

Publication File

## Sustainable Livelihood of Tribal Farmers of Tripura through Tuber Crop Cultivation

\*Dipak Nath

\*\*Subhra Shil

Krishi Vigyan Kendra, Divyodaya, West Tripura; first ISO 9001: 2008 certified Krishi Vigyan Kendra of North Eastern Region of India has been implementing CTCRI- NEH Programme entitled "*Enhancing food security and sustainable livelihoods in the North-Eastern India through tuber crops technologies*" in ST populated village of Kowhai and West Tripura district of Tripura since 2013. The project is sponsored by ICAR- Central Tuber Crop Research Institute (CTCRI), Trivandrum, Kerala. The main objective of this project is sustainable livelihood of tribal farmers through popularization of high yielding non acrid variety of some minor tuber crop like elephant foot yam var. Gajendra, colocasia var. Muktakeshi and tapioca var. Shree Vijaya.

KVK, Divyodaya, West Tripura adopted Boltali village of Khowai district and Mandwai village of West Tripura district of Tripura under this project; whereas; the project is also going on in other North Eastern states of India. In the very beginning 2013, the project was started with 31 nos. of beneficiaries for front line demonstration of elephant foot yam, colocasia and tapioca in Khowai district. In the year 2014, new farmers were included and seed materials were distributed by previous years adopted farmer with whole hearted technical support and monitoring from scientists of KVK. After completion of two year a survey was done to verify the acceptability and it is observed that out of these three crop elephant foot yam (variety Gajendra) and colocasia (variety Muktakeshi) is very much accepted by the farmers because of high yield, non acidity nature.

\*KVK, Divyodaya, West Tripura, Chebri, Khowai, Tripura



good cooking quality, very less pest and disease infestation. The area under this variety is spreading in the whole village other than adopted farmer. In the year 2015, it was extended to Mandwai village with 19 farmers.

### **Cultivation of Elephant Foot Yam in Homestead Waste Land**

Elephant foot yam is traditionally cultivated on commercial scales in the states of Andhra Pradesh, Tamil Nadu, Kerala and West Bengal. The statistics on area, production and yield of this crop are not available in the literature. Locally available wild plants of elephant foot yam are highly acrid and cause irritation in throat and mouth due to excessive amount of calcium oxalate present in them. In India, the cultivation of elephant foot yam is slowly spreading to other states like Bihar, Uttar Pradesh and through the approach of KVK in Tripura also. This crop also offers excellent export potential from India, since it is not generally cultivated commercially in other countries.

### **Secrete of Popularity**

The crop is gaining popularity due to its shade tolerance, easiness in cultivation, high productivity, less incidence of pests and diseases, steady demand and reasonably good price. Tubers are mainly used as vegetable after thorough cooking. Chips are made of starch-rich tubers. Tender stem and leaves are also used for vegetable purpose. Tubers contains calcium (50-56mg/100g), protein 1.7-5.0%, carbohydrate 18-24%, fiber 0.8%, water 72-79%, it also contain omega-3 fatty acids.

### **Climate and Soil**

Elephant foot yam grows well in warm humid climate. In fertile loamy soils, it gives good tuber yield as pure crop as well as intercrop. Generally it is raised as rainfed but is grown as irrigated crop also. It grows well in variety of soils but a well drained sandy loam or sandy clay loam soil with neutral soil reaction is ideally suited for the crop.

### **Varieties**

Sree Padma, Gajendra

### **Success Story of a Tribal Farmer**

The village Boltali is situated in Purba Ramchandra Ghat Gram Panchayat, Khowai Block at Khowai district of Tripura. The major crops cultivated in the village are paddy, local potato, local maize, ginger etc. during kharif and coriander, carrot, radish, cauliflower, cabbage, sweet potato, chilli in homestead level during rabi season. There are no proper irrigation facilities in the village. Most of the farmers are using power tiller for paddy cultivation.

Chandra Kr. Debbarma is the name of the farmer who belongs to village Boltoli. He belongs to Tribal Community and is having some waste land around his home stead. He has started growing elephant foot yam variety "Gajendra" utilizing this waste land under the technical guidance of KVK with the joint efforts of CTCRI, Kerala during April to December, 2013. Planting material was supplied by CTCRI. Within a year he obtained a yield of 45.5 t/ha and the area under cultivation was 0.08 ha.



Readers may be interested to know the techniques he has adopted. The techniques of elephant foot yam cultivation adopted by him are mentioned below:

1. Planting was done in the month of April
2. Pit Size: 45 X 45 X 45 cm
3. Spacing in between pit: 90 X 90 cm
4. Fertilizer applied in following doses:

Well decomposed cow dung @ 1.5 kg / pit

Fertilizer applied @ 40 kg N, 60Kg P, 50 Kg K Per ha in the form of urea, SSP and muriate of potash

5. Before planting big size seed tubers are cut in four pieces in such a way that each cut corn bears a portion of central bud. Cut corms are smeared with cow dung slurry and allowed to dry in partial shade to avoid rotting.

6. Straw mulching is also adopted after planting

7. Grown as rainfed crop.

8. Harvesting was done in the month of December, 2013 when the crop is completely withered and fallen.

**Table 1: Expenditure and Income of elephant foot yam cultivation**

Expenditure			Income	
SN	Item	Total Cost (Rs./ha)	Yield (t/ha)	Total value (Rs./ha)
1	Seed tuber @ 6 t/ha	24000.00	45.5	1137500.00
2	Land and pit preparation & planting @ Rs. 5.0/pit	60000.00		
3	Decomposed cowdung @ 18 t/ha	9000.00		
4	Chemical fertilizer - NPK @ 40:60:50 kg/ha	3400.00		
5	Intercultural operation including mulching, weeding, earthing up etc.	35000.00		
6	Harvesting	15000.00		
Total		362400.00	45.5	1137500.00

It is mentioned that grower can earn net profit of Rs. 775100.00 per hectare with a benefit cost ratio of 3.14. In such economics, farmer's own labour and local available inputs have also been considered in cost of cultivation. Now, coming to Mr. Debbarma depicting what actual total benefit he had received through utilizing his backyard waste land area of 0.08 ha. He has invested of Rs. 272.00 in cash as cost for chemical fertilizer for such small area for EFY cultivation. He has



got required seed tuber in free of cost. The applied cow dung and straw for mulch had been sourced from his own side without any cash investment. He also invested his own labour for land preparation, pit making, planting, intercultural operation and harvesting. Yield obtained by Mr. Debbarma from his 0.08 ha land was 3.64 t/ha with gross income amounting Rs. 91000.00. Considering all involved cost including his own contribution also both in cash and kind, he has earned net income of Rs. 62008.00 by growing elephant foot yam in 0.08 ha land.

### Farmers Perception on Tuber Crop Cultivation Technology

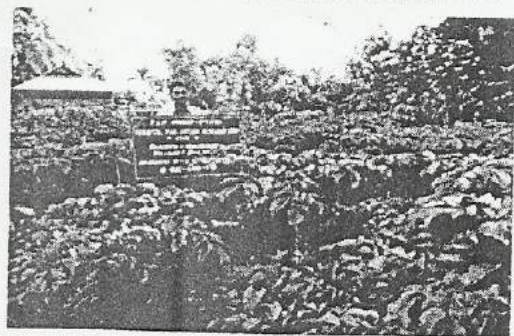
A study was conducted by KVK, Divyodaya, West Tripura in Khowai district to understand the farmers perception on tuber crop mainly elephant foot yam, colocasia, dioscoria and cassava cultivation technology. One hundred respondents were randomly selected from the Khowai district for the study. Data collection was done with the help of a structured research schedule through personal interview method to achieve the objective formulated for the present study. The collected data were calculated to find out percentage and rank for each response category.

**Table 2: Distribution of respondents based on their perception on tuber crop cultivation technology**

(N= 100)

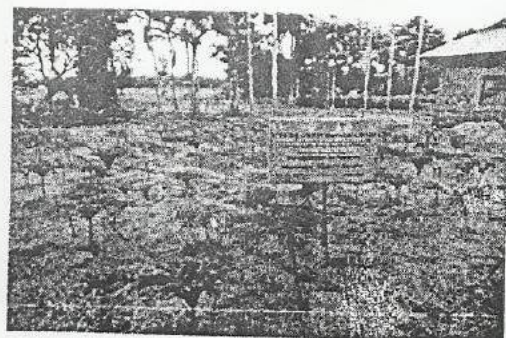
SN	Parameter	Response	Percentage	Rank
1	Germination rate	More	67	I
		Usual	33	II
		Less	0	III
2	Weed management	More	32	II
		Usual	48	I
		Less	10	III
3	Water management	More	6	III
		Usual	29	II
		Less	65	I
4	Nutrient management	More	2	III
		Usual	36	II
		Less	64	I
5	Disease incidence rate	More	0	III
		Usual	42	II
		Less	58	I
6	Pest infestation rate	More	0	III
		Usual	37	II
		Less	61	I
7	Cost of cultivation	Cheaper	41	II
		Moderate	55	I
		Costly	4	III
8	After care	More	36	II
		Usual	58	I
		Less	6	III
9	Labour requirement	More	9	III
		Usual	23	II
		Less	68	I
10	Overall rating	Superior	18	II
		No difference	78	I
		Inferior	4	III





Data presented in Table 2 reveals that perception of farmers on tuber crop germination rate is more, i.e., 67% which got I rank. Similarly, weed management (48 %, Rank I), after care ( 58 % Rank I) and cost of cultivation ( 55 %

Rank I) is as usual as other crop production technology where as 78% of the respondents revealed that there was no difference between tuber crop and other crop production technology for overall rating. The respondents were reported that water management ( 65% ,Rank I),

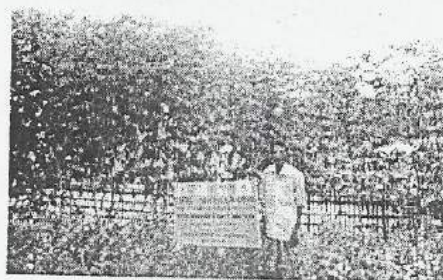


nutrient management (64%, Rank I), disease incidence rate ( 58%, Rank I), Pest infestation rate ( 61%, Rank I) and labour requirement ( (68%, Rank I) is less as compared to other crop production technology. An alternative approach would be to compare the crops

in terms of energy and protein production relative to human dietary needs. However, this approach also has its limitations in that no single crop adequately meets the balanced requirements of the human diet, which in addition to protein and energy includes specific essential amino acids, minerals, trace elements and vitamins.

Tuber crops vary considerably in these different components and in turn are markedly different from other staples, most noticeably in terms of protein content. Food protein is particularly important for the poor as their choice of food is often limited to one or two staple crops.

So, from the above finding it is concluded that the farmers of our region have potentiality, but they are not using these, after regular training, demonstration and guidance can make the farmer





an expert for tuber crop production technology which ultimately can raise their individual family income as a whole.

Tuber crops are rich source of carbohydrate and people can live healthy only having carbohydrate without protein and fat. Now a days climate is changing gradually and with this changed climate we have to have some alternative crops which can grow under such stress condition. Tuber crops especially cassava, elephant foot yam and yam are such crops which can withstand some extent to drought condition, can be grown in waste landless affected by pests and diseases and with minimum care. In villages of Tripura tuber crops like cassava, elephant foot yam are not very popular through they are using some local species which have more acidity. So, with the initiation of this type of project we can introduce some new tuber crops and also good quality planting material to the rural people. Tuber crop cultivation contributes positively to the economic empowerment of the poor people.

