Women and drudgery reduction in *Eri Yarn Production*:

Ericulture is a traditional practice among women folk in the village. However spinning was done by traditional method popularly known as *Takuri* method. Yarn produced was coarse, took long time for spinning and fetched low price per kg yield. Harnessing tradition with technology, pedal operated spinning machines were introduced which resulted in increase of yield by three times than traditional spinning practice and fetched Rs. 600.00 additional income over farmers practice. Pupae obtained from rearing is rich in protein which have high demand in local market and help in generating additional income to the farmers from sale of pupae.
i) **Horizontal expansion of improved technologies:**

Improved varieties of paddy, toria, blackgram, potato, banana, turmeric, ginger and livestock components (Vanaraja, Khaki Campbell, Beetal cross breed) were sold to nearby villages resulting in horizontal spread of technology and consequent higher income to farmers. Potato cultivation through improved practices led to harvest of 550 quintals potato from 2.5 ha area which fetched an income of Rs. 4,40,000.00. Improved cultivation practices of toria as a second crop after harvest of rice led to realization of higher yield (10.00 q/ha). The demand for seed increased and farmers could sell and earn Rs. 57,960.00 as seed and Rs. 6000.00 as oil during 2014-15.

j) **Linkage development:**

As a result of implementation of the programme in a collaborative mode, linkages were developed with district administration, Department of Agriculture, Department of Fishery, District Rural Development Agency, State Rural Livelihood Mission, Banking Institutes and various NGOs. The district administration of Dhemaji constructed an Agricultural Training hall cum Custom Hiring Center at a cost of Rs. 10 Lakhs. Agricultural Training hall cum Custom Hiring Center was instrumental in generating awareness among the local and nearby areas regarding modern agricultural technologies through training and demonstration imparted by various agencies from time to time. The village achieved significant strides in adopting modern agricultural technologies and is serving as a demonstration unit to the other farmer groups.
Salient achievements through different interventions under TSP programme:

a) Conversion of community pond to fish pond cum water harvesting tank for better profitability.
b) Custom Hiring– income generating venture for tribal youth.
c) Adoption of low cost vermicompost units for more income generation and sustainability.
d) Horizontal expansion of improved technology through sale of improved varieties of paddy, toria, sesame, blackgram seed, vermicomposting technology in form of improved earthworm species, planting material of improved banana suckers, Assam lemon, pineapple.
e) Transition from monocropping to sequential cropping.
f) Income from tertiary occupation like production and sale of *Eri* yarn, and sale of *Eri* pupa for nutritional security as source of protein supplement, sale of carpets, tie and dyed products etc.
g) Introduction of upgraded pig breed (Hampshire cross), goat breed (Beetal) to improve the economy of farmers through more meat production.
h) Empowering women folk through *Eri* farming, mushroom farming, rearing dual purpose poultry Vanaraja and Khaki Campbell duck.
i) Introduction and adoption of new varieties of rabi vegetable and fruit crops for nutritional security.
j) Cultivation of pineapple for commercialization.
k) Adoption of apiary by farmers as a remunerative farming for additional income.

Awards and Recognition:

Three famers (including one woman farmer) from TSP village Dhemaji under AICRPDA, BNCA were honored and awarded with the best dryland farmer award by ICAR, CRIDA, Hyderabad during XV Working Group Meeting of AICRPDA held at BN College of Agriculture, Biswanath Chariali from 24 to 27 December, 2016 and XXV Biennial
Workshop of AICRPDA held at AICRPDA centre Akola, Maharashtra during 17 to 21 January 2017 respectively for contribution in adoption and popularization of climate resilient technologies.

1. **Sri Luhit Sonowal**, Jalakia Suti Village, Dhemaji District, Assam, for his outstanding contribution in adoption and popularization of integrated farming system as climate resilient technology.

2. **Srimoti Bhabani Kachari**, Jalakia Suti Village, Dhemaji District, Assam, for her outstanding contribution in adoption and popularization of mechanization of eri spinning technology.

3. **Mr. Purna Sonowal**, Jalakia Suti Village, Dhemaji District, Assam, for his outstanding contribution in adoption and popularization of Crop diversification and Low-cost vermicompost production for higher productivity and profitability.

The implementation of the project resulted in successful adaptation of custom hiring center, low cost vermicomposting technology, HYV crop varieties as well as enhancement of cropping intensity. Income from tertiary occupation like production and sale of Eri yarn, sale of carpets, tie and dyed products etc. played a major role towards self sufficiency. Introduction of upgraded pig breed (Hampshire cross), goat breed (Beetal) improved the economy of farmers through increased meat production and breed up gradation of local livestock population. Empowerment of women folk through allied activities like mushroom cultivation, rearing dual purpose poultry Vanaraja and Khaki Campbell duck resulted in enhanced house hold income.
Fodder Cultivation

Protected Cultivation of Vegetable

Capacity building activities (trainings & exposure visit)
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