

Bamboo a Vital Sustenance for the Adis of East Siang, Arunachal Pradesh.

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Abstract: The bamboo, which is popularly considered as poor man's timber and Green Gold is widely used forest raw material for various constructional purposes, starting from construction of dwelling house to construction of farm hut, bridge, fence around the field and hut over the grave. It is also used as a raw materials for various craft items like baskets, mats, haversack, handle of knife and machete, hat and utensils. Bamboo is also used as food items, medicine, designing of ritual images and musical instruments. This way, the life of a Adi people cannot be imagined without the use of bamboo. Bamboo also gives shelter and food to wild animals, protect the soil from erosion.

Bamboo has been put to different uses because of its strength, versatility, lightness, availability and easy workability it application runs from construction to other day to day household utilities. Therefore, due to its plentitude of indispensable uses, it has been rightly remarked as "poor man's timber", "friend of people", "cradle to coffin timber". Today bamboo is considered as one of the very vital non wood forest product that substitute wood and it also holds socio-economic importance as vital sustenance among many indigenous people.

This paper, is an attempt to unearth the prospective of bamboo as a derivation of income and better sustenance for the Adis of East Siang District. The author also considered that bamboo hold significant global perspective with special reference to its socio-economic, and ecological ethos. While adopting the said above approach, it has been observed by the writer that, bamboo are generally cultivated and nurser in the field and homestead while other bamboo species are growing in its natural environment in the study area and it is used for various purposes from construction of houses to various household and hunting equipment. The excellency of artisanship of Adi people enrich the taste of more finer products of bamboo in the market, thus bamboo is considered as a lucrative business. The varied products of this green gold or poor man's timber commonly known as bamboo in the area, specially handicraft items had a great demand in the market which shows that the proper utilisation of bamboo can enhance the economy of the people and will help them to come out of the poverty trap.

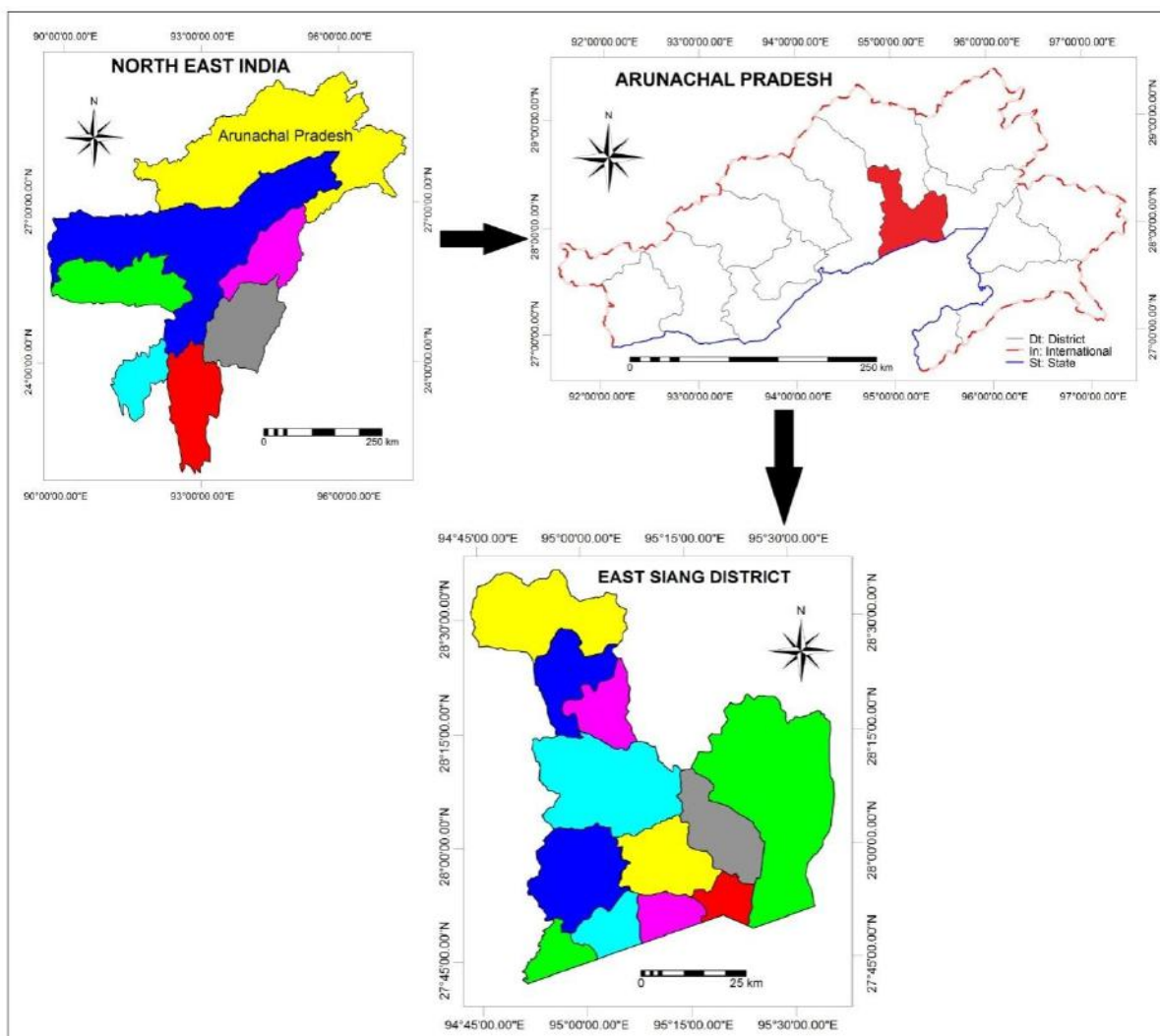
Key Words: Adis, East Siang, livelihood, green gold, poor man's timber.

1. INTRODUCTION:

The bamboo, which is widely known as poor man's timber and Green Gold is extensively used forest raw material for various constructional purposes, starting from construction of dwelling house to construction of farm hut, bridge, fence around the field and hut over the grave. It is also used as a raw materials for various craft items like baskets, mats, haversack, handle of knife and machete, hat and utensils. Bamboo is also used as food items, medicine, designing of ritual images and musical instruments. This way, the life of a tribal people cannot be imagined without the use of bamboo. Bamboo also gives shelter and food to wild animals, protect the soil from erosion.

There are 58 species of bamboo in the state of Arunachal Pradesh, among these, most widely used bamboo species are: *Dendrocalamus hamiltonii*, *Bambusa tulda*, *Bambusa balcooa*, *Bambusa nutans*, *Oxthenethra parviflora*, *Melocanna baccifera*, *D. gigantus*, *Phyllostachys bambusoides* and *Suchizostachyum* which are used for different purposes. Due to its strength, versatility, lightness, availability and easy workability bamboo has been put to different uses, its application runs from the scale of construction to other day to day household utilities. Therefore, due to its plentitude of essential uses, it has been rightly remarked as "poor man's timber", "friend of people", "cradle to coffin

timber". Today bamboo is considered as one of the major non wood forest products and potential alternate of wood. Besides, it also hold great important from socio-economic points of view.



Glimpse of North East India:

Northeast India comprises of 262,179 sq. kms having eight states namely Assam, Arunachal Pradesh, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim of the Indian Union. The state of Arunachal Pradesh is situated on the North Eastern Tip of the Country, as a part of Eastern Himalayan Ranges located between the latitudes $26^{\circ}28' N$ and $29^{\circ}30' N$ longitude $91^{\circ}20' E$ and $97^{\circ}30' E$. There are about 90 species of bamboo in North East India and in Arunachal Pradesh there are 58 species of bamboo which has multipurpose application in the livelihood of the tribal people of the state.

Geo-Environmental Background of East Siang District:

The East Siang district presents a remarkable topographical variety where some parts are wild mountainous area and others are foothill and plain. It is endowed with rich forests harbouring both in terms on flora and fauna. The region has total bamboo area of about 5.23 square kilometre of which Pasighat has 0.55 km^2 , Ruksin has 0.09 km^2 , Oyan has 0.01 km^2 , Mebo has 2.00 km^2 , Bilat has 1.40 km^2 and Koyu has 1.18 km^2 . It is also the home of Adi and Galo Community who continues to live in close proximity with nature from generation to generation and utilises wide variety of bamboo resources for their sustenance and livelihood.

Geographically East Siang District is lying between $27^{\circ}43'$ to $29^{\circ}20'$ North Latitudes and between $94^{\circ}42'$ to $95^{\circ}35'$ East longitudes, covering an area of about 4005 sq.km.

- Altitude in the district ranges from 133m to 2179 m above mean sea level.

- District has total population of 99,214 persons and 108 villages according to 2011 census and six circle namely Pasighat, Ruksin, Mebo, Oyan, Bilat and Koyu. The varied topography has a significant influence on the climate of the region, which varies as per the elevation and location. In geographical context, this unique mountain ecology has great positive impact on the livelihood of the Adis of the district.

OBJECTIVES:

- To study the different bamboo species used for various purposes.
- To highlight various bamboo Products as source of sustenance for the Adis of East Siang District, Arunachal Pradesh.
- To investigate the extent to which the Adis in the district depend on income from the bamboo resources.
- To make recommendations for best practices in assessment of bamboo as an income generator in tune to its sustainability.

2. LITERATURE REVIEW:

Handique, P (2006) in his Ph.D. research work presented an overview of uses of bamboos in the Papum Pare district of Arunachal Pradesh. According to him among the cultivated bamboo species *Bambusa tulda* is highly utilised in every locations of Papum Pare districts for making huts, fencing and crafts and for firewood. Almost all the bamboos used for traditional craft-work come from the individual plantation. The only species used for making different household articles collected from wild habitat is *D. hamiltonii*. The author argued that the quantity of bamboo shoot collection in the said district depends upon the distance of village from the natural habitat or cultivated plot and the fresh bamboo shoot are collected in the months of June and September. Further the researcher felt that the life style of Nyishi people is closely associated with the bamboo and bamboo products from the ancient time. They have been utilising different bamboo species in every aspect of their day to day activity mostly for the construction of houses, furniture, handicraft, agricultural implements, household utensils and for religious rites and industrial application.

Sharma, T.P (2007) in his Ph.D. research work on ‘Diversity and Distribution of Bamboo in Arunachal Pradesh’ presented an account of wide range of bamboo species of Arunachal Pradesh. According to him *Bambusa burmanica* is 15m long, 10-12cm broad at base, green when young, turning pale yellow along the margins, covered with appressed golden hairs. New shoots of this species are generally seen in the months of July-September. This species is found in Doimukh, Sessa, and Papum Pare districts of Arunachal Pradesh. The people of these three districts used this species for roofing, thatching, construction and basket making. The author also identified the distribution of *Bambusa nutans* in Arunachal Pradesh. The researcher mentioned that this species are loosely clumped, much branched above, thinly branched below, striate, green, smooth, not shining, white ringed below the nodes, nodes slightly raised, often hairy, lower ones bearing toilets fall under both gregarious and sporadic flowering group. This species is commonly cultivated in Arunachal Pradesh.

Nimachow, G et al., (2010) in their work “Prospect of bamboo shoot processing in North East India” described general processing of bamboo shoot starts with thorough washing followed by peeling off the skin, shredding, slicing and cutting into cones. The processed shoots are then boiled for ten minutes to remove the bitterness and to remove unwanted matter and after application of brine solution it is packed. In Arunachal Pradesh the young shoots are ground and dried and fermented. The dried shoot and their juice are stored for about 50-60 days, after that it is used as vegetable ingredients and chutney for food delicacy by the people of Arunachal Pradesh.

3. MATERIALS:

A pilot survey was conducted by the researcher in the month of June-July 2023, during field visit and market survey, the researchers use some important materials as research tools for documentation and recording of the findings; these include, notepad, pen, cell phone, camera, questionnaire etc.,

4. METHODOLOGY:

- Pilot survey has been made in selected villages, three market areas and requisite information and data base are developed after doing adequate literature review for secondary information. Information and data are collected through an open-end interview with the stakeholders of the locality. Hence, the work is of descriptive nature.

5. RESULT AND DISCUSSION:

Today bamboo is one of the most important non-wood forest products and potential wood substitute. It also hold great importance from socio-economic points of view with reference to sustenance and culture. Its application in the form of healthy vegetable has also been popular over the years. Globally bamboo is now recognized as an important economic asset in terms of poverty elevation, economic and environment development in tune with ‘go green’. In context of the Adis of East Siang District, since from time immemorial bamboo has always been played an important role in shaping the socio-economic and cultural aspects of the people. Some common application of bamboo in the study area are:

- **Bamboo as Food and nutrition:**

Generally bamboo shoot contain with fat, carbohydrate, potassium, vitamins and other dietary fibres as a result during the month of June to September it is highly demanded in the whole region. Besides this, other allied products of bamboo shoot are the most favourite delicacy of Adis of East Siang District. Annually each household on an average consumed six to ten kilograms of fermented bamboo shoot. Tender shoots of *Dendrocalamus hamiltonii*, *Melocanna baccifera*, *D. giganteus*, *Bambusa balcooa*, *Phyllostachys bambusoides* and *Suchizostachyum* was observed to be largely consumed in all the parts of the district. and it is sold as food items in the whole region.

The sales of the fresh tender shoot as well as fermented (*iikung*), dried fermented (*iiyup*) and fermented shoot (*iipeng*) open a corridor to earn a sustenance for the Adi womenfolk of East Siang District. In the entire region fermented products due to its longest availability period over significant period of time are sold in the market of Pasighat, Mebo, Oyan, and Ruksin, throughout the year, among all these urban centre, the highest sale was recorded in Pasighat town.

Table 1. Showing Bamboo Edible Common Name and Local Name

SL.NO	Common Name	Local Name
1	Tender Bamboo Shoot	Eiting
2	Fermented Chopped Shoot	likung
3	Dried Fermented Chopped Shoot	Iiyup
4	Fermented Shoot	Eipeng

Source: Data collected from Villagers during survey

Table 1.1 Showing the quantity and price of bamboo tender shoot and other allied products

Bamboo Shoot & allied products	Quantity	Price
Tender Shoot	One Piece	Rs 50
Fermented	One Container (2 ltr)	Rs 200
Dried Fermented	100 Gram	Rs 100
Fermented Shoot	One Piece	Rs 50

Source: Data Collected from market during survey in the month of June-July

Some Images of Bamboo Shoot and Allied Products



Source: Data Collected from market during survey in the month of June-July

- **Bamboo as Wood Substitution:**

The bamboo species which is found in abundances in the study areas are *Bambusa nutans*, *Dendrocalamus hamiltonii*, *Melocanna bambusoides*, *Oxytenanthera stocksii*, *Dendrocalamus strictus*, *Dendrocalamus giganteus*, *Bambusa bamboos*, *Bambusa polymorpha*, *Bambusa balcooa*. Most of the bamboo species have dense clumps of closely packed culms which can be used as an alternative of wood timber. In recent time bamboo is considered as one of the non-wood forest product and become a wood substitute and being a ubiquitous resource it is also very important from socio-economic and cultural point of view. Bamboo is a fast growing grass belongs to evergreen perennial poaceae family. which can even survive in any diverse climate, it is more commonly found in tropical areas that experience seasonal monsoon (R.K Dutta 2019). Due to its compressive strength which is higher than wood it has received greater attention by the people as an important raw material alternative to wood in various application. In tribal dominated areas, traditionally bamboo is used in construction of house where it provides wall, pillar, beam, floor, ceiling and roofing materials instead of wood. Some wood based products such as fiber board, plywood strand board etc., can be easily replace with the available raw materials of bamboo.

Moreover, the dry culms of bamboo is a good source for firewood which is also highly demanded by Adi people in the study area. Thus bamboo has a good potential to provide economic security providing healthy seasonal income to the people from all perspective to the rural community of East Siang District. Jassen (1995) stated that Bamboo wood density is more higher than hard wood density. Similarly hardness, modules of rupture and modules of elasticity is high in bamboo wood then hard wood provided that bamboo is a fast growing grass which can attain maturity in three to four years and have high regenerative capacity. This implies that it can control over environmental damage by preventing the destruction of natural forest as well as has a role play for the replacement of wood timber.

- **Bamboo as Handicraft:**

Different uses of bamboo and its values toward people in this region have been well recognized. There are many bamboo species and all of them have their specific significance of application in the study area. Thus, bamboo is a friendly usable raw material having multidimensional applications. The skills of traditional handicrafts among the Adi people has been transfer from generation to generation. In this study, it has been revealed that the people of the study area are highly skilled and talented in handicraft. Wide range of handicraft items from bamboos are beautifully and intricately crafted or woven by the expertise people and some of them are sale at high rate in the market. The items include variety of baskets such as cylindrical basket, vegetable/rice basket, hanging basket etc., especially for carrying goods like grain, firewood and for storing purpose. Apart from these, other day to day household requirements items such as winnow wing tray (*epoh*), stool (*mura*), table (*pori keng*), hat (*dunnyup*), rain shield (*ebong*), mug, spoon (*lukung/penyo*), chicken cage (*petiir*), hunting bag (*talii*), weaving equipment (*gekong gelong*), meal plate stand (*doreh*), machete (*hobuk*) so on.

In present context, in tune with the conservation of flora and faunas along with preservation of cultural aspects of Adi society, traditional hunting practices during festive season is encouraged throughout the region. Bamboo plays a vital role in the preservation of the Adi culture as it is closely connected to their birth, death and marriage. In economic context bamboo is a good source of income for the people of East Siang District. Wide range of hunting equipment are made from bamboo such as fishing rod, poles and basket, bows and arrow, trap for rodents and birds. During festive season these traditional hunting equipment are sold in the locality in order to avoid modern techniques of hunting and for the preservation and conservation of fauna of the region. In addition to these, variety of novelty eye catching items are made from bamboo which fetch handsome price in the market. All these items are sold in the market, there is a constant flow of bamboo products in the form of edible and handicraft items in every corner of the region. There exist constant demand for these handicraft items which signify that the poor man's timber has become a great source of livelihood and sustenance for the Adi community of East Siang District.

Table. 2 Showing Handicraft Items and Their Local Name

SL.NO	Handicraft Items	Local Name
1	Cylindrical Basket	Egin/Igin
2	Winnowing Tray	Epoh/Opoh
3	Hunters Bag	Taali/Lettu
4	Cylindrical Fishing Basket	Narang/Raju
5	Mouse Trap	Etku/Ooju

6	Stool	Mura
7	Chicken Cage	Petiir
8	Machete	Hobuk
9	Hat	Dunnyup/Bolup
10	Table	Pori Keng
11	Rain Sheild	Ebong
12	Spoon	Penyo
13	Weaving Tools	Gekong Gelong
14	Rice Plate Stand	Doreh
15	Bow and Arrow	Eiye Eppuk

Source: Data collected from Villagers during survey

Table. 2.2 Showing different handicraft items and their price.

Items	Price	Items	Price
Cylindrical basket	Rs 1500-2000	Weaving equipment	Rs 500-1000
Stool	Rs 500-800	Hunting bag	Rs 2500-3000
Table	Rs 2500-3000	Trap	Rs 10-15
Rain shield	Rs 150-200	Fishing basket	Rs 100-300
Winnow wing tray	Rs 500-700	Spoon	Rs 50
Chicken cage	Rs 100-150	Mug	Rs 50
Hat	Rs 2000-3000	Back pack bag	Rs 500-1000
Machete	Rs 100-200	Vegetable basket	Rs 200-300
Forcep	Rs 50-100	Container	Rs 100-200

Source: Data Collected from market during survey in the month of June-July

Some image of handicraft items made of bamboo





Fig. 2. (a) *Suppi* (wall), (b) *Bareh* (ceiling), (c) *Pejung* (basket), (d) *Biilen* (meat container), (e) *hunggeng* (hanging container), (f) *Eph* (winnower wind tray), (g) *Mura* (stool), (h) *Pori keng* (table), (i) *piho* (floor), (j) *egin* (carrying basket), (k) *Petiir* (chicken cage), (l) *borjung* (rice beer strainer), (m) *Ebong* (rain shield), Source: Photographs captured by the researcher with Vivo V-19 Cell phone.

• Bamboo as Construction and Building Materials

As a building material bamboo has great compressive strength and low weight as a result it is one of the most widely demanded and used building material for the construction of local house as well as used as beam support for concrete house, it is widely used in those area where it is found available, it is being used as scaffolding, bridges and stairs in the construction of house. Bamboo is almost used in every traditional house of the tribal people of Arunachal Pradesh in general and East Siang District in particular. The culms of bamboo are split into many flattened plies which are then used as wall, flooring and roofs materials, of the traditional house (Kumari. S et.al 2020). Apart from wall and roofs, the culms of bamboo are also used as pillar beam, post and fencing etc. Posts and beams are generally made of bamboo which remain as the main elements for construction of different types of house of the Adis which provide ultimately the structural framework of a tribal house. They are fixed and placed in such a way that can withstand any forces of nature. Bamboo has been considered as one of the best building materials which provides ample solidity to the structure of a house. Due to its light weight nature it can be easily put in use in every tribal house. Furthermore, due to its sturdiness nature it also withstand as a shield against any forces of nature or animals.

Many bamboo depot has been found in various part of different urban centres of the study area where people stored the bamboo and the buyers can easily access these resource for their wide range of needs. In the bamboo depot per culm is sale @ Rs 80.

It is found that the culture of the Adis in the region is revolving around bamboo and bamboo related products, thus it is playing a vital role in shaping their economy. This signifies that bamboo has a great demand across the region and there is high prospect for its future development for the inhabitants of the district. Hence, the world perception of bamboo as economies booster in a famous saying, "Poor man's timber to "Green Gold" has truly penetrate to the people and it has become a constant source of earning monetary and other health related benefits for the Adi community of East Siang district of Arunachal Pradesh.

Some images of bamboo culms for sale in the market depot



Source: Photographs captured by the researcher with Vivo V-19 Cell phone

Image of bamboo culms used in construction



Source: Photographs captured by the researcher with Vivo V-19 Cell phone

6. ANALYSIS:

It observed by the researcher that the socio-economic life and cultural aspects of the Adi people is revolving around bamboo and bamboo related products. It is universal truth that culture and economic go hand in hand, in the research area it has been found that bamboo is also a cultural materials. The Adis use bamboo from their birth, marriage to death, there exist close relationship between bamboo and Adi people. In context of economic aspects of bamboo the above presented table highlights that variety of novelty eye catching items are made from bamboo which fetch handsome price in the market. All these items are sold in the market, there is a constant flow of bamboo products in the form of edible and handicraft items in every corner of the region. Thus, bamboo became a life line for many rural people and unemployed young generation of East Siang District of Arunachal Pradesh.

7. RECOMMENDATIONS:

East Saing has favourable topography and climatic condition conducive for the cultivation of bamboo in an more extensive way. More bamboo species of economically important should be encourage to cultivated by the tribal people of East Siang District. In this connection the State government must supply bamboo saplings, rhizome, seeds to the farmer and further, the people should also be well trained or prepared with ample amount of knowledge to combat bamboo flowering, they should be well equipped with some basic know-how for the management of bamboo substitute or conservation when there is a bamboo flowering in the region. Micro financial help in terms of working capital should be provided by the State Govt., NGO and Financial Bank. Annual and Mid-term entrepreneurship training centre should be opened at every circle of the region, proper exposor of the artisans or entrepreneur to strengthened the Handicraft industry of the State in general and district in particular.

8. CONCLUSION:

The life style of the Adi society, culture, tradition and livelihood has close affinity with this “Green Gold” over centuries with rich traditional ecological knowledge they used this resource with efficiently for resources management, and their conservation from generation to generation. The study reveals that the bamboo is one of the most important

potential sector for income generation for the Adis. While considering the abundance of bamboo resource development of the region the central government and State government must supply bamboo shoot processing unit in all corner of the district to get and produce quality edible products and surplus of it may be exported within the country and outside the country to earn more profit.

In order to promote the socio-economic conditions of the Adis top priority must be given to handloom and handicraft industries (small scale industries) where the young unemployed people can get continuous training in order to produce more qualitative products. Emphasis should be given to value addition of the handicraft and other bamboo based edible items. Bamboo based local entrepreneur should be given encouragement by providing proper knowledge and financial support to generate more self-employment opportunities in the entire region of the study area.

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