



Vernacular architecture of Majuli, Assam - meaning, model and metaphor in integrating the environmental, socio- economic and cultural realms

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Abstract: Vernacular Architecture is the art that showcases the traditional built environment of the people of a particular region. The traditional, ethnic and a primitive approach of the inhabitants to create built environment to establish the title of vernacular which is specific and critical to the region. The term vernacular is used to categories methods of construction to use locally available resources and traditions to address local requirements. Vernacular architecture tends to evolve over a period of time to reflect the traditional, climatic, cultural and historical context in which it exists. It has often been dismissed as crude and unrefined, but also has proponents who highlight its importance in present situation. This study initiates to understand the socio-cultural, economic and ethnic traditions of river island Majuli, Assam that is influencing over the years to develop the unique vernacular architecture of region. Three case studies of the dominant Mising, Deuri and Sonowal Kachari tribes have been made to showcase various character of tribal architecture of Majuli and analyse the local construction techniques and locally available building materials of the region.

Index Terms - vernacular architecture, tradition, culture, building material

I INTRODUCTION

Majuli represents a plethora of culture, vernacular diversity, a stunning panorama of arts and crafts. The unique image of identity has been highlighted by the vernacular artifacts and build-spaces typical of the traditional communities of Majuli. The indigenous architectural style of Majuli responds to the climate, blends with the topography; vibrate with the cultural trends, lifestyle, spiritual and religious parameters of ethnic communities. These illustrative narrations speak the language of skill and craftsmanship, appreciation of culture, respect to local materials and methods of the building science.

Vernacular architecture can be defined as the architectural languages of mass and described in two ways:

1. It can be termed as '*Architecture without Architects*' (Rudofsky) where structures are built by amateurs without any training in design and construction.
2. The function of the structures is predominant as compare to aesthetics. Spaces are organised considering the following factors :
 - ❖ Local construction techniques
 - ❖ Local Labour & Tools
 - ❖ Local building materials
 - ❖ Climatic condition of the region



Fig : 1 River boat



Fig : 2 Flora and fauna



Fig : 3 Traditional stilt house

a. Aim of the project

The main aim of this study is to understand tribal architecture of Majuli, Assam and take an initiative to document this unique vernacular identity of ethnic tribes - the Misings, Deuris and Sonowal Kacharis of Majuli. The objectives of the study are as follows:

- ❑ To study the typical characters of tribal architecture of Majuli that stands as the pillars of faith and the answers that question its identity.
- ❑ To identify the typical tribal character and the notable features of the case study buildings that represents the traditional vernacular architecture of Majuli.
- ❑ To study the design concept, construction techniques, building materials and tools used in the tribal vernacular architecture of Majuli.

It has been observed that the modernisation without a keen sense of adjustment to changes and a conscious respect to regional architecture is creating a threat of transition leading to steady decline of settlements that have evolved the language of traditional architecture in Majuli.

II STUDY AREA: MAJULI THE RIVER ISLAND

The geographical region of Majuli is in the North-East state of Assam. The island situates itself in the midstream of the river Brahmaputra. Majuli Island is a riverine delta, a unique geographical occurrence and a result of the dynamics of vast river system. The island extends for a length of about 80 km east to west and for about 10-15 km north to south with a total area of about 875 Sq KM.



Fig : 4 Geographical location of Majuli

The island is bounded by the river Subansiri and her tributaries Ranganadi, Dikrong, Dubla, Chici and Tuni etc. on the North-west, the Kherkatia Suti in the northeast and the main Brahmaputra River on the South and the South west. These tributaries usually bring flashy floods and heavy load of clayey sediments every year. North and the South banks of the river Brahmaputra have the wetlands, locally known as the Beels. They are the habitat of rich flora and fauna. The island of Majuli today comprises of a total of 243 small and large villages. There are a total of 30 Satras in Majuli many of which are in the mainland with a distinct spiritual influence in the entire region. Each Satra represents a centre for socio cultural as well as economic activities and even acts as a democratic institution to settle local disputes.



Fig : 5 People, art, dance, music, crafts, culture and architecture of Majuli

These Satra villages and other vernacular settlements residence people from various ethnic origins. The dominant ethnic settlers of Majuli are Misings, Deuris, Sonowal Kacharis and the non-tribal communities include Koch, Kalitas, Ahoms, Chutiyas, Keots, Yogis, and Kaivarttas etc. All the settlements have their own characteristics and building typologies. The Mising and Deuri community has probably the most unique house form, which is on bamboo stilts being located near the riverine tracts, wetlands and along other hydrological features. All these settlements are scattered in the exceptional natural landscape with wide range of land types and water bodies. The understanding of the systems of this natural phenomenon by the local people is complete and exhibited in the local nomenclature of each natural component of the landscape which has evolved over a period of time.

III PRESENT SCENARIO OF MAJULI DISTRICT

Majuli is located between 26° 45'-27°12' north and 93° 39' -94° 35' east. It is bordering with Lakhimpur in the north, Golaghat in the south-west, Sibsagar on the south-east, Dibrugarh in the east and Jorhat in the south. Majuli today is a district with its head quarter at Garmur. The newly formed district is said to be rural and agrarian district. The main cultural and commercial centres are: Garmur, Aauniati, Kamalabari, Dakhinpat, Bongaon, and Jengramukh. The main crops are rice and mustard.

a. Communication network



Fig : 6 Physical map of Assam



Fig : 7 Communication network of Majuli

The river island Majuli is well connected with the air, rail, road transport and river transport systems with the rest of the parts of the country. The connectivity of the Majuli is as follows:

- ❑ Air transport: Jorhat airport at Raroiakh on the south and Lilabari airport at north Lakhimpur in the north
- ❑ Rail transport: Moriani, Jorhat and North Lakhimpur
- ❑ Road transport: Assam state transport corporation station at Jorhat, North Lakhimpur, and public bus-stand at Sonari Chapari
- ❑ Ferry transport: Neematighat is the river port from where one can reach Majuli by ferry boats sail to Kamalabari & Dakhinpat in Majuli Island and takes 1 to 2 hours of sailing to cross the river.

Majuli is the largest fresh water river island in South-east Asia. It is the plethora of Assamese culture, vernacular diversity and panorama of arts and crafts. Settlements of various ethnic groups with typical riverine stilt bamboo structures developed a unique style of tribal architecture over the years. It has a distinct influence of vaishnavite culture of monasteries / Sattras. Today Majuli abode numerous cottage industries – pottery making, boat making, mask making, weaving, and local handicrafts.

IV HISTORICAL BACKGROUND

The historical background of development of vernacular architecture of Majuli is divided into three phases:

1. Settlement of different tribes.
2. Influence of local conditions.
3. Revival of vaishnavite movement.

1. Settlement of Different Tribes

The dwellers of Majuli are mostly of tribal folk. These ethnic tribes are the Misings, the Deuris and the Sonowal Kacharis who migrated to Majuli centuries ago.

❖ The Misings

The Mising tribe of Assam lives along the river Brahmaputra mainly concentrated on the north banks and is believed to be the descendents of mongoloid origin who have settled along the banks of the river Brahmaputra mainly in upper Assam. They belong to greater Tani community which comprises many tribes of Arunachal Pradesh. The Misings are the mixture of East Asian as well as the South-east Asian sub race of Mangoloid Race.

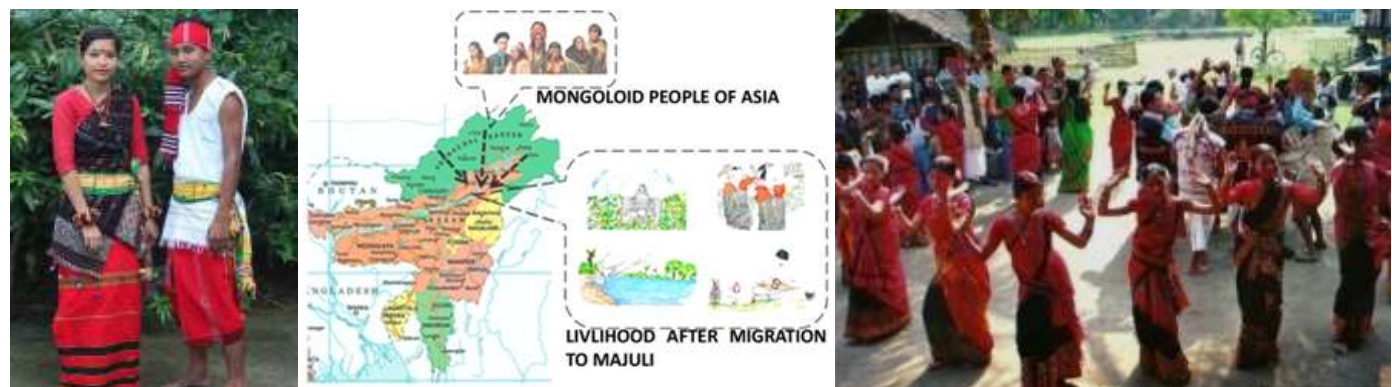


Fig : 8 Mishing People, origin and Dance

❖ **The Deuris**

The Deuris were originally from priest and worshiper community and depended mostly on agriculture for their livelihood. They migrated from a place called ‘Sadiya’ which is located at present Tinsukia District of Assam.

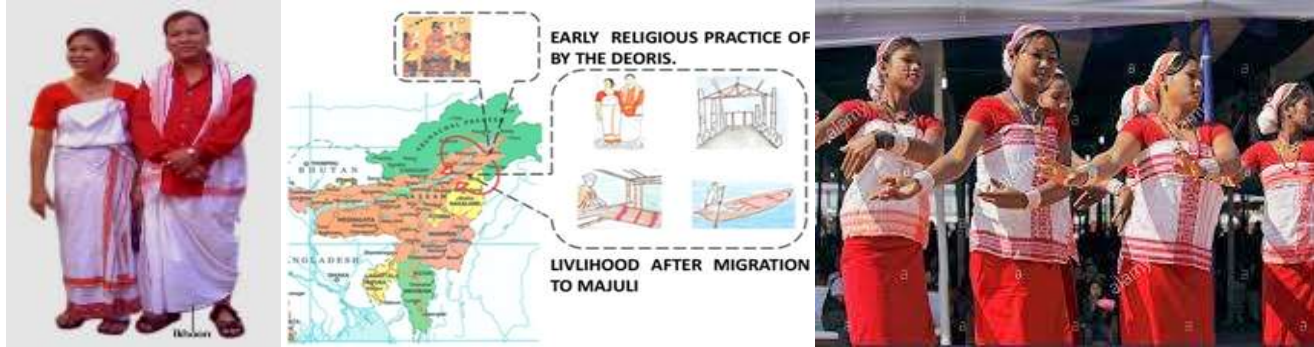


Fig : 9 Deuri couple, origin and dance

❖ **The Sonowal Kacharis**

The Sonowal Kacharis are amongst the royal dynasties of the north east part of India and are scattered in the districts of Sibsagar, Jorhat, Golaghat and in Nagaland and Arunachal Pradesh in east India. During the reign of Ahom king some of the Kacharis were engaged in gold washing of the river sand. Hence, they were called the Sonowal or the gold washer.

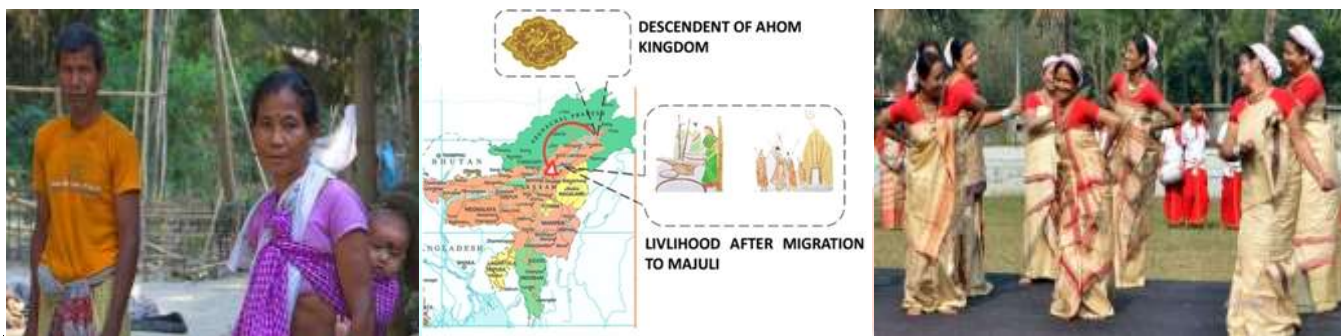


Fig : 10 Sonowal Kachari people, origin and dance

2. **Influence of Local Conditions**

The traditional vernacular architecture of Majuli is also influenced by local conditions such as:

- ❖ Soil erosion: Gradual shrinkage of land area due to severe river bank erosion.
- ❖ Flood: Due to flood people started relying on boat as a mode of transportation during monsoon. Boat making from wooden logs and bamboo has become a cottage industry.
- ❖ Wild animal: Houses were built in stilts for protecting from wild animals and flood.
- ❖ Alluvial soil: Soil is full of silt; land is fertile for agriculture and also suitable for pottery making.



Fig : 11 Soil erosion, frequent flood, wild animals and alluvial soil

3. **The Vaishnavite Movement: Srimanta Sankaradeva**

Five hundred years ago, the Hindu saint **Srimanta Sankaradeva** introduced Vaishnavism in Majuli. It is a form of Hinduism that emphasises the use of prayer, dance and ritualistic performance s to attain eternal peace. Majuli became the leading centre for Vaishnavism with the establishment of Sattras or Monasteries' are Socio-Religious institutions that belong to Mohapuruxiya sect of Hinduism. Monks are called Bhakats, live in the Sattras under a Satradhikar. These Sattras established a plethora for development of unique art, culture, and architecture.



Fig : 12 Srimanta Sankaradeva, sattriya nritya, paal naam

V ART, CULTURE AND THE LIVELIHOOD

Majuli has been the main cultural center and the base of Assamese civilization for the past five hundred years. The Satras set up preserve antiques like weapons, utensils, jewellery and other items of cultural significance. Pottery is made in Majuli from crushed clay and burnt in driftwood fired kilns. The handloom craft works of these tribes are also internationally famous. Influenced by the religious and cultural patronage of various Satras, virtually every single person on the island is involved in the three-day long raas festival, depicting the life of Lord Krishna. People from all over Assam come to celebrate this festival including a large number of expatriate members of community. The Satras are also encouraging certain art and craft traditions. In Natun Samuguri Satra for example, one can still find the craft of mask-making; and in the Kamalabari satra the finest boats are made by the local people



Fig : 13 Boat making, traditional weaving, mask making and bamboo handicraft making

a. Livelihood of the people

- ❖ Agriculture: Majuli has fertile land and suitable climatic condition for agriculture. It is the most widespread occupation with both commercial and non-commercial.
- ❖ Pisciculture: There are more than 60 large beels (water bodies) which are used for fish cultivation and production that provides livelihood to large number of Majuli inhabitants apart from generating substantial revenue for the Govt./Local bodies



Fig : 14 Agriculture

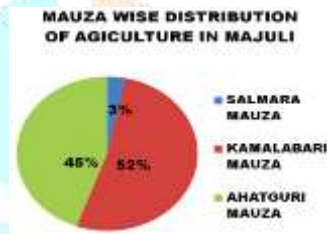
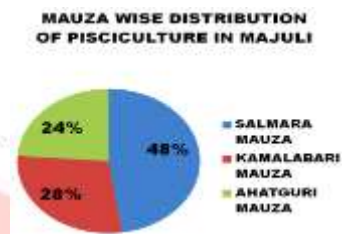


Fig : 15 Pisciculture



- ❖ Pottery: Majuli is famous for potteries in entire valley for design and quality of their products and artifacts.
- ❖ Boat making: Being a flood prone, rain fed and water logged area where water transport is the only mode of transportation, the boat making is an age-old traditional business. Around 3000 families are dependent on this trade.



Fig : 16 Pottery making

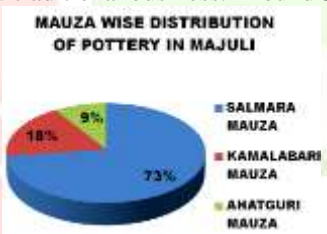
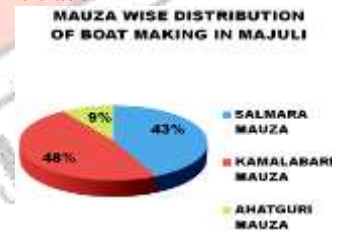


Fig : 17 Boat making



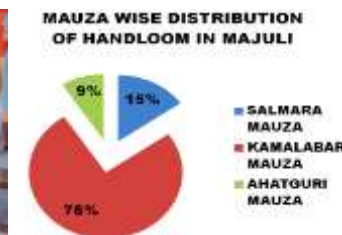
- ❖ Handicrafts/furniture making: Bamboo craft and cane works are main handicraft trades.
- ❖ Handloom: Women of Majuli are expert weavers and weave their own cloths. Mising women weave a world famous fabric called 'Mirizim' that is known for striking designs and pleasant colour combination.
- ❖ Horticulture: Majuli has fertile land and suitable climatic condition for horticulture. It is also an area of the economic development, yet mostly non-commercial.
- ❖ Sericulture: In Majuli, approximately 20 villages entirely depend on Sericulture by product of raw silk, erhi as well as other value added products.
- ❖ Mask Making: The popular art work of mask making is also one of the craft works of the people during the time of religious festivals.



Fig : 18 Handicraft making



Fig : 19 Handloom



b. The Climate

The island of Majuli enjoys a sub-tropical warm and humid climate. Summer Months are usually hot and have extremely high relative humidity.

- ❖ Rain fall: Rain fall is very high .The average annual rainfall in the region is around 215 CM.
- ❖ Summer: The summer season starts from March to July and is warm and humid. During these times, the temperature may go up to 34°C with 90 % relative humidity.
- ❖ Monsoon: The monsoon season in Majuli starts around July and lasts till August, after which the post-monsoon season follows.
- ❖ Winter: The winter season, on the other hand, starts from November and lasts till February. The average temperature during the season is around 7°C to 18°C with a Relative humidity of 75%.

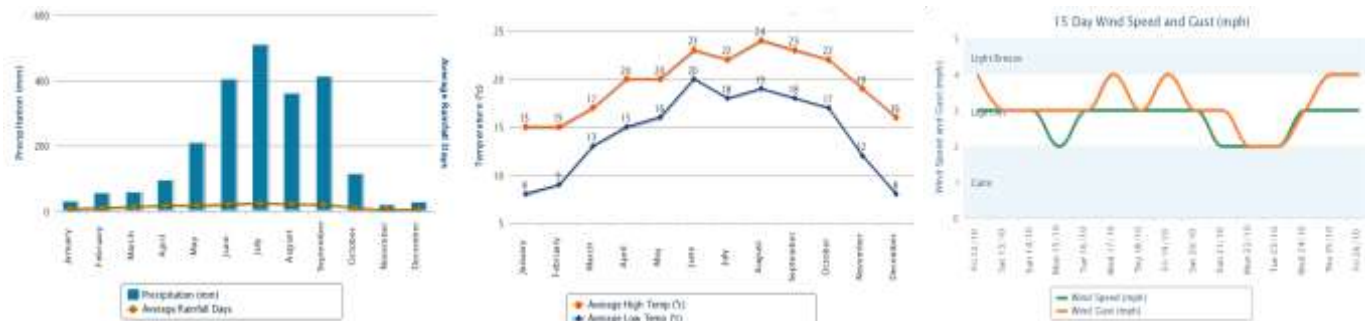


Fig : 20 Annual rainfall, Average temperature and wind velocity of Majuli

VI CASE STUDY: 1

1. Stilt Bamboo Hut of Mising Tribe

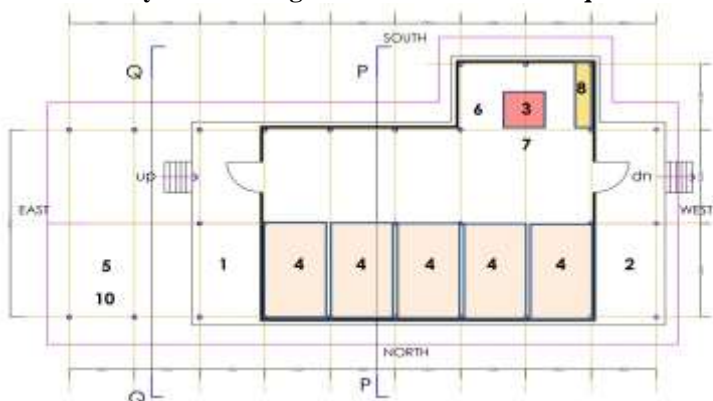


Fig : 21 Mising house, granary, pig stay and duckary under the stilt

Constituting 44% of the total population of Majuli, the Misings are the most important and dominant tribal community of Majuli. The Mising people build their traditional vernacular houses by using wood, bamboo, cane, reed, thatch etc. As a branch of burmish mongoloid origin, they believe in staying in stilt houses. A typical Mising house has following characteristics:

- ❖ The house on stilts is a big hall with a open kitchen for a large joint family. Places around the fireplace acts as a family interactive space. The fireplace keeps the house warm during winter. The animals living under the stilt floor also get warmer living space.
- ❖ Main entry to the house is from east side.
- ❖ Sleeping areas are in the North side.
- ❖ Main architectural feature of the house is the double height front portico which is used for grinding & handloom space.
- ❖ Stilt platform is 5 to 7 feet high to accommodate handloom and pig stay under it.
- ❖ The houses have perforated flooring to have ventilation from bottom.
- ❖ These houses were built in stilts to provide protection from wild animals especially from elephants.
- ❖ Apart from the main house there is a traditional granary on raised platform.
- ❖ They believe that elephants do not attack houses on stilts and therefore not destroy even the granaries.
- ❖ The grains are also protected from moisture, rodents and flood.

2. Analysis: Planning and construction techniques



- Legend**
1. Tunggeng : front verandah
 2. Yapkur : back verandah
 3. Meram : fire place
 4. Yupko : sleeping space
 5. Donam uko : grinding place
 6. Resing : sitting place for head
 7. Guest sitting place
 8. Koktok : store
 9. Yegom : pig stay
 10. Ege sumko : handloom space

Fig : 22 Typical plan of a Mising stilt house.



Fig : 23 Space for headman, koktok, meram and rapte for Apong

Salient Features of the structure

- ❖ Foundation: Bamboo columns are inserted underground up to a depth of 1000mm.
- ❖ Column: Separate bamboo column for flooring and roofing.
- ❖ Flooring: Wooden flooring over bamboo stilt platform.
- ❖ Wall: Bamboo split wall without plastering.
- ❖ Roof: Thatch roofing over bamboo truss.

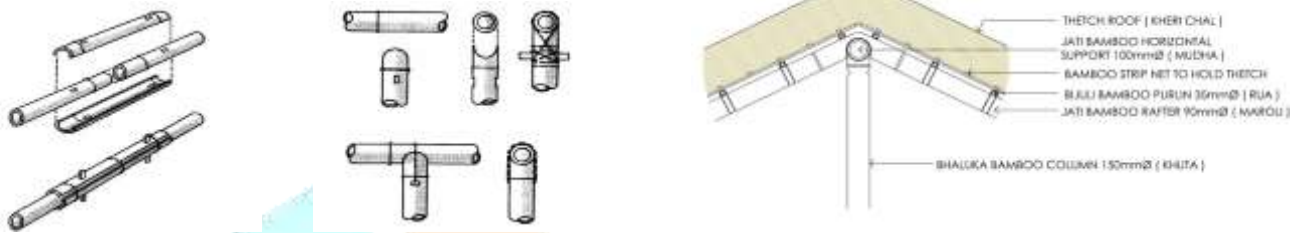


Fig : 24 Bamboo joint details and detail-A

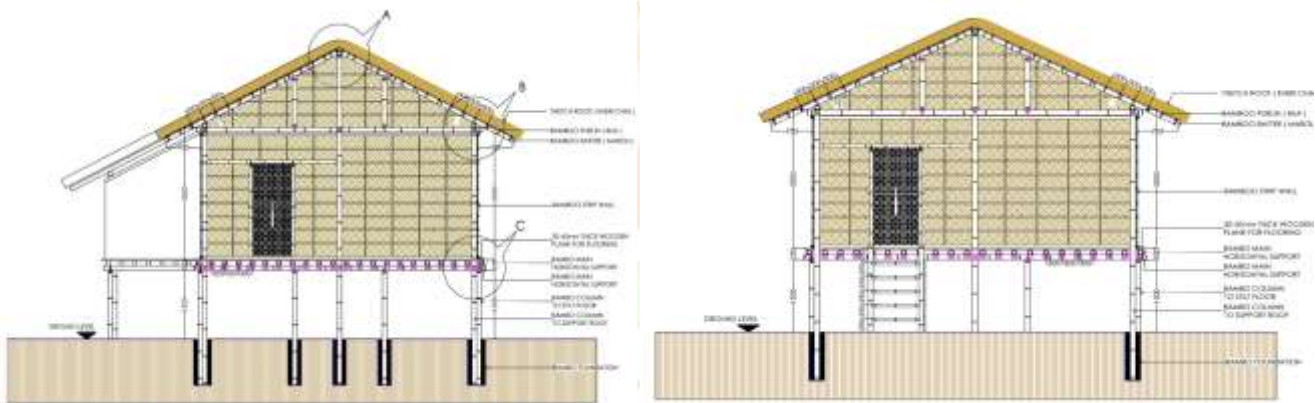


Fig : 23 Sections P & Q of a Mising stilt house.



Fig : 23 Detail-B and Detail-C

VII CASE STUDY: 2

1. Stilt bamboo chang ghar of Deuri tribe

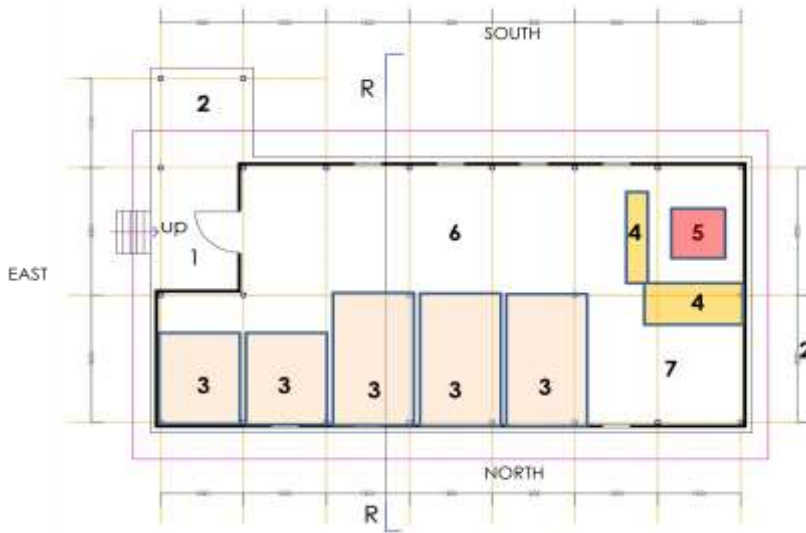


Fig : 24 Deuri chang ghar, perforated floor, pig stay and duckery under the stilt

Constituting 31% of the total population of Majuli, Deuris are another important tribal community of Majuli. The Deuri people build their traditional houses by using wood, bamboo, cane, reed, thatch etc. They believe in staying in chang ghar (raised platform). A typical Deuri house has following characteristics:

- ❖ The house on stilts is a big hall with a kitchen for a large joint family. Places around the fireplace acts as a family interactive space. The fireplace keeps the house warm during winter. The animals living under the stilt floor also get warmer living space.
- ❖ Main Entry to the house is from east side.
- ❖ Sleeping areas are in the north side.
- ❖ The lower part of the house is used as an enclosure for the animals.
- ❖ The floor is perforated for better ventilation and they pass the unnecessary victuals to the animals.
- ❖ The fire-place is attached with the chang and they call it as 'Dudepati'. Deuri people cook various meals in Dudepati and dine sitting around the fireplace.
- ❖ A raised platform remains enclosed to the house for cleaning.
- ❖ Apart from the main building, a traditional granary is also built on raised platform next to main building.
- ❖ The grains are protected from moisture, rodents and flood.

2. Analysis: Planning and construction techniques



Legend

1. Verandah
2. Drinking platform
3. Sleeping space
4. Sitting for elders
5. Kitchen & fire place
6. Hall
7. Store
8. Handloom space under the stilt floor
9. Pig stay under the stilt floor

Fig : 25 Typical plan of a Deuri chang ghar

Salient Features of the structure:

- ❖ Foundation: Bamboo columns are inserted underground up to a depth of 1000mm.
- ❖ Column: Separate bamboo column for flooring and roofing.
- ❖ Flooring: Wooden flooring over bamboo stilt platform.
- ❖ Wall: Bamboo split wall without plastering.
- ❖ Roof: Thatch roofing over bamboo truss.

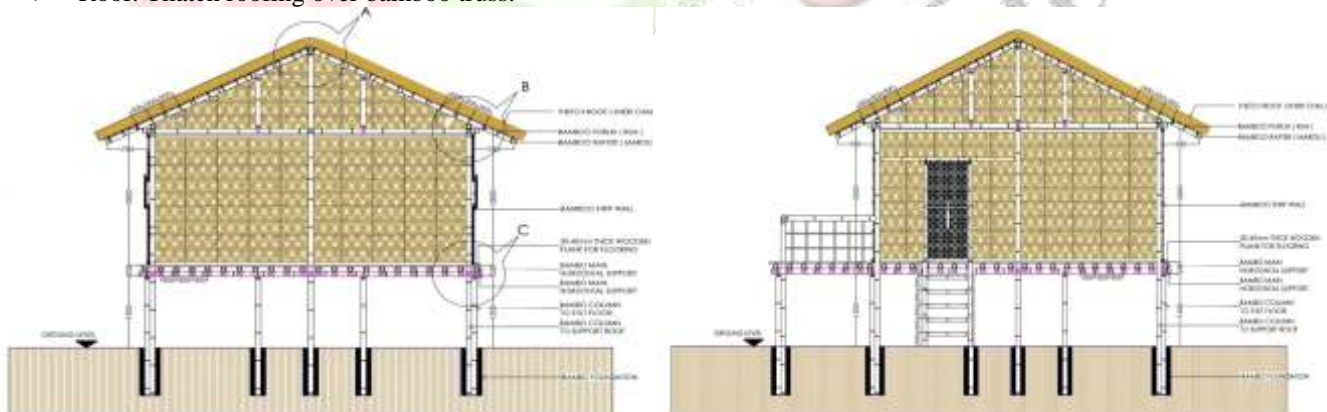


Fig : 26 Sections of a Deuri chang ghar



Fig : 27 Bamboo joint details and door detail

VIII CASE STUDY: 3

1. Sonowal Kachari house

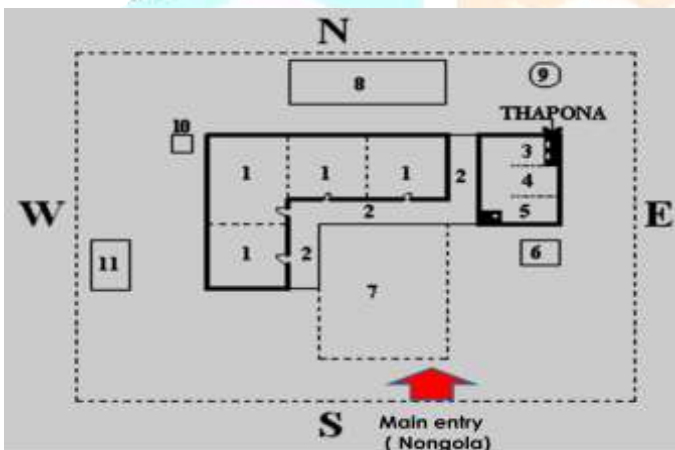


Fig : 28 Sonowal Kachari house, fish catcher, duckery, granary, and cow shed

Constituting 18% of the total population of Majuli, The Sonowal Kacharis are another major tribal community of Majuli. Unlike Misings and Deuris, Sonowal Kachari people build their traditional houses in the ground with raised plinth by using wood, bamboo, cane, reed, thatch etc. Typical Sonowal Kachari house has following characteristics:

- ❖ The typical house of Sonowal Kacharis is two sloped single ridge house for joint family system.
- ❖ Main Entry to the house is from South side.
- ❖ The interior is divided into partitions for sleeping and has a wide verandah where from the entry is made to the rooms.
- ❖ Kitchen is generally kept detached from the main house but connected by the corridor.
- ❖ In Sonowal Kachari tradition, kitchen has three divisions based on the use of the spaces. ‘Thapana’ is a place where prayer is done which is made of clay raised from the floor. This is the most sacred place of the house where only the family members can enter.
- ❖ They construct the walls of the houses with bamboo mesh and plastered with cow dung and mud plasters.
- ❖ Apart from the main house there is a traditional granary on raised platform, cowshed, poultry shed, ring well and pond.
- ❖ They have a chotal (courtyard) in front of their houses.

2. Analysis: Planning and construction techniques



Legend

1. Bed space
2. Corridor
3. Thapana (prayer room)
4. Chuwa ghar (dining space)
5. Jui ghar (fire place)
6. Bhoral (granary)
7. Chotal (courtyard)
8. Pukhuri (fish pond)
9. Nad (ring well)
10. Poultry shed
11. Gohali (cow shed)

Fig : 29 Typical plan of a Sonowal Kachari House

Salient Features of the structure:

- ❖ Foundation: Bamboo columns are inserted underground up to a depth of 1000mm.
- ❖ Column: Bamboo column for supporting roof.
- ❖ Flooring: Earth flooring over raised plinth.
- ❖ Wall: Bamboo mesh wall with cow dung & mud plastering.
- ❖ Roof: Thatch roofing over bamboo truss.

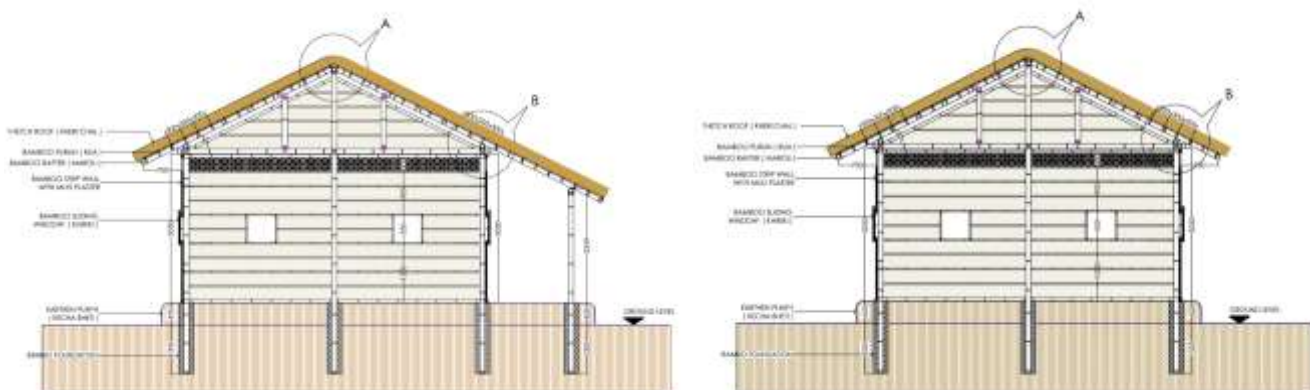


Fig : 30 Sections of a Sonowal Kachari House



Fig : 31 Detail-B and details of Nongola (entrance gate)

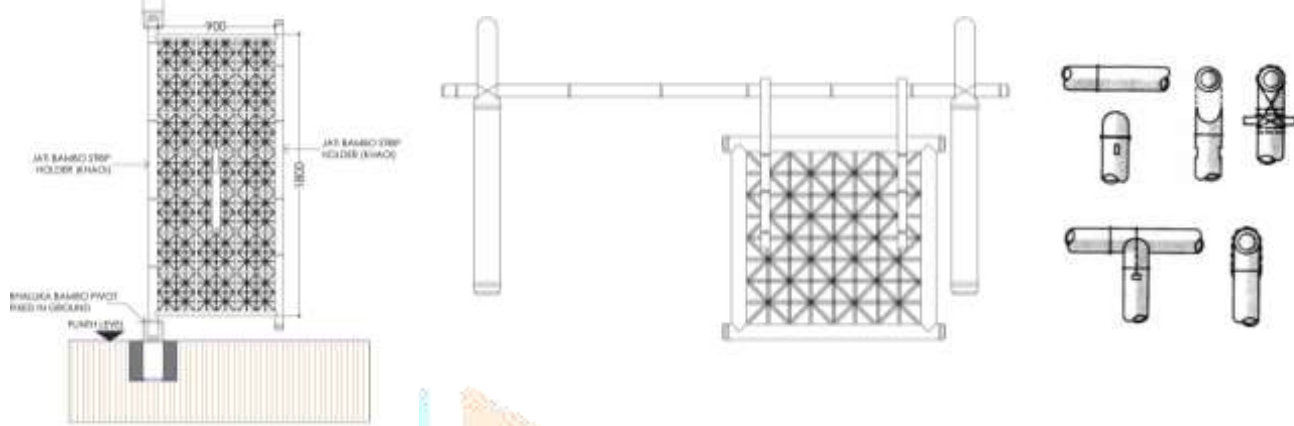


Fig : 32 Door detail, sliding window detail and bamboo joint details

3. Other construction techniques

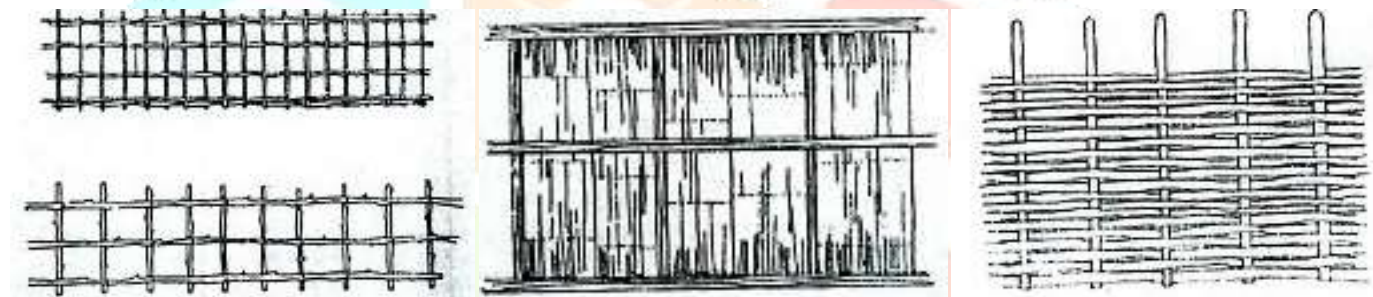


Fig : 33 Bamboo boundary wall, bamboo mesh wall with mud plaster and bamboo mesh wall for poultry shed

IX CONSTRUCTION MATERIALS

In vernacular architecture, only locally available materials are used in construction. In Majuli, bamboo, straw, mud, cane, thatch/coconut leaves, timber are abundantly available building materials.



Fig : 34 Local materials -bamboo, straw, mud, thatch/coconut leaves, timber

1. Bamboo

Bamboo is the most common building material that is used for building construction. Bamboo has high Tensile strength and highly ductile (earthquake-proof) in nature. It is cost effective, sustainable, readily available, workable and easily replaceable or partially replaceable. Bamboo is used for column, beam, flooring, wall, and roof frame.

2. Straw

Straw is the baled up dead plant stems of a grain crop, once the seed head has been harvested from the plant. It has virtually all its seed heads removed, and contains no leaves or flowers. It is a lifeless material, with a analogous chemical composition of wood. Straw is used as an energy efficient roof covering materials. It is easily available local material and required no skill labour.

3. Mud

Mud is a mixture of water, cow dung, and clay. It is the most commonly used as plastering materials in vernacular architecture. It is easily available, cheap, and workable. It is used as a plastering material for bamboo mesh walls and as floor finishing material. Mud mixed with cow-dung has anti-termite properties.

4. Thatch / Coconut Leaves

Thatching is the technique of roofing with dry vegetation such as straw, water reed, sedge, rushes, or heather, layering on the roof frame so as to shed water away from the roof. It is a very old roofing method and has been used extensively in Majuli.

5. Timber

Timber is one of the most commonly used materials in the vernacular architecture. From flooring to roof truss, beam and columns, timber is used in many parts of house as an alternative to bamboo.

6. Tools

Various types of knives are used for cutting purposes, each having its own individual utility. The khonta is used for digging purposes and ropes for tying purposes. Ropes for tying purposes and hammers are used for beating the timber or bamboo to create the desired joinery.



Fig : 35 Construction tools - daa, kotari, haturi(Normal hammer), claw hammer, khonta, kuthar (Axe), kasi(Sickle), korat(Shaw), Botali(Chisel), rosi(Jute Rope)

X CONCLUSION

The wet tropical environments of both Majuli and North east India create a typical architectural style. The traditional vernacular architecture of Majuli has following characteristics:

1. Open lay-out of living and family spaces
2. Significance of the rectangular and L-shaped layout
3. Sloping roofs and protruding eaves as response to tropical rain, wind and other natural elements
4. Grilled windows and porous walls as response to tropical sun glare and humidity
5. Some tribes build their houses in the stilts as response to overcome flood and wild animals

The following observations are evolved from the critical study of tribal houses:

- ❖ Choice of site depending on the economic criteria such as agriculture, animal husbandry, culture.
- ❖ Choice of materials depending upon availability, popular use and climatic suitability.
- ❖ Dimensioning in construction usually correlate with human body such as units of measurements in foot sizes, span of fingers and thumbs.
- ❖ A typical construction process involves excavation for bamboo posts in all type of construction.
- ❖ Building frame work is usually highly ductile bamboo or timber framework in case of post and beam construction.
- ❖ Bamboo frames are the popular roofing structure

Vernacular Techniques

- ❖ All the vernacular structures of Majuli have unique techniques which are learned and applied as the most suitable for a particular setting.
- ❖ Vernacular Techniques are refined over the time and are seldom backed by traditionally evolved scientific techniques.
- ❖ These craftsmen should understand the entire construction process as well as have the capacity to deal with adaptation and flexibility
- ❖ These craftsmen should be able to deal with differences in dimensions, consistency of materials, forces of nature and other problems which arise during building construction.
- ❖ The craftsmen should also have skills of bamboo construction, skills of carpentry and wood curving.

Roofing

Primary objective of vernacular architecture of Majuli is to provide shelter. The essence of shelter is to provide enclosed space achieved by covering the structure. Most popular form of roof is the pitched roof sloping on two sides and with gables at each end. In these types of roofs ridge takes some load while rafters take the most of the load. These roofs are able to carry burden of cladding such as thatch and reed. Pitched roofs have large overhangs to protect the wall from rain and sun.

Floors and Floor Finishes

- ❖ Floors are either used for human activity or animal activity. Floors are on the ground or raised platform above the ground level
- ❖ Usually for the ground floor the upper layer of soil is removed and filled with more stable materials and then compacted
- ❖ Often in floors are plastered with mixture of cow dung and clay
- ❖ Compacted earth in Sonowal Kachari house
- ❖ Wooden planks over bamboo frame work in Mising and Deuri houses

Structure and Supports

- ❖ Difference in form is further elaborated with usually distinctive use of building materials such as thatched bamboo framed roof and bamboo columns as support.
- ❖ Vertical loads are transferred from the roof to the columns to the ground.
- ❖ Usually the buildings are not more than one story in height with a 5 to 7 feet high stilt.

Ventilation & Lighting

In warm and humid climate buildings have devised forms to facilitate ventilation. In north east India ventilation through the ridge vent is very popular and effective. Series of jalli openings just below the roof are used for the provision of ventilation and lighting. Openings are the main source of lighting.

In conclusion, the vernacular architecture of Majuli is not only an Indian style of traditional architecture but also it shows a gesture of cross-boundary and multi-cultural architectural styles of south-east Asia. The studies carried in these three ethnic tribes – the Misings, the Deuris and the Sonowal Kacharis highlight the uniqueness of traditional adaptation of planning. The holistic amalgamation of society with locally available construction materials, labour, technology, and climate goes on to prove the sustainable aspects that exists in the rural architecture in this part of the world.

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