

House Of Adi Tribe Of Arunachal Pradesh: Construction Materials And The Use Of Space

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Abstract: *Adi is one of the major tribes of Arunachal Pradesh, in North East India. A typical Adi house is raised on stilts. Every part of the Adi house has some specific name and each part has unique functional significance. Different species of bamboo, palm, cane and timber formed the construction materials for a traditional Adi house. Traditionally it is believed that the construction materials collected during a particular period last long and are free from the attack of termites and other insects.*

Keywords: *Adi tribe, traditional house, bamboo, cane, palm*

I. INTRODUCTION

Adi people reside mostly in the foothills of the Eastern Himalaya and they are one of the major tribes of Arunachal Pradesh (Mandal *et al.* 2002). Out of the total 18 districts of the state *Adi* tribe live in six districts, namely East Siang, West Siang, Upper Siang, Lower Dibang Valley, Lohit and Upper Subansiri (Modi 2007). *Adi* is divided into 14 sub-tribes such as *Ashing, Bori, Bokar, Karko, Komkar, Minyong, Millang, Pasi, Padam, Panggi, Pailibo, Ramo, Shimong* and *Tangam* (Mandal *et al.* 2002, Singh 1995). They speak *Adi* language which belongs to the Tibeto-Burman language family (Singh 1998a, 1995b, Mandal *et al.* 2002). The unique music, dance and songs form a part of the rich cultural heritage of these people. The society administers all its affairs within its jurisdiction through a village council called *Kebang*. The *Kebang* moderates and settles all the disputes of the *Adi* people. The faith of the society on village council makes them to accept the verdicts of the council even today *in toto* (Mitkong 2002). Since time immemorial the *Adi* have lived in close association with nature and made the best use of the natural resources for their livelihood. Majority of the men-folk of the *Adi* are good craftsmen. Most of the household articles such as vegetable baskets, spoons, grinders, firewood baskets and mats are made using plant material (Singh *et al.* 2008). They have unique way of building houses using different types of plant materials. The season for collecting each building material varies and depends upon the waxing and waning of

the moon. This paper deals about the construction materials and use of space in a traditional *Adi* house.

II. METHODOLOGY

Banggo is the basic traditional administrative unit for *Adi* tribe. Each *banggo* consists a cluster of villages of varying numbers. This study was conducted in Yagrung village of *Bosing Banggo* (Figure1). This is the first comprehensive study on the house construction of *Adi* tribe. This study was conducted from September 2011 to January 2012. A preliminary visit was made to the village to get acquainted with the community as well as to select knowledge partners. The knowledge partners were either met individually or in groups and were explained about the scope and the purpose of the study. A Prior Informed Consent (PIC) was obtained from the knowledge partners as well as from the villagers for documenting the knowledge. The process of obtaining PIC was facilitated as the first author of this paper is from the same tribe as well as from same *Banggo*. Knowledge was gathered with a semi-structured questionnaire. The responses were noted in the field note book. A few knowledgeable persons accompanied the field trips for identification of plants and for information on their uses. The specimens were identified with the help of different floras such as Materials for the Flora of Arunachal Pradesh (Hajra *et al.* 1996, Chowdhery *et al.* 2009), Flora of British India (Hooker 1872 - 1897), Flora of Assam (Kanjalil *et al.* 1934 - 1940), e-floras of China, Nepal and

Thailand. The specimens were authenticated with the herbarium collections housed in Botanical Survey of India, Arunachal Pradesh Regional Centre (ARUN), Itanagar. Plant names were updated by referring to www.tropicos.org, www.ars-grin.gov and www.plantlist.org. The voucher specimens were deposited in FRLHT Biocultural Herbarium (FRLH), Bengaluru.

III. RESULTS AND DISCUSSION

A. SELECTION OF PLOT

The selection of plot for the construction of house is done after performing some ritual. The ritual is performed with the help of 4 unbroken rice grains and ginger wrapped in *Yogir* (*Dalhouisia bracteata*) leaf. The rice grains are placed over the leaf and the ginger is cut into pieces and the leaf is folded properly and covered with *Pesak* (a shallow bowl like vessel made of cast iron) and buried in the place which is selected as plot for the construction. The suitability of the plot for construction is decided based on the rice appearing broken or entire. If the rice is entire the plot is considered suitable. Ritual may show different indications for different persons for the same plot. Therefore, an abandoned plot is not considered as taboo by the others (Dhasmana 1979).

B. GENERAL PATTERN OF ADI HOUSE

A typical *Adi* house is raised on stilts (Figure 2). The space provided by stilts is used for storing firewood and keeping poultry (Figure 3). The stilts have also served other purposes during the inter-village wars fought between 1700 and 1800 A.D. (Tabi 2006). As the people stayed indoors for fear of getting killed, the fecal matter of the inmates was dropped below the stilt, which was consumed by the pigs reared below. Stilt houses are also constructed by many tribes of Arunachal Pradesh such as *Buguns* (Pandey 1996), *Idu Mishmi* (Baruah 1988), *Tagins* (Riddi 2006) and *Ramo* (Dhasmana 1979). Such houses are also built by tribes of Assam (Borah 2010), tribes of Nicobar Island (Sharief 2008), tribes of peninsular Malaysia (Beswick 2010) and tribes of Indonesia (Prihantoro 2006). *Adi* houses are usually rectangular in shape (Modi 2007). Rectangular house are also build by Mangakulane tribe of South Africa (Gaugris and Rooyen 2006). The size of the house varies accordingly to the number of members in the family. Houses are constructed mostly in an east - west direction that helps to receive maximum sun light. The number of houses per village varies from 13 to 400.

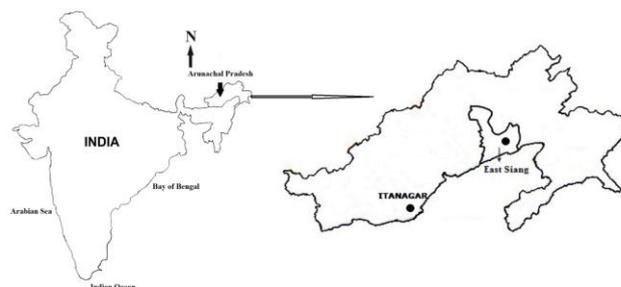


Figure 1: Map of Arunachal Pradesh showing the study area



Figure 2: A. Construction in process. B & C. Thatching the complete roof frame



Figure 3: A. Floor made of split bamboo and fire place fill up with mud. B. The walls are made of plaited bamboo and the stilt space is used for storing firewood. C. A finished Adi house

C. CONSTRUCTION MATERIALS USED FOR DIFFERENT PARTS OF THE HOUSE

Bamboo plays a key role for the construction of tribal houses in Arunachal Pradesh (Dhasmana 1979, Sharma & Borthakur 2008). Bamboos are long lasting, highly stable and fire safety (Kroetsch 2013). The main stilts that run from the ground to the side beam are called as *Giyang*. The supporting small stilts are known as *Gillae* (Figure 2). The *Giyang* and *Gillae* are usually made from any of the following woods such as *Bellang* (*Artocarpus heterophyllus*), *Belam* (*Choerospondias axillaris*), *Bulukang* (*Dendrocalamus hamiltonii*), *Shingkeng* (*Hopea shingkeng*), *Nahor* (*Mesua ferrea*), *Eyum* (*Morus macroura*) and *Keji* (*Toona sureni*). The side rafters which are known as *Dareng* are made of *Dibang* (*Bambusa pallida*). The main beam to which all the rafters are attached is known as *Lodang*. The roof frame is constructed using the top slender portion of *B. pallida* as it requires straight culms. The ladder that leads to the house is known as *Balae* and is made of timber from plants such as *Bellang* (*Artocarpus heterophyllus*), *Belam* (*Choerospondias axillaris*) or bamboo such as *Dibang* (*Bambusa pallida*), *Hurung* (*Dendrocalamus giganteus*) and *Bulukang* (*Bambusa balcooa*) (Table 1). The front space of the house serves two purposes. The open outer front space of the house is called *Tunggo*

gotek and is used for drying grains, seeds, clothes and also serves as a sit-out in the evenings especially during the summer. It is constructed using either split culms of different bamboos, split stems of *Tamak* (*Caryota urens*) or split stems of *Guye* (*Areca catechu*). Use of *Areca catechu* stems for hut floor has been observed in *Nicobari* tribes of Katchal, Car Nicobar and Chowr Island (Sharief 2008). The inner front space of the house is called *Tunggo Gorang* which is mostly used for weaving, storing dried grains and as a social space to spend time with the guests. The inner floor space of the house is normally made of *Dibang* (*Bambusa pallida*) or *Hurung* (*Dendrocalamus giganteus*) which has giant culms. These culms are split and spread on the floor. The use of giant bamboo for the floor is based on judicious use of resources. If they were to use the small bamboo, they will require more number of culms to spread on the floor and this will mean more destruction of bamboos.

Sl. No	Plant Name	Family	Local Name	Uses
1.	<i>Areca catechu</i> L.	Arecaceae	<i>Guye</i>	Split stem used for making <i>tunggo gotek</i> (outer front space of the house).
2.	<i>Artocarpus heterophyllus</i> Lam.	Moraceae	<i>Bellang</i>	Trunk used as <i>balae</i> (ladder) and <i>gilae</i> (beam).
3.	<i>Ailanthus integrifolia</i> Lam.	Simaroubaceae	<i>Sileng</i>	Trunk used for <i>talung</i> (Wall).
4.	<i>Altingia excelsa</i> Noronha	Altingiaceae	<i>Sirih</i>	Trunk used for <i>talung</i> (Wall).
5.	<i>Bambusa pallida</i> Munro	Poaceae	<i>Dibang</i>	Culms used for making <i>balae</i> (ladder), <i>puyo</i> or <i>tasut</i> (floor), <i>dareng</i> (rafter), <i>tarja</i> (plaited wall made of bamboo) <i>perab</i> (tier above the fire), <i>tunggo gotek</i> (outer front space) and <i>tunggo gorang</i> (inner front space).
6.	<i>Bambusa balcooa</i> Roxb.	Poaceae	<i>Bulukang</i>	Culms used for making <i>giyang</i> (post) and <i>balae</i> (ladder).
7.	<i>Bombax ceiba</i> L.	Malvaceae	<i>Shinge</i>	Trunk used for <i>talung</i> (wall).
8.	<i>Caryota urens</i> L.	Arecaceae	<i>Tamak</i>	Split stems used for making <i>tunggo gotek</i> (outer front space).
9.	<i>Calamus leptospadix</i> Griff.	Arecaceae	<i>Jeying</i>	Split stem used as rope for tying <i>gilae</i> (beam), <i>giyang</i> (post), <i>dareng</i> (rafter) and <i>talung</i> (wall).
10.	<i>Calamus flagellum</i> Griff. ex Mart.	Arecaceae	<i>Ramang</i>	Split stem used as rope for tying <i>gilae</i> (beam), <i>giyang</i> (post), <i>dareng</i> (rafter) and <i>talung</i> (wall).
11.	<i>Choerospondias axillaris</i> (Roxb.) B. L. Burtt & A. W. Hill	Anacardiaceae	<i>Belam</i>	Split stems used for making <i>gilae</i> (beam).
12.	<i>Cephalostachyum pergracile</i> Munro	Poaceae	<i>Madang</i>	Used for making <i>tabun</i> and <i>tatir</i> (rope) that is used for tying the thatching leaves with the rafters.
13.	<i>Dendrocalamus giganteus</i> Munro	Poaceae	<i>Hurung</i>	Culms used for making <i>balae</i> (ladder), <i>puyo</i> or <i>tasut</i>

				(floor), <i>tunggo gotek</i> (outer front space) and <i>tungo gorang</i> (inner front space).
14.	<i>Dalhouisia bracteata</i> (Roxb.) Benth.	Leguminosae	<i>Yogir</i>	Leaf used in plot selection ritual.
15.	<i>Duabanga grandiflora</i> (DC.) Walp.	Lythraceae	<i>Kobo</i>	Used for making <i>boorang</i> (third attics).
16.	<i>Erythrina stricta</i> Roxb.	Fabaceae	<i>Tagat</i>	Trunk used for <i>talung</i> (wall).
17.	<i>Hopea shingkeng</i> (Dunn) Bor	Dipterocarpaceae	<i>Shingkeng</i>	Trunk used as <i>giyang</i> (post) and <i>gilae</i> (beam).
18.	<i>Livistona jenkinsiana</i> Griff.	Arecaceae	<i>Tek / Taa - eek</i>	Leaves used for thatching.
19.	<i>Mesua ferrea</i> L.	Calophyllaceae	<i>Nahor</i>	Trunk used as <i>giyang</i> (post) and <i>gilae</i> (beam).
20.	<i>Morus macroura</i> Miq.	Moraceae	<i>Eyum</i>	Trunk used as <i>giyang</i> (post) and <i>gilae</i> (beam).
21.	<i>Schizostachyum seshagirianum</i> R.B. Majumdar	Poaceae	<i>Tabum</i>	Used for making <i>tatir</i> (rope) that is used for tying the thatching leaves with the rafters.
22.	<i>Terminalia myriocarpa</i> Van Heurck & Mull. Arg.	Combretaceae	<i>Hillock / Sillock</i>	Trunk used for <i>talung</i> (wall) and <i>eyap</i> (door).
23.	<i>Toona sureni</i> (Blume) Merr	Meliaceae	<i>Keji</i>	Trunk used for <i>talung</i> (wall).

Table 1: Plants used in the construction of Adi houses

The main entrance of the house is known as *Eyap / yapgo* (door). There are one to three doors in an *Adi* house but without windows. The walls near the main door are decorated with skulls of hunted animals such as deer and wild boars as well as domesticated animals such as *Eso / Mithum* (*Bos frontails*) and pigs (Figure 4). Tribes of Arunachal Pradesh such as *Idu Mishmi* and *Millang* also practice decorating the wall with animal skulls (Baruah 1988, Modi 2007). The walls of the house are made from timbers and bamboos. The various timber used for walls are *Hillock* (*Terminalia myriocarpa*), *Keji* (*Toona sureni*), *Sileng* (*Ailanthus integrifolia*), *Sirih* (*Altingia excelsa*) and *Shinge* (*Bombax ceiba*). *Bambusa pallida* is usually used for making *Tarja* (plaited wall).

The central part of the house is the fire place known as *Merom / Meram*, which is raised on stilts right from the basement (Figure 3). *Merom* is used for cooking purpose as well as generating heat for warming the inner space of the house. There are no outlets for the smoke generated from the fire place as a result the roofs and the walls of the house become black. The actual fire spot is located on mud placed at the top of the stilts above which four tier attics are built. The first tier known as *Perab Rabmik* is close to the fire, about two-three feet above and is used for drying meat. This tier is detachable. When there is no need for drying this tier is removed and kept above the next tier. This tier is made of the basal part of the *Bambusa pallida* which is comparatively stronger than the aerial parts. The second tier is called *Perab* and is usually made of basal part of *B. pallida* which is used for drying rice grains, millet, chilies especially during the rainy season. The third tier which is called *Boorang* is made of timbers such as *Kobo* (*Duabanga grandiflora*), *Sileng* (*Ailanthus integrifolia*) and *Shinge* (*Bombax ceiba*). In case of the shortage of wood, culms of *B. pallida* are split and plaited

to make *Boorang* which is used for storing salt, seeds, meats and fruits for ripening (Figure 4). *Adi* people claim that the culms of *B. pallida* stay for a longer time compared to the culms of *Dendrocalamus giganteus*. Above the *Boorang* there is another tier that serves as a ceiling known as *Kumbang*. *Kumbang* is made of split culms of *B. pallida* and covers all parts of the house except the cooking space. It is used for storing newly woven/plaited household articles such as *Egin* (a basket used for carrying and storing grains and vegetables), *Ebar* (a basket used for carrying firewood), *Epo* (winnowing pan), *Epu* (mat used for drying grains), *Tabum* and *Tatir* (ropes made from *Cephalostachyum pergracile* and *Schizostachyum seshagirianum*), *Jeying* (*Calamus leptospadix*) and *Ramang* (*Calamus flagellum*). The attics above the fire place is also observed in *Naga* houses of Nagaland which are used for curing meats, storing spices and vegetables and also household articles for immediate use (Arya & Joshi 2004).

The most preferred material for roofing is the leaf of *Tek / Taa-eek* (*Livistona jenkinsiana*). The leaves of the roof above the fire place last longer for eight-ten years and leaves from other areas of the house last only for four-five years. Cordage for tying the bamboo with the main pole, rafter and leaves are obtained from rattans and bamboos such as *Jeying* (*Calamus leptospadix*), *Madang* (*Cephalostachyum pergracile*), *Ramang* (*Calamus flagellum*), and *Tabum* (*Schizostachyum seshagirianum*). Rattans are also widely used by the tribes of Andaman and Nicobar Island for building houses, making ropes, furniture and fences (Senthilkumar *et al.* 2014).



Figure 4: A. Fire place and 3-4 tier attics. B. Front wall decorated with skull of animals that are hunted or sacrificed

D. SPACE OF ADI HOUSE

Every part of *Adi* house has a specific name and the utility of each differs from that of the others. The entire inner space of the house is without any partition. However the space is divided into several units. The space around the central fire place has different names and functions. The place for the head of the family is called *Erang*. The place for guests is called *Sodung* and place for the male family member is known as *Rising*. *Kodang* is the place where all the cooking activities take place. In most of the *Adi* houses there is a door near the *Kodang* that leads to the place called *Kok* which is mostly used by the *Adi* for keeping the poultry. The poultry are usually kept in a case made of different bamboos such as *Dibang* (*Bambusa pallida*), *Madang* (*Cephalostachyum pergracile*) and *Tabum* (*Schizostachyum seshagirianum*) which is known as *Petir*. The space between the ground and the house is used for storing firewood which prevents the firewood from getting wet. The place near the *Balae* (ladder) is called *Batum* which is used for feeding domestic animals such as cattle and pigs. It is also a place for keeping plant species used in rituals that serves as an indication to outsiders that a ritual is in progress.

E. COLLECTION AND PROCESSING OF THE BUILDING MATERIALS

The collection time of materials for building an *Adi* house depends upon the waxing and waning of the moon. The leaves used for thatching are collected two to three weeks before the construction of the house. The leaves are arranged in a circular manner, dried and pressed by placing stones or logs of wood on the leaves. The leaves are kept in a place enclosed by bamboo fences to protect them from grazing by cattle. The leaves are dried till they turn brown.

The bamboos that are used for the construction of the houses are collected one to three weeks before the construction. Those bamboos which are used for *Tasut* (floor) and *Tarja* (wall) should be processed within three days after collecting from the field as they are amenable for splicing. The bamboo culms used for floor and wall are split neatly and spread over the ground to make them flat. The collection period for cordages differs from person to person varying from two month to one and half year. The ropes are processed and kept on the attics above the fire. The ropes that are stored for a longer period on the attics last longer. The heat and the smoke generated seems to have a curing effect on the materials stored above. Raw materials for making ropes such as *Madang* (*Cephalostachyum pergracile*) and *Tabum* (*Schizostachyum seshagirianum*) used for construction and thatching leaves are collected within three days before the new moon. The materials collected before the new moon are said to be free from infection and last long whereas those that are collected at other times are said to be attacked by termites and insects and do not last long. The houses are usually built during January to April. This period is relatively a free period as all the major agricultural activities come to an end by the end of December. *Adi* celebrate the completion of the house construction in which a large amount of rice beer is consumed. The temperature during this period is also conducive for the fermentation of rice beer. The time taken for building an *Adi*

house is just one-two days depending upon the number of persons involved in the construction of the house and the size of the house. Probably this is the shortest period for constructing a house.

F. COMMUNITY PARTICIPATION IN HOUSE CONSTRUCTION

Both men and women take part in the construction of a house (Figure 3). Men are particularly involved in collection and processing of bamboos, collection of raw materials for ropes from the forest, cutting and binding the thatching leaves into bundles and collection of wood from forest. Each bundle of thatching leaves comprises 40 to 50 leaves. The major activities of the women involve preparation of *Apong* (rice beer), collection of vegetables before the construction of house and bringing the bundled thatching leaves from forest. During the construction of the house men do more work compared to the women. All parts of the house are built by the men whereas women help only in thatching the leaves. Women are mostly involved in cooking, gathering firewood from the discarded construction material, separation of damaged and good thatched leaves from the old house. On the day of completion, all the families of the village are invited for a get together in the evening which is known as *Ebor / Borne* evening. *Ponung*, a joyful traditional dance, is performed during the night by the women folk during which rice beer is served by the host.

G. CHANGING DESIGN OF ADI HOUSE

Major changes in the design of traditional *Adi* house include the addition of windows with glass pane, addition of ceiling below the thatched roof and dividing the undivided inner space of the house into several rooms. The traditional construction materials are also changing. Leaves are being replaced by tin sheets. The wooden *Gilae* and *Giyang* (stilts) are replaced by concrete and the *Tasut* or *Puyo* (bamboo floor) is replaced by cement and wood. These changes are driven by a number of social and economic factors such as introduction of new culture, exchange of ideas from nearby urban areas or states and affluence (Figure 5).



Figure 5: A & B. Windows are included in the designs; roof made of *Livistona jenkinsiana* leaves replaced by tin sheets; stilts made up of bamboo are replaced by concrete

IV. CONCLUSION

Adi house is an eco-friendly house built entirely out of natural materials. The shortest time that is taken to complete an *Adi* house is probably due to readily available construction resources and the whole-hearted community participation. The division of space in an *Adi* house addresses the needs of a family from all aspects. The stilts provide much needed under space for the purpose of storage of firewood and shelter for fowls and pig. The fire place is central to the *Adi* house that provides the necessary warmth for the inner space. The heat and the smoke generated from the fireplace also keep off the insects and other pests in the interior space and have a curing effect on the construction materials and other stored things. The vertical space above the fire place is effectively used by placing tiers of attics that efficiently utilizes the dissipating heat.

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