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INVENTORY OF INDIGENOUS TECHNICAL KNOWLEDGE AND EXTENT OF USAGE OF FIELD IMPLEMENTS OF ANGAMI TRIBE, NAGALAND, INDIA

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ABSTRACT

Indigenous Technical Knowledge (ITK) is based on local knowledge and experiences therefore they are region specific. Nagaland is an agrarian state with spectacular wealth of indigenous knowledge. There are 17 recognized tribes inhabiting Nagaland State, the 16th state of India whereby the Angami tribe is one of the major tribe and since time immemorial they have been practicing traditional method of agriculture. Thus, a research was conducted in 2019 to document the identified ITK on agricultural tools used in their agricultural fields. The research was conducted in Kohima district covering two blocks namely, Chiephobozou and Sechü-Zubza and four villages *viz*., Tuophema, Chiechama, Jotsoma and Sechüma with a total of 120 respondents, following the random sampling method and descriptive research design. Through this study, sixteen (16) different indigenous tools and implements of the Angami tribe used in agricultural activities and their purpose were identified and documented. It was found that almost all the tools and implements had a touch of bamboo. The identified species used for making them are *Dendrocalamus hamiltonii* and *Melocanna baccifera*. The study also found that more than 90 per cent of the respondents were medium to high users of these identified ITK. However,with the passage of time and advancement of technology many ITK are being forgotten by the younger generation, therefore, the study recommends that one has to create awareness about the indigenous technology which is vital for sustainable development as it has evolved after thousands of years of observation and experience imbedded in local knowledge.

(Key words: Sustainable, agriculture, indigenous agriculture, tools)

INTRODUCTION

Transfer of knowledge of time tested nature friendly agricultural practices have survived only through word of mouth in rural areas. These practices unless documented will die with passage of time. Today with ecology and environment facing severe questions of sustainability it is now the right time to look upon environmentally friendly as well as innovations which will be viable economically, thus, innovations with a touch of ITK promotes sustainability and "any technology that claims the mantle of 'appropriate' should also be adaptable and flexible, while eliminating adverse environmental impacts"(Darrow and Saxenian, 1986; Tharakan, 2004). "Indigenous knowledge is very useful and indigenous technical knowledge possessed by the farmers should be identified" (Rizwana and Lyaquet, 2009).

Since India has a long history and much enriched culture, there is an abundant reservoir of indigenous knowledge in every part of the country. Indigenous knowledge systems may appear simple to outsiders but they represent mechanisms to ensure minimal livelihoods for local people. "They are often tuned to the needs of local people and quality and quantity of available resources" (Pandey *et al,* 2017).

Nagaland, one of the states of the North- East India is basically a state with constructive agro-climatic conditions and prosperous bio-diversity of Plants and animals. There are 17 recognized tribes in Nagaland where Angami trible is one of the major tribe of Nagaland and since time immemorial they have been practicing traditional method of agriculture. Nagaland is rich in Indigenous Technical Knowledge and Kithan (2014) in her research on ITK in Nagaland also found that, "the Angami and Chakhesang tribes of Nagaland have terrace cultivation of paddy wherever water is available for irrigation. Zabo system of rice cultivation is an excellent indigenous method of rain water harvesting used by farmers in Phek district of Nagaland. The Jhumia of Kohima and Phek district of Nagaland plant alder trees in the Jhum cycle area along with traditional agricultural crops such as rice". Traditionally the Angami society has been sustained for generations through the indigenous practices of agriculture, however, with the advancement of technology and change in lifestyle of people the indigenous practices that were being passed on from generation to generation is now slowly reducing and forgotten. Therefore, one has to create awareness about the indigenous technology which is vital for sustainable development as it has evolved after thousands of years of observation and experience. Thus, this research was carried out to document the identified

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ITK of agricultural tools and implements particularly of Angami Tribe from Nagaland, India.

MATERIALS AND METHODS

The study was conducted in the state of Nagaland. With a total population of 1,980,602 (2011 census) making it one of the smallest states of India. There are 16 districts in Nagaland inhabited by 17 tribes and due to its vibrant culture; it is popularly known as, "the land of festivals". This research was done in the year 2019 under Kohima district, the capital city of Nagaland. A total of four villages i.e., Tuophema , Chiechama, Jotsoma and Sechüma from two blocks ie., Chiephobozou and Sechü-Zubza, respectively were considered and a sample size of 120 respondents were chosen randomly following descriptive research design. Primary and secondary data collection methods were employed and the "inventory of ITK" were analyzed using conventional statistical tools. For this study, the "extent of use of ITK" refers to whether the individual respondent had practiced each of the identified ITK's in the previous years and was analyzed by following formula as given below.

$$\text{Extent of use of ITK (\%)} = \frac{\text{Number of ITK adopted}}{\text{Number of ITK applicable}} \text{X } 100$$

The respondents were classified into low users, medium users and high users based on extent of adoption, by using cumulative frequency method.

RESULTS AND DISCUSSION

1. Description of identified indigenous Agricultural tools and implements

Table 1 indicates that sixteen (16) different indigenous tools and implements of the Angami tribe used in agricultural activities were identified. It was found that almost all theidentified tools and implements had a touch of bamboo. The identified species used for making them are *Dendrocalamus hamiltonii* and *Melocanna baccifera*. It was found that, with the old generation passing away these skills were slowly disappearing and today only few elderly artisans in the village can make them. Knowledge and hand skills are required for selecting locally available materials from nature to make the various handicrafts and these are irreplaceable. Only through instructions of the elderly artisans these knowledge and skills can be learned. The young generation today should take interest to learn and keep alive this irreplaceable knowledge and skills, before it is lost.

All the identified tools and implements are documented below with short description

Spade which is locally called 'Kedzü' is a primary multipurpose tool for digging and was used in the fields for carrying out almost all operations in the field such as digging of land for seed bed preparation, weeding, digging soil for planting seeds and seedlings, ploughing the fields, loosening of the soil which improves the water holding capacity of the soil thus improves the productivity. This is similar to the findings of Ghodpage *et. al.* (2020), who reported that, yield of vegetables was positively correlated with the water holding capacity. Hannah (2020), also reported that, deep ploughing is taken up in summer in drylands for avoiding hard pan in soil, improving water holding capacity and pest control. It was made up of a sharp edged blade with a wooden handle in various sizes. Table 1 reveals that 100.00 per cent of the respondents were in use of it.

Dao locally called 'Zhie' is a multipurpose tool for cutting like wood cutting, clearing of jungle, bushes, etc. It is made of sharp edged iron and the handle is made of bamboo winded with steel wire or steel sheet. Table 1 reveals that 100.00 per cent of the respondents presently are in usage of it.

Traditional storage bin which is locally called 'Tsünuo' is made of bamboo which was used for storing the grains of paddy. They were raised around one to two feet from the ground which kept away the rats and as it was made from bamboo, it gave good aeration and could store the paddy grain for years without getting spoiled. Table 1 reveals that 83.33 per cent of the respondents are still using it for storage of paddy though they also use granary for storing of the grains, however, the rest 16.67 per cent of respondents store paddy grains only in granary.

Bamboo mat locally called 'Zoprie' is used for drying the grains in the sunlight so that husk can be easily removed when milling. It is a mat made of bamboo. Table 1 reveals that 100.00 per cent of the respondents presently are in usage of it for drying paddy grains.

Husking plate locally called 'Zarü' is made of bamboo for removing the husk from grain after the grains are milled. Table 1 reveals that 100.00 per cent of the respondents presently are in usage of it.

Bamboo winnower is made of bamboo locally called 'Liherü' for removing the empty chaffs from the grain before they are stored in the storage bins. Table 1 reveals that 100.00 per cent of the respondents presently are in usage of it.

Garden rake locally called 'Charo' is usually made of bamboo used for collecting the unwanted particles in the field, for spreading the seeds evenly in the field after broadcasting, etc. Table 1 reveals that 100.00 per cent of the respondents presently are in usage of it.

Sickle locally called 'Zhiephinuo' is used during harvesting for cutting the paddy straw. It is a hook like at the tip to catch hold of the paddy and cut them and is made of a sharp blade having a wooden handle. Table 1 reveals that 100.00 per cent of the respondents presently are in usage of it.

Traditional umbrella locally called 'Kenho' serves as a raincoat and is used by farmers for working in the field during rainy season. It is made from the dried leaves of *Imperatacy lindrica.* They are very light and can be easily

carried on the back and field works can be done freely unlike the umbrellas which needs holding by the hands.Table 1 reveals that 83.33 per cent of the respondents presently are in usage of it, while 16.67 per cent are using readymade hats/scarf for protection from sun and rain.

Traditional bamboo basket locally called 'Mekho' was made of bamboo and they are of two types 'Khodi' and 'Khorü' which serves different purposes. The 'Khodi' is thickly knitted and was used for carrying grains and 'Khorü' which is knitted with holes was used for carrying agricultural commodities, farm products, etc. Table 1 reveals that 100.00 per cent of the respondents presently are in usage of it.

Hand operated rice pounder locally called 'Ciekhe' is made of wood and was used for removing husk of grains and also for pounding the grains. Table 1 reveals that 70.00 per cent of the respondents presently are in usage of it for pounding small amount especially sticky rice for consumption as lunch while a larger part of the grains are pounded from rice mill and the rest 30.00 per cent pound grains from rice mill only.

Pick axe locally called 'Kathi' is made up of sharp edge blade on both the ends with the handle made of wood. It was used as a digger in stony places and for digging the soil deep down. Table 1 reveals that 100.00 per cent of the respondents presently are in usage of it.

Bamboo basket locally called 'Yietho' is made of bamboo and is used for filtration during fishing and also for storing farm products which are to be hung above the fire. Bamboo container locally called 'Merha' is usedfor storing grains and other farm products. Table 1 reveals that 100.00 per cent of the respondents presently are in usage of it.

2. Extent of use of ITK

From Table 2, it can be seen that majority of the respondents were in the category of high user of ITK with a percentage of 50.83followed by medium users with 34.17 per cent and low users with 15 per cent. Thus, it was concluded that more than 90 per cent of the respondents were medium to high users of ITK. This can be related to the findings of Bhoyar *et al.* (2018), who did a research on the 'assessment of agro-forestry systems' and reported that, out of seven agro-forestry systems, six were found to be traditional agro-forestry systems. This confirms the importance and usage of Indigenous Technical Knowledge in agriculture.

This research on identification and documentation of indigenous agricultural tools and implements of the Angami tribe, Nagaland, India and to determine the extent of its usage by the sample farmers concluded that, through the study sixteen (16) different indigenous tools and implements of the Angami tribe used in agricultural activities were identified. It was found that all the tools and implements had a touch of bamboo. The identified species used for making them are *Dendrocalamus hamiltonii* and *Melocanna baccifera*. With the old generation passing away these skills are slowly disappearing and today only few elderly artisans in the village can make them. The study also found that more than 90 per cent of the respondents were medium to high users of these identified ITK.Knowledge and hand skills are required for selecting locally available materials from nature to make the various handicrafts and these are irreplaceable. Only through instructions of the elderly artisans these knowledge and skills can be learned. Therefore, the study recommends that one has to create awareness about the indigenous technology which is vital for sustainable development as it has evolved after thousands of years of observation and experience imbedded in local knowledge and the younger generation of today should take interest to learn and keep alive this irreplaceable knowledge and skills, before it is lost.

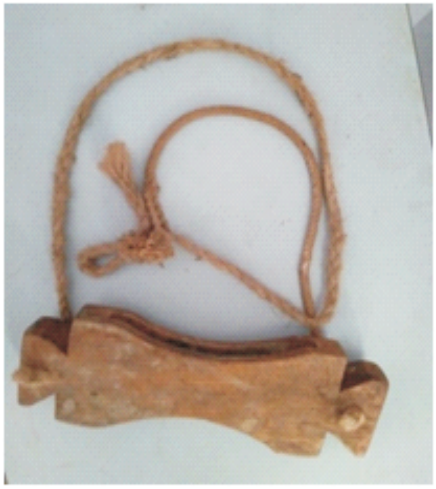
Table 1 Identified Indigenous Agricultural tools and implements

Sl. No.	Name	Local name	Purpose for which used	% of users
1.	Spade	*Kedzü*	Used for ploughing, digging, loosening of the soil, etc.	100.00
2.	Dao	*Zhie*	Used for clearing the jungle, bushes, cutting trees, woods, etc.	100.00
3.	Traditional storage bin	*Tshünuo*	For storing paddy grains	83.33
4.	Bamboo mat	*Zoprie*	For drying the grains	100.00
5.	Husking plate	*Zarü*	For removing husks from grain	100.00
6.	Bamboo winnower	*Liherü*	For removing the chaffs from grain	100.00
7.	Garden rake	*Charo*	Used for, collecting unwanted particles, for spreading seeds evenly on the seedbed during broadcasting, etc.	100.00

8.	Sickle	*Zhiepfino*	For harvesting the paddy	100.00
9.	Traditional umbrella	*Kenho*	Used as a raincoat	83.33
10.	Traditional bamboo basket	*Mekho: i.Khodi (thickly knitted) ii)Khorü (thinly knitted)*	i) *Khodi*- used for carrying the paddy grains ii) *Khorü*- used for carrying inputs, farm products, *etc*.	100.00
11.	Hand operated rice ponder	*Chiekhe*	Used for removal of husk of paddy or any other grains and also for pondering.	70.00
12.	Traditional waist belts	*Zhieku*	Used for carrying dao on the back.	100.00
13.	Pick axe	*Kathi*	Used for digging in stony places and for digging the soil deep down.	100.00
14.	Bamboo basket	*Yietho*	Usually used for and also for storing farm products to be hung above the fire.	100.00
15.	Bamboo container	*Merha*	Used for storing grains and other farm products.	100.00
16.	Axe	*Seidurü*	For chopping wood	100.00

Table 2 Distribution of respondents based on extent of use of ITK

Sl. No.	Category	Frequency	Percentage (%)
1.	Low users	18	15
2.	Medium users	41	34.17
3.	High users	61	50.83



Waist belt (*Zhieku*)

Umbrella (*Kenho*)

Bamboo container(*Merha*)

Bamboo mat (*Zoprie*)

Basket (*Khorü*)

Basket (*Khodi*)

Storage bin (*Tsünuo*)

Basket (*Yietho*)

Axe (*Seidurü*)

Figure 1.Indigenous tools and implements

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