

**“STUDY AND DOCUMENTATION OF INDIGENOUS
TRADITIONAL PLANT PROTECTION METHODS USED IN
AGRICULTURE IN TRIPURA”**

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Introduction

The advent of the concept of sustainable agriculture in late eighties in Indian agricultural scenario has evoked interest on indigenous technical knowledge (ITK) that has the element of use of natural products to solve the problems pertaining to agriculture and allied activities. Indian farmers, over centuries, have learnt to grow food and to survive in difficult environments, where the rich tradition of ITK has been interwoven with the agricultural practices followed by them.

India, a country spreading over 3287.26 thousand sq. km. and inhabited by about 1000 million people has been nurturing a tradition of very rich civilization over a period of five thousand years. India's ancient scriptures consisting of 4 Vedas, 108 Upanishads, 2 epics, Bhagwad Gita, Brahmasutras, 18 Purana, Manu Sniriti, Kautilya Shastra and Smritis as well as the teachings of innumerable sayings, proverbs and sages contain profound literature of ideas, concepts and practices which are designed to address the process of building harmonious relationship among man, animal and nature. The enhancement of the quality of life of the Indians who in great majority live in and depend on agricultural production systems would be impossible by keeping this rich tradition of ITK aside.

Indigenous technology knowledge (ITK) can be defined as any information originated out of farmers experience which has practical utility in solving farmers problems which is feasible, profitable and socially acceptable and adopted farmers own conditions which moves from one generation to another by word of mouth (Sabarathnam, 1990). Indigenous technology knowledge (ITK) refers to the unique, traditional, local knowledge existing within and developed around the specific conditions of women and men indigenous to a particular geographical area (Grenier, 1998). Indigenous Technology Knowledge (ITK) is based on the experiences that gathered momentum through generation and are being developed and standardized through innumerable experimentation and practices to enhance the life of the people who greatly depend on agriculture production system.

Survey Work:

Survey works were conducted in Belonia, Rajnagar agri Sub-division, South Tripura; Bamutia, West Tripura; Killa village, Gomati ; Khowai, in Khowai district. For present survey work, use of local resource persons and In-depth interview of farmers survey methods were used. Notes, Photos, Audio-recordings and Video-recordings were used for documenting the ITK in different parts of Tripura by present investigator.

Different Indigenous Technical Knowledge observed during survey work in Tripura:

There is a lot of indigenous agricultural know-how available with the farming communities specially the tribals. These traditional farming systems are products of centuries of accumulated experiences. Farmers all over the world have developed their own indigenous systems of farming with local inputs. Some of the ITKs are herewith documented with photographs and description.



Name of the ITK	Function	Preparation method	Name of the farmers from whom collected	Place of collection
Bird scarecrow	It is used for protecting crop from the birds.	It is made with the straw or similar type materials. It seems like a man standing in the field wearing any old dresses. It's face is made of earthen pot drawing with eyes and mouth.	Durga Manik Jamatia	Noabari, Killa



Name of the ITK	Function	Preparation method	Name of the farmers from whom collected	Place of collection
Crow screw	It is used for protecting crop from the birds.	It is made with the straw or similar type materials. It seems like a man standing in the field wearing any old dresses. It's face is made of earthen pot drawing with eyes and mouth.	Mr. Manish Roy	Chandrapur, Agartala



ITK : Drying of paddy after parboiling

Place of collection : Belonia



Name of the ITK	Function	Preparation method	Name of the farmers from whom collected	Place of collection
Field house	House for watching the monkey and protection of crops from monkey attack	It is made with straw or similar type of material at some height from ground level of the field. Within this house, people used to stay and protect the field from monkey attack by creating some noise of firing some rubber bullets or any other thing.		Belonia



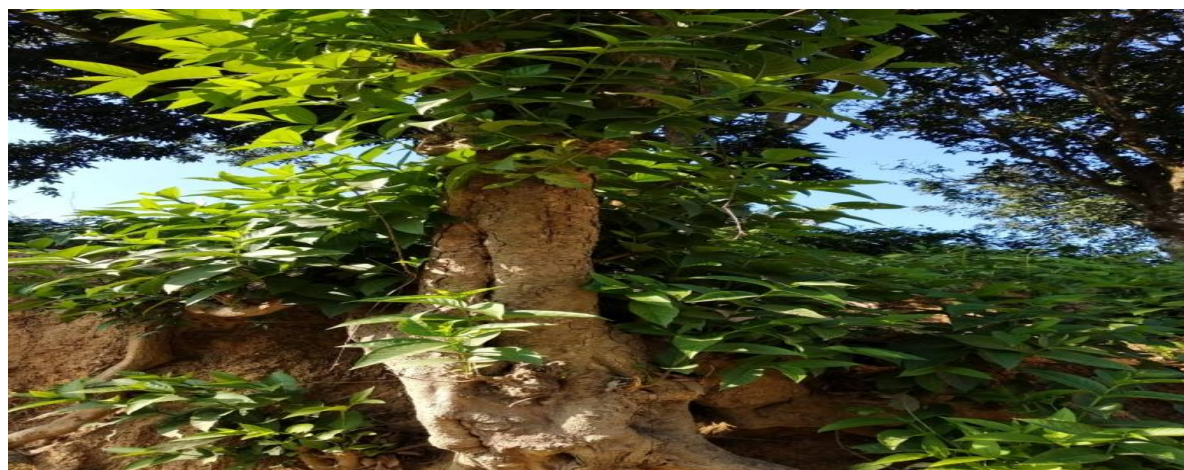
Name of the ITK	Function	Preparation method	Name of the farmers from whom collected	Place of collection
Water conservation by using banana trash	Water conservation on vegetable cultivation.	Banana dry leaves are used to protect the direct heat of sun. The dry leaves are kept on hanging by using a bamboo or rope at the base of the crop at East and South side of the crop from which direction sunlight is come.		Rajnagar, Belonia



Name of the ITK	Function	Preparation method	Name of the farmers from whom collected	Place of collection
Dry hive of honey bee	Dry hive of honey bee which is used for treatment of wounds on human body	Honey bee hive, after collection of honey, is sundried or naturally dried. This hive is used by traditional people for their treatment.		Chittamara, Belonia



Name of the ITK	Function	Preparation method	Name of the farmers from whom collected	Place of collection
Insect repellent (Not identified)	This leaf is used as insect repellent in paddy	Leaves are used in rice field after transplanting by placing them in different places of the field. The smell of leaves are act as insect repellent.		Chittamara, Belonia



Name of the ITK	Function	Preparation method	Name of the farmers from whom collected	Place of collection
Insect repellent tree S.N. - <i>Holarhena pubescens</i>	This leaf is used as insect repellent in paddy	Leaves are used in rice field after transplanting by placing them in different places of the field. The smell of leaves are act as insect repellent.		Chittamara, Belonia



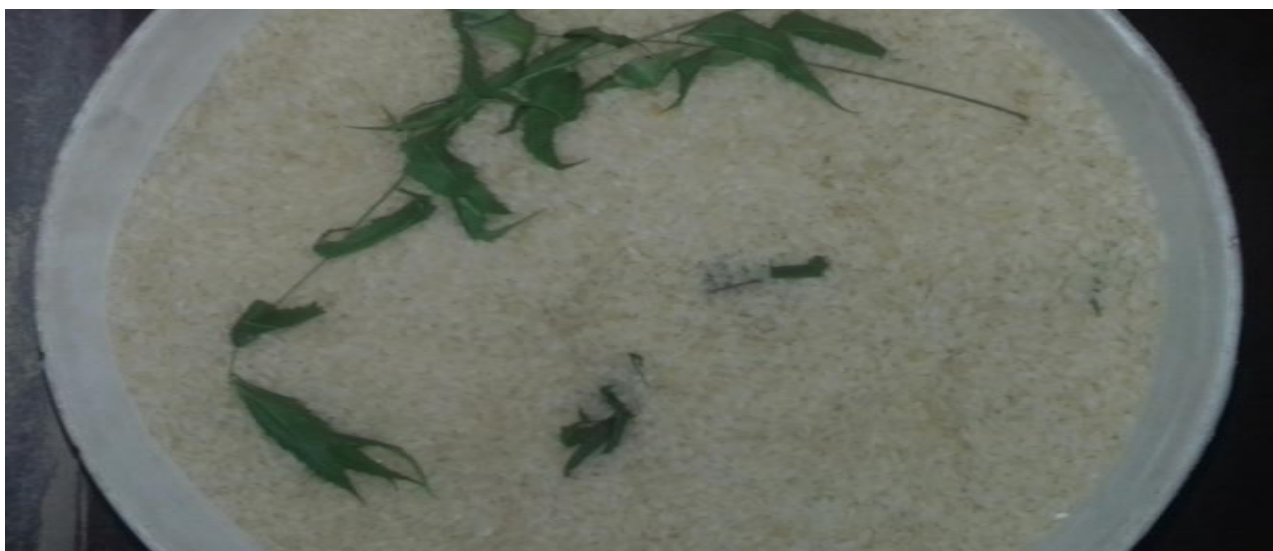
Name of the ITK	Function	Preparation method	Name of the farmers from whom collected	Place of collection
Bamboo made sprayer	Spraying of pesticides is done in absence of sprayer	It is bamboo made having two nodes. One side has small hole and other side of the bamboo has bigger hole where through valve will be inserted. Small hole is made where through water or spray material will be emerged when pressure will be given at the other side through a valve type bamboo made parts by the hand.		Chittamara, Belonia



Name of the ITK	Function	Preparation method	Name of the farmers from whom collected	Place of collection
Banana stem for weed control	For making row clearance, weed control, increase aeration etc.	Banana pseudo stem is used in standing pulse crop to clear the rows between the lines, weed suppression and it will ultimately increase the aeration.		Killa Gomati



Name of the ITK	Function	Preparation method	Name of the farmers from whom collected	Place of collection
Seed preservation with banana pseudo stem	For better seed germination (Seed of Bitter Gourd)	Bitter gourd seeds are kept by wrapping with banana pseudo stem for few days before sowing. It will increase the germination percentage of seeds and health of the seeds remain in good condition.		Killa Gomati



<p>ITK – Rice with Neem leaf</p> <p>Use – To protect rice from stored grain insect attack</p> <p>Owner name: Mr. Manish Roy</p> <p>Location: Chandrapur, Agartala</p>



ITK – Ash spreading to plants

Use – To protect rice from stored grain insect attack

Owner name: Mr. Manish Roy

Location: Chandrapur, Agartala



Name of the ITK	Function	Preparation method	Name of the farmers from whom collected	Place of collection
Seed preservation in bamboo (wasung)	Store the seeds for next year cultivation.	Seeds are kept inside the bamboo for whole year. It will maintain the germination percentage of seeds and health of the seeds. It acts as storage of seeds.		Killa Gomati



Name of the ITK	Function	Preparation method	Name of the farmers from whom collected	Place of collection
Rat trap by Bamboo (Rat killing Kaman - local name)	Trapping of rat and killing thereby to reduce the rat attack in crop.	The structure is placed at mouth of the rat hole. It contains three parts – arrow and two bamboo structure. One bamboo part is narrower than the other. The narrower part contains food item of rat which is placed with the help of jute rope in such a way with the bigger one that when rat has enter in the bamboo to eat, the rope needs to be cut. When the rope is cut, the narrower part is forcefully enter to the top portion of the bigger one as it is tight with the arrow and kill the rat.	Bijoysl Majumder	East R. C. Ghat, Khowai



Name of the ITK	Function	Preparation method	Name of the farmers from whom collected	Place of collection
Bird trap (Run-away of birds, local name - Dongki)	To protect the crop from bird attack. To run away the birds from the crop.	One bamboo of small size is splinted in two parts with one end remaining fixed. It is hold with hand at the fixed side end. After holding it, if it is shaken, it creates a typical sound which crops are protected from attack of birds.	Chandan Das	East R. C. Ghat, Khowai



Name of the ITK	Function	Preparation method	Name of the farmers from whom collected	Place of collection
Cultivation of Bitter gourd in brinjal as relay cropping	To use the brinjal stem as “Machha” for bitter gourd crop.	After the brinjal, bittergourd crop is planted 2 weeks before the completion of brinjal as relay crop. When the brinjal harvesting is completed, the leaves are destroyed by applying herbicides, only stems are left in the field. This stems are used for supporting the bitter gourd crop for trailing.	Chandan Das	East R. C. Ghat, Khowai



Name of the ITK	Function	Preparation method	Name of the farmers from whom collected	Place of collection
Use of cow urine for pest control	To protect the bamboo structure from attack of termite.	Cow urine collected in the morning at cowshed is used at the base of the bamboo structure after diluting it with water at 1:10 ratio. It has reduced the attack of termite and increased the life duration of the structure. The base is covered with cemented poly bag to hold the cow urine for long time.	Bijoysl Majumder	East R. C. Ghat, Khowai

Some old indigenous techniques used by the farmer:

Ananda pada Jamatia, the ITKs are taken from him at killa.

A. Tobacco based insecticide:

► Materials required : 200 – 300 gms tobacco, filter/ cotton cloth & water

► Step:

1. Take a handful (Around 200-300 gm) of tobacco
2. Soak it in water for 2-4 days (It is to be noted that the longer you soak the tobacco in water the more the action of the filtrate occurs on insect).
3. Filter the mixture using a strainer or cotton cloth
4. Use the filtrate as insecticide (especially used on soft bodied sucking pests such as aphids)

B. Tobacco based anti-mosquito technique

► Materials required : ½ tobacco leaves

► Step: Rub the tobacco leaves on the body surface before going to a place which is infested by mosquitoes. It keeps mosquito away from your body.

C. Rubber liquid based insecticide

► Materials required : 1 bucket rubber sheet leftover liquid & equal amount of water

► Steps :

► 1. Take 1 bucket of the liquids which is produced while making the sheet of rubber

► 2. Take equal amount of water

► 3. Mix the rubber left over liquid with water

► 4. Mixture Ready to be used as insecticide

► *Over use of this technique may cause in burning of the leaves and tissues of the crops

D. Chilli + Neem insecticide

► Materials required : 1 kg dry chilli, 2 kg neem leaves, 250 gram detergent & water

► Steps :

1. Soak the dry chilli in water for 1 night

2. Grind it and make paste and filter the decoction

3. 2 kg neem leaves are grinded and left for soaking in water

4. Filter the decoction

5. Mix the chilli decoction and neem
6. Add water in the ratio of 1: 3
7. Add 250 gms of detergent which acts as holding material
8. Mixture is ready for field application

Traditional techniques for crop protection:

Storage rooms may be smoked regularly with neem leaves to keep away moths, weevils and beetles.

- A. Wood, cowdung ash and sand may be mixed with the grain. One effect of adding these is that they fill the inter-granular spaces and therefore, restrict insect movement.
- B. In paddy, spraying a solution of cow dung prepared by mixing 3 kg cow dung in 3 l of water was observed in the study area against the control of paddy blast and bacterial blight.
- C. In case of soil-borne diseases viz., root rot, collar rot, etc. and termites, the castor cake, karanj cake, or neem cake were used as a control measure.
- D. Use of kerosene was also common against control of termites in the field.

Sl. No.	Name of ITK	Details of ITK
1.	Control of rodents by smokes through burning of paddy husk and dry chillies	Rodents cause heavy loss to paddy in jhum fields. To control this– i. Burrow of rats are stuffed with smoke by burning paddy husk and land race dry chillies variety.
2	Control red ants by using turmeric powder	i. Spreading of turmeric dust is a popular practice to protect spinach from the attack of red ants.
3	Traditional eco-technologies for the management of disease in traditional land use system	i. Traditional technologies such as bamboo drip method of irrigation of terrace rice.
4	Control of nematodes in ginger, chillies, tomato and turmeric by intercropping with <i>Chrysanthemum coronarium</i>	i. Intercropping with <i>Chrysanthemum coronarium</i> , <i>Tagetes erecta</i> or growing <i>Tagetes erecta</i> as border crops. ii. Incorporate the leaves of these trap crops into the soil to enhance effectiveness and nutrients enrichment of crops.

Conclusion

ITK is still an under-utilized resource in the development activities. It needs to be intensively and extensively studied and incorporated into formal research and extension practices in order to

make rural development strategies more sustainable. Special efforts are needed to understand, document and disseminate ITK for preservation, transfer or adoption elsewhere. We conclude that ITK is used in agriculture, engineering, medicine, soil conservation and in many other fields. For instance, wooden hand hoes out of wood were used for cultivation, farmers knew which trees to get herbs from, fresh foods were obtained from the wilderness and people observed changes in climate by watching the entire environment. Intercropping is believed to increase on the crop yield per unit area and also to replenish the soil. Long periods of fallowing land were observed, mulching was practiced and crop rotation was equally important. Management strategies employed by the local people to exploit the environment show that there is a store of indigenous knowledge which people have developed over generations through daily observations and practices.

Indigenous knowledge still plays an important role in traditional farming in the culture, thus supporting local food security. The potential food insecurity is not primarily due to decreasing yields, but more so because of the uncertainty of market prices. To protect biodiversity and ensure the in-situ management of natural resources, an adequate farmer's income is required.