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Han-up Ahi Karcho: Homage to the all-season food vegetable bamboo shoot in the North-eastern region of India

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Abstract

Karbi ethnic group in the Northeastern region of India possesses immense knowledge of forest resources, including bamboo, for subsistence and well-being. From birth to death, *Kaipho* or *Dendrocalamus hamiltonii* is regarded as the most important forest resource providing all material needs of the community. *Han-up* or tender shoots is an exceptional food that provides food security as a vegetable around the year, the only vegetable accorded the status of the major crop paddy. According to their oral history, tender shoots of *D. hamiltonii* were the most abundant and easily accessible food in forests, Karbis natural habitat, and the community subsisted on bamboo shoots during food scarcity and migration. Based on indigenous technological knowledge the tender shoots are processed and fermented in bamboo tubes and then stored for consumption throughout the year. To pay homage to the all-season food vegetable, Karbi folks observe the *Han-up Ahi Karcho* festival which involves community fermentation of bamboo shoots in a special bamboo basket called *Han-up Ahi*. Young boys and girls perform the crop harvesting dance *Hacha Kekan* to the tune of a folk song that narrates their origin, migration, subsistence practices and worldviews. The event falls during the Karbi calendar months Chete-Phree (October-November) which coincides with the time of lean agricultural activities and thus, guarantees maximum involvement of folks for the occasion. It is also the stretch when the growth of bamboo shoots reaches consideration height and is hard enough to withstand the harsh environment of bulk fermentation. *Han-up Ahi Karcho* is a valuable source of information encoded in Karbi oral tradition, such as migration and cultural history, subsistence practices, traditional ecological knowledge, past environment and resource management. Even today, Karbis forages bamboo shoots in the local forests but a sound knowledge is inevitable to identify the appropriate season and bamboo species, and successful processing of the harvest.

Keywords Bamboo Shoots; All-season Vegetable; *Han-up Ahi Karcho*

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1. Introduction

Bamboos are arborescent woody grass belonging to the botanical family Poaceae. With over 1200 species distributed in tropical, subtropical and mild temperate zones, about 124 species under 18 genera occur in India (Tewari 1992; Brystriakova and Kapos 2006). Popularly known as ‘poor man’s timber’, bamboo is a versatile green resource of great value that played a key role in human society since time immemorial. Throughout the world, bamboo culture is deeply ingrained with the life of rural communities supplying all requirements for houses, bridges, utensils, food and nutrition, medicine, fuel, crafts and religious practice. There is a growing importance of its use in urban structures as well. Bamboos also play an important role in forest ecosystem dynamics through its distinctive life cycle (Brystriakova and Kapos 2006) and woody biomass (WWF 2003). Further, bamboo groves of the forest provide refuge and food to many animals; many animals of conservation concern depend on bamboo for food and other ecological needs (Brystriakova and Kapos 2006).

The Northeastern region of India with its diverse ethnic cultures is synonymous with bamboo and bamboo products. The region has a rich diversity of bamboo representing more than 60 species (under 18 genera) of India’s 124 bamboo species (Tewari 1992). The interrelationship of bamboo with the socio-cultural life of the tribal population of Northeastern India is noteworthy in terms of food, shelter, medicine, handicraft, culture, construction and religious purposes along with its role in carbon sequestration and biodiversity conservation. Many bamboo species are a part and parcel of traditional delicacies, in the form of both fermented and non-fermented food which significantly contributes to dietary and health management among tribal communities (Mao and Odyuo 2007; Tamang and Tamang 2009; Bisht et al. 2012). Studies have found bamboo as a highly potential source of nutritional as well as nutraceutical components that can significantly contribute to human health well-being (Nirmala et al. 2011, 2014; Chandramawli and Vishwanath 2012; Basumatary et al. 2017). Many species have high demands in handicraft industries, pulp and paper industries, musical instruments, house construction etc. Moreover, bamboo has immense significance in ethnic agro-forestry systems thereby highlighting the ecological role of bamboo (Loushambam et al. 2017). In the forest ecosystem bamboo provides a source of food security to many rural families during the period of food shortage (Bhatt et al. 2003, 2004) and natural calamities.

Bamboo is profoundly entrenched in social and cultural life of the people of Northeast India. In this paper bamboo culture, a case study of the Karbi people of Northeastern India is being discussed with special reference to the use of bamboo shoots as food and religious observation

to pay homage to the all-season food vegetable. Karbi people are mainly associated with wild bamboo such as *Dendrocalamus hamiltonii*, *Melocanna baccifera*, *Schizostachyum dullooa* and *Bambusa multiplex* of which *D. hamiltonii* is the most important species that provide all community and household requirements of construction, food, nutrition, health, fuel, livelihoods and source of cultural identity. There are a few reports on the ethnobotany of the Karbi ethnic group (Jain and Borthakur 1980; Borthakur 1976a, 1976b; Teron 2005, 2006, 2008; Teron and Gogoi 2004; Teron and Borthakur 2008, 2012a, 2012b, 2012c) but their bamboo culture has been scarcely studied (Teron and Borthakur 2012). For indigenous people, knowledge of biodiversity is crucial for the identification, utilization and management of natural resources for construction, food, medicine, fiber and other utilities. Study on people-plant interactions in different ecosystems has relevance to United Nations Sustainable Development Goals (SDG) such as ending poverty, food security, livelihood diversification, gender equality, sustainable agriculture and biodiversity conservation.

2. The Karbi People and their Culture

Karbis are recognized as Scheduled Tribe under the Constitution of India. With distinct cultures, they represent one of the prominent ethnic tribes of the Northeastern region of India with distribution in the states of Assam, Meghalaya, Nagaland and Arunachal Pradesh. Some reports suggest their presence in neighbouring countries of Myanmar and Bangladesh, particularly the Chittagong Hill tracts. Ethnically Karbis are Mongoloid and linguistically belong to Tibeto-Burman and more particularly the Kuki-Chin sub-group of languages. Due to lack of written history not much is known about their origin. However, they are believed to have migrated from the Kuki-Chin area in and around the Chindwin River valley in Western Myanmar (Phangcho 2001). The Karbis call themselves *Arleng* which means 'Man'. In the early days, they inhabited the hilly areas and houses were built on raised platforms probably to protect themselves from wild animals. Karbis practice an animistic form of religion that include beliefs in multiple deities or gods and propitiate them, often involving animal sacrifice, in return for good health and favourable harvest.

Karbis are agriculturists and shifting cultivation also referred to as *jhum* in India, is the main practice of cultivation even today, at least in the hills. They grow multiple crops of which paddy is the major crop besides pumpkin, maize, yams, sesame, barley, brinjal, chilies, arums, cotton and many more. Men are known for their expertise in wood, cane and bamboo crafts. Women are expert weavers and make quality garments with beautiful indigenous designs for themselves as well as for the families. Rice is the staple food eaten along with wild/cultivated

plants as vegetables. Oil is seldom used in cooking while dish prepared from locally prepared water extract of ash called *pholo* and dried fish is usually preferred. They are not habituated to taking milk but instead prefer red tea with roasted or boiled root and tubers. Rice beer or *horlang* is a common alcoholic drink consumed in daily life and during special occasions; *horlang* is also used during rituals as offering to deities. *Horlang* is produced by fermenting rice and other cereals using locally prepared starter cakes called *Thap* (Teron 2005).

3. Materials and Methods

Information on traditional knowledge of bamboo and its use was collected through semi-structured interviews with Karbi elders residing in the states of Assam and Meghalaya. A certain amount of data on the association of Karbi people with *D. hamiltonii* was incorporated from various community activities. Information on the origin and practice of *Han-up Ahi Karcho* or homage to bamboo shoots was collected by attending two such festivals in Karbi Anglong district of Assam during September 2012 and January 2013 organized by Hemphu Karbi Hongri Asong, a local Socio-Cultural organization. Focus group interview was conducted with Langtuk Tokbi, a Karbi elder aged about 60 years, who is well-versed in the folk song relating to the origin and practice of the bamboo shoot festival. The festival provided a good opportunity in understanding the revered festival and the role of traditional institutions and the community (both men and women) in general. Information were also collected from the local markets and trade centers, interacted with vendors to make an inventory of bamboo.

4. Results and Discussion

4.1. Folk nomenclature and socio-cultural significance of bamboos

Forest is the natural habitat of the Karbi people so traditionally their bamboo culture is associated chiefly with wild bamboo species namely *Dendrocalamus hamiltonii*, *Melocanna baccifera*, *Schizostachyum dullooa* and *Bambusa multiplex*. Among all bamboos, *D. hamiltonii* however, is the most exploited resource. Karbi practices an ingenuous system of nomenclature of biodiversity, including bamboo, which enables them to identify and classify natural resources for use. The folk nomenclature of bamboo, however, is not straight forward with no common term for bamboo and no uniformity in the use of 'prefix'. Similar to nomenclatural systems prevalent in other traditional societies, Karbi's nomenclature of bamboo is also based on external morphological features and growth forms. They refer "*Kaipho*" for the bamboo species *D. hamiltonii* and the prefix '*pho*' is used to name the variants of *Kaipho*, for example,

Pho-pi, Pho-chetung, Pho-jang, Phojir, Pho-nei, Pho-ar, Pho-sang, Pho-banjar and *Pho-kang*. These variants are identified by their growth form and features of stem and leaf. Different stages of the plant are referred to by different names. A *Kaipho* grove is called *Ko-phang* (*Ko*: *Kaipho*; *phang*: grove) (Figure 1) and a forest dominated by *Kaipho* is called *Phori-Photen*. The tender shoot is called *Angtuk*. The immature bamboo plant is called *Arjang* while the mature plant is called *Aphulu*. They refer to the leaf as *Arvo*, node as *Asek*, internode as *Apong*, rhizome as *Apholong* and root as *Angkur* (Figure 1). The nomenclature of other wild bamboos is different from *Kaipho* as prefixes are not associated with the names like *Tereng* (*Schizostachyum dullooa*), *Arthem* (*Melocanna baccifera*) and *Artungso* (*Bambusa multiplex*). Karbi folks also recognize the mass flowering of wild bamboo as a caution for rodent population explosion and damage to crops which in turn can bring famine and food shortage. The prefix “*Chek*” is used to refer to the cultivated bamboo, for example, *Chek-keme* (*B. tulda*), *Chek-buluk* (*B. balcooa*), *Chek-inghin* (*B. pallida*), *Chek-sudo* (*B. arundinacea*) and *Chek-mokor* (*B. auriculata*). The different types of wild and cultivated bamboo have certain preferred utility so precise nomenclatural knowledge is fundamental for their proper selection and use.

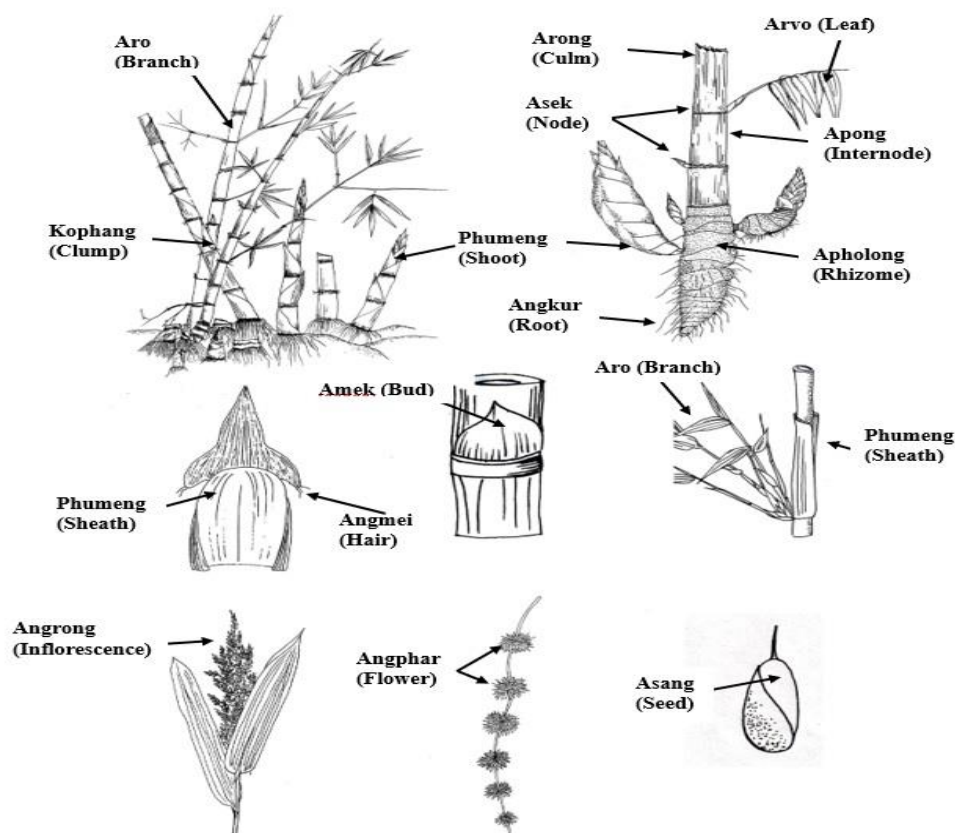


Fig. 1. Karbi system of naming a bamboo plant

The role of bamboo is paramount to Karbi society with great influence on their social and cultural life. Using their indigenous wisdom, the Karbi folks have judiciously exploited forest resources for their needs since antiquity. Karbis consider *Kaipho* or *D. hamiltonii* as the most important bamboo resource; this perception is borne out of long habitation in forests dominated by *D. hamiltonii*. *Kaipho* is everything to the Karbis; from birth to death, it is an inalienable resource that is linked to all aspects of Karbi folk life. According to Karbi's traditional beliefs and practice, a few months after a mother conceive, some rituals are performed in honour of *Hemphu*, an important Karbi deity, where the use of *Kaipho* is mandatory. During the birth of the baby, birth attendants (strictly women elders) make a blade (*Tarno*) from *Kaipho* stem to cut the umbilical cord of the newborn. From infancy to death all rituals are performed for the well-being of a person, the use of *Kaipho* is without exception. For the construction of a living house *Kaipho* stem (culm) is the solution providing materials for post, floor, wall, doors, roof and cordage (Figure 2). In the absence of thatch grass, stems of *Kaipho* are used to cover the roof. All household implements such as utensils mat, granary, hand fan, sieve, containers, weaving implements, ornaments, musical instruments, and fishing and hunting gears are made from *Kaipho* stems. In sports and recreation, *Kaipho* fulfills all the requirements. Dried bamboo culm sticks are used for fire and during agricultural activities and forest ventures. Karbi folk calendar months namely *Jangmi* (April), *Vosik* (June) and *Cheti* (September) are based on the growth stages of *Kaipho*. During the selection of a new plot for jhum agriculture (slash and burn), the presence of *Kaipho* groves is considered an indicator of mature or old vegetation and fertile soil. *Kophang* (*Kaipho* grove) around the jhum field supplies all materials (fire, fuel, food, utensils, huts, etc) during agricultural operations. *Kaipho* is used for building fire during jhum activities and hunting or foraging trips. The bamboo culms are used as pipes to irrigate land for cultivation and household purposes. The plant is also used in healthcare; and extract from the ash of the culm is used to cure stomach aches below the navel. A house or hut constructed from *Kaipho* protects them from the vagaries of nature (rain, sunlight, wild, cold, lightning, thunder, storm, hailstones) and wild beasts which are potential sources of insecurity in forests. The bamboo shoot (Figure 3) provides all-important vegetable for food and nutrition security around the year. Routine consumption of bamboo shoots (*Han-up*) exposes their body to useful botanicals thus, providing security or immunity against many diseases in addition to food and nutritional security. The spiritual association with *Kaipho* also brings religious harmony to a family and the community.



Fig. 2. Karbi traditional house constructed from bamboo



Fig. 3. *Han-up angtuk*, tender shoot of bamboo

Bamboo has a significant contribution to the development of the Karbi language. Many vocabularies are based on *Kaipho* and prominently appear in folk songs, proverbs and stories. Further, many places in Karbi inhabited areas are named (toponymy) after *Kaipho* and other wild bamboo such as *Phonei Langso* (*Pho-nei*: a variety of *Kaipho*; *Langso*: stream), *Chek-su Anglong* (*Chke-su*: spiny bamboo; *Anglong*: hill), *Chek-so Langso* (*Chek-so*: small bamboo; *Langso*: stream), *Kaipho Langso* (*Kaipho*: *D. hamiltonii*; *Langso*: stream). After the death of a family member certain cultural requirements such as mat, hand fan, catapult, etc are made from *Kaipho*. The corpse is carried to the cremation ground with the help of *Kaipho* stem. Sometimes, the corpse is carried with *Dola*, a kind of palanquin; the latter is made from a particular *Kaipho* variety called *Pho-banjar*. With death, the life cycle of a Karbi man is considered complete whereas *Kaipho* is associated with all facets of life. For this, the Karbi people, aptly say “*Mehang kethek ta kaipho pen, kithi ta kaipho pen*” which means “Born with *Kaipho*, died with *kaipho*”.

4.2. Bamboo shoot- all-season food vegetable

The traditional diet of the Karbi people includes staple rice called *Ann* and *Han* or vegetables gathered from jhum fields, home gardens and wild habitats. In a broad sense, *han* includes both plant and animal foods consumed along with rice. Wild foods are regularly foraged and consumed and tender shoots or *Han-up* of *Kaipho* (*D. hamiltonii*) are the most reliable resource to Karbi people providing the all-important *han* or vegetable for food and nutritional security around the year. The nomenclature of *han-up* is grounded on the method of consumption and season of availability; the prefix ‘*up*’ is used to name them. *Han-up* is consumed as a vegetable

in three different forms, fresh or *Up-wai* (*wai*: fresh), fermented or *Up-thor* (*thor*: sour) and dry or *Akreng*. A set of indigenous technological knowledge is involved in processing these items and culinary methods are also different. The new *han-up* season starts after the burning of slash of the jhum field (usually April) and continues up to November. Foraging activity begins with the collection of *han-up* from the jhum field which are actually tender branches produced from the stumps of *Kaipho* cleared for preparing cultivating field. For its unique taste, this *han-up* is generally fermented to produce *up-thor* and relished after cooking with white meat or pork. Main *han-up* begins after the first rain (usually June-July) when large tender shoots emerge from the base of mature stems. After collection and processing, it is cooked for immediate consumption as *up-wai* and/or fermented to produce *up-thor*. But this early season *up-thor* cannot be preserved for a long period as it decomposes with time.

Unlike early season harvest, processing of late season *han-up* (i.e., September-November) is elaborate and demands more skill. Based on indigenous wisdom acquired from their ancestors, almost every house ferments a good quantity of *han-up* during months. After processing, the apical tender portion is separated for immediate consumption as *up-wai* while lower hardier shoots are processed for bulk fermentation as the material is hard enough to withstand long rigors of fermentation (Figure 4a). Traditionally, *Langpong*, or an internode of the stem with nodes at both ends is cut from a mature *Kaipho* stem. A hole is made at the upper node and the processed *han-up* is stuffed into the *langpong* and finally, the mouth is sealed with a piece of wood to make it air tight (Figure 4b). *Han-up* filled *langpong* are either buried in soil or immersed in water for fermentation. *Up-thor* is produced after fermentation for about three nights and is relished around the year, even after the appearance of the next season's *han-up*. Late season *han-up* is preserved and stored in another novel method. The processed *han-up* is sundried, wrapped with banana leaves and kept near the fire place for future use.



Fig. 4a. Processed *han-up* of *Kaipho* (*Dendrocalamus hamiltonii*) ready for fermentation, **b.** Fermentation of *han-up* stuffed in *Langpong* (bamboo stem)

Han-up (*up-wai*, *up-thor* and *akreng*) is relished in many ways. *Up-wai* is eaten boiled alone or with other vegetables and local herbs. The sour *up-thor* is cooked alone or with other vegetables or meat as the main dish. It is also often used to flavor vegetable, meat and fish dishes. As a recent trend, *up-thor* is made into pickles or used to flavor chili and meat pickles. Main or side dish, *up-thor* is an admired vegetable in Karbi society and will continue in future. Culturally significant food called *Pholo* is produced from the ash of *Arjang* or immature *Kaipho* stems that form the signature of Karbi culinary practice. As per old practice, ash of *D. hamiltonii* is collected from jhum fields after burning of the slash (vegetation). It is stored in aerated baskets for future use. For processing, some quantity of the ash is taken in a conical bamboo craft with a long tail called *Pholobisir*. Water is poured from above which leaches through the column of ash and the extract (*Pholo*) is collected in a container. *Pholo* is used for seasoning vegetable, meat and fish items; it makes the dish soft and palatable. In the olden days *Pholo* was used as a detergent for washing clothes and cleaning purposes. In the production of textiles, *Pholo* is added to soften eri cocoons. *Pholo* is also used in processing natural dyes for textiles. Many families collect and keep good stock of *Kaipho* ash for extraction of *Pholo* for consumption and other purposes. It however, has a short self-life so extracted as and when required. Karbis observe culinary taboo on adding *Pholo* in sour dishes while vegetable cooked with *Pholo* is offered to deities during ritual observations.

Tender shoots of the bamboo *Kaipho* is an all-season food vegetable that has established its distinctiveness as a source of food security among the Karbi people. During periods of food scarcity (August to October) *up-wai* is consumed in resource-poor families as a substitute for rice or mixed with it and then eaten cooked. Elders often skip meals to save food for their children. In the time of mass flowering of *Kaipho*, the seeds are collected and eaten. *Kaipho* groves provide shelter to many wild animals that the Karbi hunted or trapped either for diet diversification or food security. Larva of an insect called *Ketje* which resides in the stems of *Kaipho* provide a source of a delicious diet. A species of edible mushroom *Muphang* that grows only on decayed grove of *Kophang* is a revered dish during summer. It is also noteworthy to mention that Karbis maintained a taboo on the consumption of new season *han-up* until the observation of community ritual called *Rongker*.

Though there are reports on the presence of toxic cyanogenic glycosides in fresh shoots of some bamboo species, Karbi people have not reported any cases of poisoning or fatality after consumption of *D. hamiltonii* shoots. The minute exercise of washing *han-up* with water is not intended to remove or reduce cyanogenic glycosides, if present, but to remove hairs and dirt. Probably Karbi people were able to avoid poisoning from consumption of *han-up* by applying

the empirical knowledge of processing handed down from ancestors. Traditionally, *han-up* is collected from earlier collected Kaipho grove; such *han-up* is said to have a pleasant taste. *Han-up* harvested from a grove with no history of earlier collection is said to be bitter and when consumed results in severe stomach pain and vomiting, probably the effect cyanogenic glycosides. This health complication is called *Han-up Kangre*. Karbis strictly avoid tender shoots of *Schizostachyum dullooa* and *Pho-kang* variety of *Kaipho*, as these bamboos have a history of producing shoots with bitter taste and health complications. However, fermented *han-up* (*up-terang*) of *Schizostachyum dullooa* is said to be safe for consumption; they claim fermentation reactions remove the toxic principle but it requires validation of this folk perception. Further, Karbi folks believe that the presence of bitterness in the shoots varies from hill to hill and from grove to grove; its (bitterness) is said to be particularly prominent in groves with no history of harvesting. Foraging bamboo shoots thus, demands sound knowledge and skill that, a first time may end up collecting a basket full of bitter shoots. The above account points to the role of management in reducing or removing the toxic cyanogenic glycosides from bamboo shoots. Management, which the Karbi folks unconsciously have been practicing by harvesting the edible shoots from the same bamboo grove, prevented the accumulation of the toxic compounds. On the other hand, bamboo shoots not disturbed for long periods through harvesting leads to the accumulation of toxic compounds that may cause poisoning if mistakenly consumed.

4.3. *Han-up Ahi Karcho*- homage to all-season food vegetable bamboo shoot

Bamboo culture of the Karbi people is associated largely with wild bamboo species namely *Kaipho* (*Dendrocalamus hamiltonii*), *Arthem* (*Melocanna baccifera*), *Tereng* (*Schizostachyum dullooa*) and *Artungso* (*Bambusa multiplex*). As stated earlier, *Dendrocalamus hamiltonii* or *Kaipho* is the most important bamboo resource for the people supplying all requirements of life, from birth to death. According to an oral historical account, the Karbi people endured a long history of migration before finally settling in the present habitat. Though no region is confirmed, the oral narrative on the origin of paddy mentions Karbi people settled in the Kuki-Chin area before entering the present Northeastern region of India. They are said to have subsisted on rice and other minor crops but they also depended on wild foods (plants and animals) for food security to survive in the forest ecosystem. Tender shoots or *han-up* of the wild bamboo *D. hamiltonii* was the first vegetable consumed by them and also the most accessible vegetable around the year. Even in the bygone days, Karbi people acquired technological knowledge of processing and fermenting bamboo shoots to ensure supply of food

around the year. For being an indispensable source of food security, Karbi people regard *han-up* as *Han Akleng* or supreme vegetable (*Han*: vegetable; *Akleng*: highest). This vital association gradually evolved into a religious one with the people recognizing *han-up* as the youngest daughter of Songsar recho, a Karbi God. During the tenure of the Karbi chief Sarhai Sar Inghi (belonging to the Inghi clan), it was decided to give all-season bamboo shoot vegetables the status of major crop paddy in a befitting manner. Hence, a religious observation named *Han-up Ahi Karcho* was initiated to honor and pay homage to all season bamboo shoot vegetable involving community fermentation of *han-up* in a specially woven bamboo basket called *Han-up Ahi* (Fig. 5). Though devoid of written records, Karbis carry memories of a long migration history from a hypothetical region in present Myanmar. They are peace loving and avoid confrontation with warring groups by moving to a different location and hardly settled in one place for long years. During the course of travel, it is obvious, that they survived on forest products but found the bamboo Kaipho (*D. hamiltonii*) a more abundant and easily accessible source of vegetable and other material needs. Having knowledge on the bamboo species, its exploitation was continued even after settlement in the present habitat which gradually became firmly molded with socio-cultural life of the people. The present deep association of *Kaipho* with Karbi culture thus originated out of necessity and due to the availability of the resource (*D. hamiltonii*) in their local environment in the past.



Fig. 5. Villagers weaving the *Han-up Ahi* (basket) for community fermentation of *han-up*

Karbis have strong traditional institutions at village and regional level. Customarily, *Han-up Ahi Karcho* is observed in the house of village dignitary Riso Basa in the Karbi calendar month Cheti or Phree (September or October). Villages of a particular *Longri* or territory are invited to participate in the festival. It is an elaborate exercise that is completed in two phases- storing the *han-up* for fermentation and harvesting of fermented *han-up*. On 16th September 2012 and 14th January 2013 respectively the event was organized by Hemphu Karbi Honghari Asong, a local Socio-Cultural Organization. The first phase is observed during the Karbi calendar months Chete-Phree (October-November) which coincides with period of lean agricultural activities and thus, guarantees maximum involvement of folks for the occasion. It is also the time when the growth of bamboo shoots reaches consideration height and is hard enough to withstand the harsh environment of bulk fermentation. Elders of the host village make the special conical-shaped basket called *Han-up Ahi* using bamboo-splits for fermenting *han-up*. On the auspicious day, the village head and territorial chiefs perform rituals in honor of local and territorial deities for the peace and safety of the community. Participants from various villages bring their collection of *han-up* and after processing by slicing and chopping (Fig. 6a), the *han-up* is transferred into the large *Ahi* (basket) (Fig. 6b). A few whole tender shoots are also added for fermentation; to add flavor, pumpkin and pork are also added. Young boys and girls perform the *Hacha Kekan*, a revered harvesting dance, to the tune of a folk song referred to as *Han-up Keplang Alun* (song of the origin of bamboo shoots). This song narrates their origin, worldviews, migration, habitat, food, subsistence strategies and association of Karbi people with forest and bamboo shoots. The role of village institutions (village head and youths) in observing this religious festival is also explained in the song. After completing the formalities, *han-up* is left to ferment in the revered *Ahi* (Fig. 6c) till harvesting crops. The village head ends the day with a fervent appeal to traditional deities for proper fermentation of the *han-up*.



Fig. 7a. Community processing of *han-up* for fermentation, **b.** Religious transfer of processed *han-up* to the *Ahi*, **c.** Fermentation of *han-up* in the *Ahi*

The second phase of *Han-up Ahi Karcho* is the retrieval and distribution of fermented *han-up* for consumption among the public. It is performed in the month of Arkoi (January) or Thangthang (February) after the harvesting of crops, a period dedicated to household activities before starting of the new agricultural season. In this case, the event was observed on 14th January 2013 as fixed by the organizer`. The village head observed religious formatives and asked the youths to perform the harvesting dance *Hacha Kekan* (Fig. 8c). After that youths retrieve the fermented *han-up* from the *Ahi* (basket) and evaluate the quality of the food (Fig. 8b). According to local beliefs, the quality of the fermented *han-up* has implications for the future of the community and the territory. Decomposition is read as a bad omen like unfavorable climate for agriculture, famine, diseases and any issue that may affect the well-being of the people. Each household of the village gets an equal share of the fermented *han-up* which is distributed with a basket called *ahop*. All guests including were honored with the same quantity of the revered food vegetable (Fig. 8c).



Fig. 8a. *Hacha Kekan* by youths around the revered *Han-up Ahi* to the tune of folk song, **b.** Retrieval and evaluation of the fermented *han-up*, **c.** Packaging fermented *han-up* in *Ahop*, small bamboo basket, for distribution

4.4. Ecological basis of *Han-up Ahi Karcho*

Han-up Ahi Karcho is being celebrated for the sole purpose of paying homage to bamboo shoots on which Karbi people sustained before access to present day crops and to trasmit the tradition and associated knowledge to new generations. In absence of published records, opinion on the historical origin of the festival is chiefly based on oral tradition that repeatedly mention about abundance of the bamboo *Kaiphoo* (*D. hamiltonii*) in their habitat, albiet temporary, or their migration through bamboo forests. Thus the choice of the food plant leading to the present day celebration of *Han-up Ahi Karcho* is influenced by the ecological settings. The festival is also linked to agricultural cycles though the temporal factor of its observation is determined by the growth stage of bamboo shoots. The observation of each of two phases of

Han-up Ahi Karcho at specific moments of agricultural cycles also indicate linkages between the festival and ecological conditions. The first phase of *Han-up Ahi Karcho* observed during the Karbi calendar months Chete-Phree (October-November) is a period of lean agricultural activities and the bamboo shoots attain the growth hard enough to withstand the harsh environment of bulk fermentation. The second phase of the festival is observed during the month of Arkoi (January) or Thangthang (February) after the harvesting of crops; it is the period dedicated to household activities before starting of the new agricultural season. Being closely linked to the ecological settings, the temporal aspects of *Han-up Ahi Karcho* is expected to vary with changes in the landscapes. The requirement of huge quantity of *han-up* of *Kaipho* and acculturation however, pose limitation to the continuity and sustainability of *Han-up Ahi Karcho* tradition. With change in land use practice that resulted to the shrinkage of *Kaipho* habitat, and most youths staying in boardings, away from their native villages, to pursue modern education, the festival may gradually lose fervor and be rendered to an act of continuance of a tradition only. To this argument the Karbi people indigenous sustainable practice can contribute to continuation of *Han-up Ahi Karcho*; they have an option of reviving indigenous tradition of maintaining a bamboo forest called *Namlom* or *Namso pangjok* in the vicinity of each village to accomplish the requirement of *han-up* for the festival. In the present day, each Karbi family in the hill region maintain bamboo plantations for commercial purpose. Further, to lessen pressure on wild *Kaipho* populations, cultivated bamboo can supplement the *han-up* requirement for observation of *Han-up Ahi Karcho* and continue the tradition simultaneously with conservation. Such practice has potential to promote and develop bamboo-based agroforestry for multiple benefits of resource poor families and the community as well.

Conclusion

Karbi ethnic group in the Northeastern region of India possesses immense knowledge of forest resources, including bamboo, for subsistence. From birth to death, *Kaipho* or *Dendrocalamus hamiltonii* is regarded as the most important forest resource providing all material needs of the community. *Han-up* or tender shoots is an exceptional food that provides food security as a vegetable round the year, the only vegetable accorded the status of the major crop paddy. According to their oral history, tender shoots of *D. hamiltonii* was the most abundant and easily accessible food in a forest, Karbis natural habitat, and the community subsisted on bamboo shoots during food scarcity and migration. Based on indigenous technological knowledge the tender shoots are processed and fermented in bamboo tubes and then stored for consumption throughout the year. Bamboo culture of Karbi people including diversity, traditional

knowledge, use and management presents one of the many people-plant interactions occurring in different forest ecosystems. But the selective use of *Kaipho* (*D. hamiltonii*) for all aspects of life, from birth to death, exhibits the importance of traditional ecological knowledge for subsistence and survival in forest habitats. *Han-up Ahi Karcho* is a valuable source of information encoded in Karbi oral tradition, such as migration and cultural history, subsistence practices, traditional ecological knowledge, past environment and resource management. Even today, Karbis forages bamboo shoots in the local forests but a profound knowledge is inevitable to identify the appropriate season and bamboo species, and successful processing of the harvest. Karbi-*Kaipho* interactions which arose as a necessity for food and other material needs, exhibits a vivid example of how plant shapes human culture. In the present time, observation of *Han-up Ahi Karcho* face real challenges due to changes in land use patterns leading to the loss of *Kaipho* cover, and the demise of resourceful elders without proper transmission of the cultural knowledge and folk songs. Promotion of the bamboo culture of Karbi and other indigenous people and the associated knowledge could be an option for the protection of their culture, intellectual property and native land. Karbi people have a virtuous option of continuing the *Han-up Ahi Karcho* for years by reviving their age-old tradition of maintaining a bamboo forest called *Namlom* or *Namso pangjok* in the vicinity of each village and bamboo shoot production from plantations (that each Karbi family in the hill region maintains), to supplement *han-up* requirement for the festival. Nonetheless, *Han-up Ahi Karcho* provides great scope for research on Karbi's historical ethnobotany.

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Conflict of Interest

The author declares there is no conflict of interest

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