Some of Indigenous Technical Knowledge Practices of Barak Valley Zone of Assam with Special Reference to Animal Husbandry, Plant Protection and Fish Capturing Technique

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ABSTRACT

Barak valley zone of Assam constituted with three different districts *viz.,* Cachar, Karimganj and Hailakandi, native to many indigenous tribes, believe on their folkculture and depends on traditional farming practises for growing crops and livelihood activities. To outline such traditional practices a survey programme was conducted during the year 2020-2022, all together 27 blocks were covered reaching 500 numbers of farmers through personal interview and questionnaire. The study of this survey programme revealed some popular and effective indigenous practices which was followed by the farmers since decade. An array of 10 numbers of different indigenous technical knowledge (ITKs) practices has been followed in this valley. Among the three different categories *viz.,* Animal Husbandry, Plant Protection and Fish Capturing Technique. Plant protection recorded highest numbers ITKs while the other two categories registered three numbers of ITKs each. Documentation and validation with scientific procedure of such ITKs is the need of the hour. Without valid and proper documentation such ITK practices in the coming days become extinct.

Key words: 20 Fish Capturing techniques, Animal husbandry, Barak valley, Indigenous technical knowledge, Plant protection.

In an early period, Agriculture farming becomes more conventional, farmers during that time merely depend on chemical agricultural inputs, solely rely on the availability of natural resources to solve farming problems. Indigenous Technical Knowledge (ITK) is quite different from the knowledge that are gained from formal educations, these technical knowledges are acquired by local indigenous people based on their experiences and learning during any agricultural farming activities and these practices are passed on from one generation to other (Warren, 1991). Over the several generations there is a change of environmental conditions and the farming practices must compliances with such changes of abiotic factors and to ensuing sustainability various local masses evolved their farming practices through experimental farming, curiosity experiments, problem solving experiments and adaptation experiments (Devi *et al.,* 2018). However, such indigenous practices may vary place to place, locality to locality based on the availability of resources of that particular area (Wang, 1988; Laired and Kate, 1998). Many biotic factors that hinder agricultural production may tackle by using Indigenous Technical Knowledge. Indigenous Technical Knowledge is specifically concerns on actual application of thinking of the local people in various activities of agriculture and allied areas of farming based on continuous experiences (Haverkort, 1988). It covers a vast area of subjects related to crop production, plant protection, livestock rearing, fisheries, natural resources etc. The North Easten Region of India is native to many tribal communities having different ethnic diversity, they have their own method of crop cultivations which are very unique and this traditional knowledge of farming are passing through generations to generations orally since its discovery (Sharma, 1999). However, due to rapid urbanization, modernization and easy availability of agricultural inputs in farming sector leads to extinction of such ITKS. Moreover, most of the workers of this region confined their study on particular subject only, leaving some other important disciplines of farming. Considering the importance, Krishi Vigyan Kendra, Cachar with other line departments of the district executed these tedious efforts to

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delineate some of the popular ITKs in agriculture and allied fields which are predominantly practised in these Barak Valley regions of Assam.

The survey programme was conducted during 2020-22 in three different districts *viz.,* Cachar, Karimganj and Hailakandi. The GPS locations of Cachar, Karimganj and Hailakandi located at latitude of 25°5′0″N and longitude of 92°55′0″E, latitude 24°52′12″N and longitude 92°2′0″E and latitude 24°40′48″N and longitude 92°34′12″E respectively. There are 27 blocks of the three districts had been covered where most of the indigenous tribal communities resides. Collection of data was recorded in vernacular language using different tools like personal interview and questionnaire involving village level extension workers, almost 500 numbers of farmers were reached through such data collecting tools. To highlight such indigenous practices adopted in this valley, a methodology given by Deka *et al.* (2006) had been followed where different responses of farmers were recorded as occasional, regular and frequent users based on practicing of different ITKs with reference to Animal Husbandry, Plant Protection and Fish Capturing Technique. In the survey programme following points were considered to prepare the questionnaire:

I. Do you know about ITK?
II. Have you come across any ITK?
III. Where from you get to know the ITK?
IV. Have you followed any ITKs on Animal Husbandry, Pest Management and Fishery sector?
V. What are the popular and common ITKs practiced in Animal Husbandry, Pest Management and Fishery sector?
VI. In what extend these ITKs are used?
VII. What are the reasons for short fall for not adopting these ITKs?

Table 1: Responses of farmers in different ITKs related to animal husbandry, plant protection and fish capturing techniques.

Dimensions ITKs in different category	Title of the ITKs	Response of the farmers	Percentage
Animal husbandary	Curing of Mastitis diseases of dairy cattle through application of alovera, turmeric and chuna.	Regular use	20.45
		Frequent use	26.32
		Occasional use	53.23
	Curing of Indigestion problem of livestock through application of tender beetle vine leaves.	Regular use	58.62
		Frequent use	30.89
		Occasional use	10.49
	Curing of stomach pain / bloting condition in dairy cattle through feeding of crushed beetlevine leaves, cumin, turmeric, pepper and zinger mixed with jaggery and salt.	Regular use	15.32
		Frequent use	20.65
		Occasional use	64.03
Pest managament	Reduce early infestation of stem borer, hispa and leaf folder on paddy through application of chopped leaves and twigs of Posotia (*Eupatorium odoratum*), bel (*Zizipus* sp.), peel of pummelo and orange over the rice field.	Regular use	10.50
		Frequent use	20.64
		Occasional use	68.86
	Reduce infestation of potato tuber moth in field and storage condition by covering the tubers with a 5 mm with layer of dry sand, ash, rice husk or saw dust and branches of *Lantana* or *Eupatorium* respectively.	Regular use	28.62
		Frequent use	56.42
		Occasional use	14.96
	Reduce infestation of rice weevil on paddy through application of branches and leaves of neem and ber over paddy in storage condition.	Regular use	5.30
		Frequent use	15.26
		Occasional use	79.44
Fish capturing techniques	Capturing of fish through nets with bamboos canes.	Regular use	60.25
		Frequent use	30.56
		Occasional use	9.19
	Fishing through installation of box type trapping device.	Regular use	70.32
		Frequent use	15.20
		Occasional use	14.48
	Fishing through conical type fishing trap.	Regular use	80.25
		Frequent use	12.68
		Occasional use	7.07

Table 2: Some of the traditional practises to cure some livestock diseases.

Disease	Treatment	Method of preparation	About the ITK
Mastitis diseases of dairy cattle: Mastitis is an inflammation of the mammary gland or udder through bacterial infection, commonly seen in dairy farms from acute to chronic form.	Mixing of alovera, turmeric and chuna [Ca(OH)2] in different proportion to treat mastitis in animals.	Alovera gel: 200 grams Turmeric powder: 50 grams Chuna: 5 grams The above materials are finely ground with mortar and pestle and prepare a solid form. Prior to application, add water to the mixture and applied to infected udder until the swollen get reduce.	This traditional practice also followed by farming community of barak Valley region, Assam. Presence of antibacterial compounds in above mixture not only cures the disease but also enhance milk production of dairy cattle. It's a sustainable, cost effective and environmentally safe technology.
Indigestion problem of livestock: Indigestion in young calves is common problem as rumen is undeveloped in very young age.	Tender beetle vine leaves are used to treat the problem of indigestion in young calves.	Tender leaves are collected and grinded over a rock, paste and then fed to young ones with animal feed.	Tender betel (*Piper betel* Lin) has several health benefits on livestock, acting as a natural post meal digestive stimulant, antiseptic, astringent, nerve tonic and as a diuretic. It is cost effective, very easy to prepare and a bundantly available in rural villages of this Valley.
Stomach pain/Blot condition: Stomach pain or abdominal pain refers as colic (blot condition) in Animal Science. Accumulation of gas within the cow's ruminal forestomach results to this condition such condition arise due to change in intake of fooder.	Beetlevine leaves, cumin, turmeric, pepper and zinger are thoroughly grind and mixed with jaggery and salt to cure this problem.	Beetle vine leafs: 10 nos, ginger: 15 nos, pepper: 15 nos, cumin: 25 -gram, turmeric: 10 grams firstly, cumin and pepper grind and make it powder form and on this other ingredient are mixed. Later on, jaggery is added to make these as boll for easy feeding but before boll treats with salt and feeding continue until the condition cures.	Beetlevine leaves with common salt act as metabolic stimulant while turmeric has antimicrobial properties helps to cure the disease and this practice is popular in barak valley region, Assam.

Perusal of the data presented in the Table 1 reveals that many farmers were aware about the Indigenous Technical Knowledge practiced in various Agriculture and Allied activities. Most of the farmers where questionnaire had been collected belong to small and marginal farmers specially communities from Namasudra, Kaibarta, Deshwali, Tripuri, Khasi and Manipuri. The traditional practiced they acquired from their ancestors with improvisation of old practices because of changing cropping pattern, weather, land situation and soil edaphic factors. Data presented in Table 1 exhibited that in case of Animal Husbandry there were practices like curing of Mastitis diseases of dairy cattle and Stomach Pain /Blot condition through indigenous techniques registered more percentage of occasional users than frequent and regular users. In another study conducted by Galav *et al.* (2013) in Rajasthan, they observed that the rural farmers prepared a paste from the 100-gram ash of the stem of *Cocculus* plants and 100 ml cow milk fat which was then applied topically to treat the mastitis disease. Swelling of udder due to Mastitis cured through application of termite mound soil suspension. About 200 gram of termite mound soil collected and boiled for 10-15 minutes and after cooling the suspension is applied on udder for quick relief (Sow and Ranjan 2021). Whereas curing of Indigestion problem of livestock through application of tender beetle vine leaves registered a greater number of regular users than frequent and occasional users. This finding corroborated with the study conducted by Aziz *et al.* (2018) at Bajaur Agency Pakistan they mentioned that dry powder of *Beta vulgaris* plant mixed with floor and black tea and bulb of the crushed onion and mixed with milk gave promising results to treat indigestion problem in livestock, details of some traditional practices to cure some animal diseases are mentioned in the Table 2. More or less a similar kind of trend was registered in case of pest management practices where infestation of stem borer, hispa, leaf folder and Rice weevil on paddy through indigenous methods registered a smaller number of frequent and regular users compare to occasional users. Checking of early infestation of stemborer, hispa and leaf folder on paddy through application of chopped leaves and twigs of Posotia (*Eupatorium odoratum*), Bel (*Zizipus* sp.), peel of pummelo and orange also put forwarded by(Pathak *et al.,* 2001). They also mentioned that citrus plant after decomposition released an offensive smell over the paddy field which retard the infestation of these pests. Management of pest problem through indigenous practices are highlighted in the Table 3. On the other hand, in case of fishery sector most prominent and regular practiced of indigenous fish capturing method like fusing through nets, bamboo canes and trapping device were very much popular in this valley of Assam. This study confirmatory with the survey conducted by Sharma *et al.* (2017) at two different locations of Cachar District *viz.,* Irongmara and Dwarband, they revealed a total of 21 fishing devices operated in that area in the form of traps, nets and hooks accompanied with

Table 3: Some indigenous techniques to manage some pest problems.

Insect pest infestation	Treatment	About the ITK
Infestation of stem borer, hispa and leaf folder on paddy: Infestation of these insect pests on rice crop is very common, causes significant damage to the rice crop. It is estimated that when favourable condition prevails loss incurred due to these pests cause more than 25 per cent.	Collection and chopping of leaves and twigs of posotia (*Eupatorium odoratum*), bel (*Zizipus* sp.), peel of pummelo and orange, apply in rice field to reduce early infestation of these pests.	This technique is followed in many regions of Assam. Presence of water in rice field enhances decomposition and releases an offensive odour to deter the infestation of these pests.
Infestation of potato tuber moth in field and storage: Infestation of potato tuber moth caused significant loss to potato growing farmers of this region. Escaped infested tubers, reach to go- down and lead to complete damage of the crop, larvae make irregular galleries and tunnel deep inside the tuber in storage.	Cover the tubers with a 5 mm layer of dry sand, ash, rice husk or saw dust in field condition and in storage /godowns, cover upper surface of potato tubers with *Lantana* or *Eupatorium* branches.	Covering with sand reduce the larval movement if larva move it gets killed by abrasion with sand particles while covering with *Lantana* or *Eupatorium* branches helps to repel oviposition.
Infestation of rice weevil: Rice weevil caused significant damage to stored paddy. Sometimes infestation leads to huge economic loss to growers and other stag holders.	Keeping of branches and leaves of neem and ber over paddy in storage condition.	Both the neem and ber have secondary metabolites like phenols and polyphenol compounds which hinders the infestation of rice weevil.

accessories used while fishing. Indigenous method of fish capturing technique through naturally available resources are summarized in the Table 4, where bamboo was mainly used for the construction of fishing gadgets which is locally available and economical.

Indigenous technical knowledge (ITK) on animal husbandry

Indigenous Technical Knowledge on animal husbandry is as old as the domestication of different livestock since civilisation. These, practices are extensively followed in rural areas to treat many livestock diseases. However, with modern medical facilities these practices are slowly reduced and leads to eliminate from the rural societies. Considering the importance some useful ITKs on Animal Husbandry particularly on Live stock are highlighted below:

Indigenous technical knowledge (ITK) on pest management

Indigenous technical knowledge to get rid of pest problem is an old practiced followed by tribal farmers of this region. Farmers based on their experiences and learning from decades depends on availability of local resources and technical knowledge they owned from their ancestors, assist them to reduce pest infestation problem. However, with ease of availability of insecticides, the demand of synthetic insecticides during recent past has increased and practising of such traditional knowledge in pest management sector has been slowly diminishing. In view of, some of the important traditional knowledge practiced in pest management sector are highlighted in (Table 3).

Indigenous technical knowledge (ITK) on fshery sector

Fishing is one of the oldest livelihood practices followed by different indigenous communities of Assam. The rich biodiversity and wet land area encourages many fresh waters fish to proliferate. Among all the districts of Assam, Barak Valley Zone has highest number of artificial and natural wetlands. Fishery farmers maintain those wetland areas for fishing to generate income with least investments. This part of Assam constitutes different indigenous

Table 4: Some of indigenous fish capturing techniques of the valley.

Indigenous techniques of fishing	Methods of preparation and installation	About the ITK
Capturing of fish through nets with bamboos canes.	The bamboo canes are tied cross sectionally so that it forms four corners where nets are tied firmly. Again, thorough this cross section one long bamboo is fitted which are tied with rope for lifting of the nets. This type of fishing through nets vernacularly termed as dhubjal. The whole frame submerged in water simply by slowly releasing the rope.	It is cost effective and sustainable practice followed by many farmers of barak valley involved in fishing in large wet land areas.
Fishing through installation of box type trapping device. Such devices are kept in artificially created flowing water areas to capture different kinds small fishes.	Trapping devices are made in such way that fishes are trapped inside the device and escapes through entrance become impossible because during escaping process fishes are stuck with the bamboo slits. A box type rectangular fishing trap vernacularly termed as Duri, made with bamboo strips tied with plastic threads, the trap has inner side flexible openings. Installation of traps with two bamboos tied with rope on front side of the trap.	Such type of fishing trap is popular in barak valley. Fish farmers installed this trap in beels, large wet land areas, rivers and paddy fields *etc*. This device is suitable to catch to small size fish.
Conical type fishing trap also popular trapping device to collect small size fish install vertically in large water bodies, wet land areas	This type of conical trapping devices is locally termed as “paron” made up of small bamboo strips which are tied with nylon ropes, it has broad base while tapper at top with two flexible openings. When it is installed in submerged water the tapper end remains close and fish enter with flowing water and gets trapped.	This trapping device are usually installed in large wet land areas, beels, paddy fields and ponds *etc.* Suitable to catch small size fishes.

communities rely on various locally available resources made by bamboos and other canes for fishing. This fishing practices are more or less similar with fishing practices followed by other parts of Assam. However, the techniques and device, farmers use have different names as most of the people resides in this valley are belongs to Bengali community. Considering this, some of the common traditional methods, which are practiced for fishing in this region of Assam are highlighted in this section.

CONCLUSION

Practicing of Indigenous Technical Knowledge in agriculture and allied fields since many decades ago. North East India is harbour of many indigenous tribes, where farmers utilize their knowledge to combat any agri. and allied issues. This manuscript is just an attempt to document some popular and prominent indigenous techniques utilize in Agriculture and Allied sectors particularly in this region of Assam. The knowledge of indigenous techniques should be spread across whole North Eastern regions as it is socially acceptable, economically viable, more sustainable, ecofriendly and utilize all available resources. Such technology needs to identify and modify with modern agriculture techniques which leads to the development of new innovations in Agriculture and Allied sectors. Government institutions and policy makers should encourage people deals with such innovative ideas/ techniques.

Conflict of interest

All authors declaared that there is no conflict of interest.

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