Preparation of Payra Kuakata Comprehensive Plan Focusing on Eco-Tourism Project

Government of the People's Republic of Bangladesh
Ministry of Housing and Public Works
Urban Development Directorate (UDD)

Examine the traditional architecture, urban form and pattern within the region

2nd Report

DRAFT REPORT

ON

Examine the traditional architecture, urban form and pattern within the region

By

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December, 2021

Executive Summary

This report is the outcome of the study on the traditional architectural potentialities of the Payra-Kuakata Coastal region. Several upazilas from Patuakhali and Barguna district, namely, Galachipa, Kalapara, Rangabali, Amtali, and Taltali has been selected as sample study areas for 'general reconnaissance survey'. From the literature survey, Payra-Kuakata Coastal Region is identified as 'Dispersed and isolated settlements' type of settlement pattern (Choudhury & Zaman, 1976). Generally this type of settlements can be found in the coastal areas and offshore islands of Bangladesh. These areas are extremely fertile as they are formed by the sedimentations of the rivers. These fertile offshore islands and areas are not only potential for agriculture but also for fishing and foresting purpose. The opportunities of cultivation and fishing inspired people to start living in the offshore islands. Homesteads are also built here an isolated, which gradually resulted in a dispersed and isolated settlement pattern. Generally the each individual homestead consists one or more pavilion structures on raised ground practicing the vernacular construction technique of pucca-kutcha structure. The elongated slope roof with narrow angle of inclination is one of the identical feature of the house-form in this Payra-Kuakata Coastal Region. Besides that, wooden framed vertical enclosures with colorful visual appearance are the distinctive attribute of this coastal region architecture. These house-forms are the unique examples of local tradition and craftsmanship of the inhabitants. This report has try to explore the architectural potentialities of the vernacular house-form with overviewed for understand the context, environment and eco-tourism.

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1.1 Introduction

The geological formation of Bangladesh is developed by the three mighty river systems as the Ganges-Padma river system, Brahmaputra-Jamuna river system and Surma-Meghna river system. Quaternary Sediments deposited from these three-river systems has formed this delta plain and major coastal areas of southern Bangladesh. The project area of Payra-Kuakata is located to this coastal region consisting several upazilas of Patuakhali and Barguna district. Where the traditional architecture and the settlement of this deltaic region is more or less similar. The settlement and the house-form of the local inhabitant are the creation of the context of the land –water relationship.

1.2. Background of the study area

Patuakhali and Barguna district fall in the Ganges tidal floodplain. Generally the coastal areas of Bangladesh are classified under two broad categories viz. interior coast and exterior coast (Ahsan, 2013). Amtali, Taltali, Barguna Sadar, and Patharghata upazila of Barguna district and Galachipa, Rangabali, and Kalapara upazilas of Patuakhali district are among the main study exposed areas (fig 01).

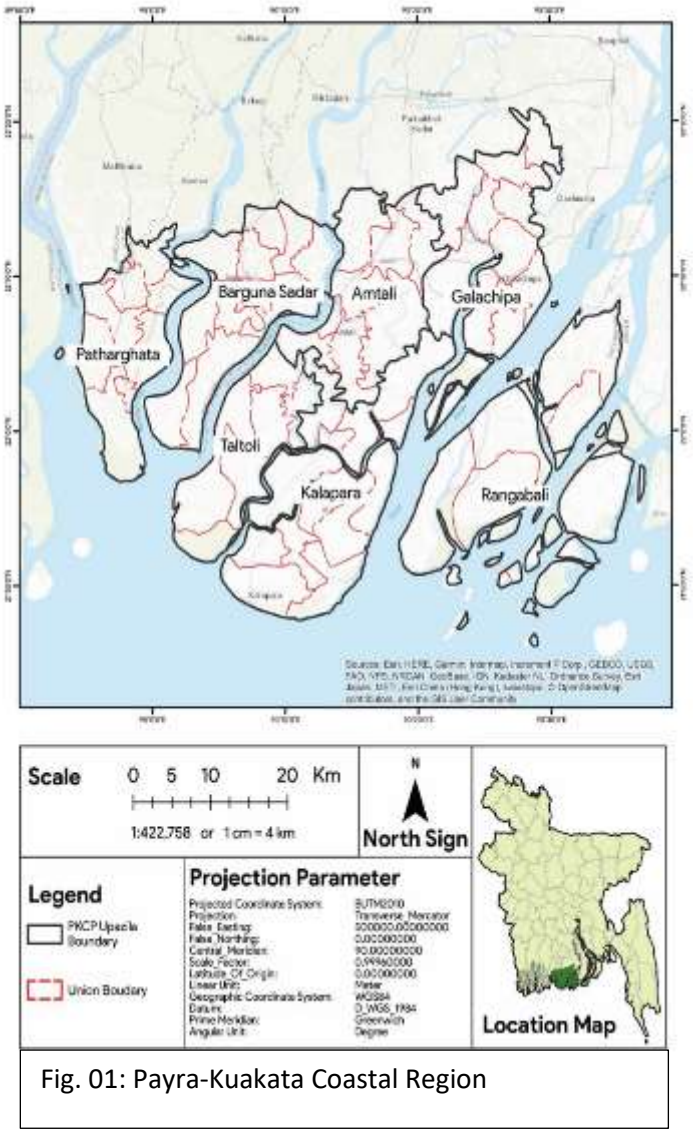

Fig. 01: Payra-Kuakata Coastal Region

The tidal landscape of the Ganges Tidal Floodplain has a low ridge and a basin relief crossed by innumerable tidal rivers and creeks. Local differences in elevation generally are less than 1m compared with 2-3m on the Ganges floodplain (Banglapedia, 2003). The sediments are mainly non-calcareous clays, but they are silty and slightly calcareous on riverbanks (Huq & Shoaib, 2013).

The upazilas of this region are low-lying coastal areas, they are at risk of being affected by the sea level rise due to climate change (Brammer, 2014). The rivers going through the districts are The Andharmanik, Agunmukha, Payra, Lohalia, Patuakhali, and Tentulia of Patuakhali and Payra, Bishkhali, Khagdum and Baleshwar of Barguna.

1.3. Objective of the study

The study area mainly falls under the Ganges Tidal floodplain. The people of this study area are at risk of being affected by the sea level rise due to climate change. More over a prominent part of this study is covered by reserved mangrove forest. Patharghata and Amtali upazila has the highest percentage of reserve forest area. The overall goal of this regional plan is to achieve sustainable development of the Payra-Kuakata Coastal Region So it is important to explore the land-water and forest relation with local inhabitants. This contextual relationship may be examined through their settlement and their formation of the house-form.

The overall objectives of the study are

1. To study the context as well as the settlement regarding the landscape of the region.
2. Study the Settlement patterns with relation to connectivity
3. To trace out the traditional house-form and its development process.
4. To analyze the architectural styles and features of the traditional house
5. Examine the general characteristics of a traditional house
6. Find out the ethnic or regional variety if any
7. Study the material and construction techniques of traditional house-form

1.4. Methodology of study

The study is conducted by two stages of research, one is the 'prior survey' that mainly covers the literature review and background study and another is the 'on-field observational survey'. At first the archival documents and the literatures as in published books, reports etc. are studied which provided the primary plan for designing the fieldwork as well as the method of data collection and documentation.

The study used the 'general reconnaissance survey' in the field to relate the literature review with the field data collection. Under this present study, it is conventionally observed the existing landscape profile and the habitation arrangements of the study unit which has helped to understand the architectural potentialities of the traditional house-form of the Payra-Kuakata costal region.

2.1. Context and the settlements

2.1.1 Patuakhali District

Patuakhali district is one of the coastal districts of Barisal Division and is located at the fringe of the Bay of Bengal. It became a sub-division of Barisal (former Bakerganj) district in 1871 and a district in 1969. Former Patuakhali district was constituted with two sub-division viz. Patuakhali Sadar and Barguna. In 1983 Patuakhali Sadar subdivision was upgraded to Zila (BBS, 2011).

Opinions about the origin of the name "Patuakhali" varies from different sources. The most accredited belief is that the name originated from the Portuguese Canal which flows through the district. It is said that the Portuguese pirates used to make regular incursions through this canal at the beginning of the seventeenth century. Subsequently, the canal was named "Patuakhali" and the area was named after it.

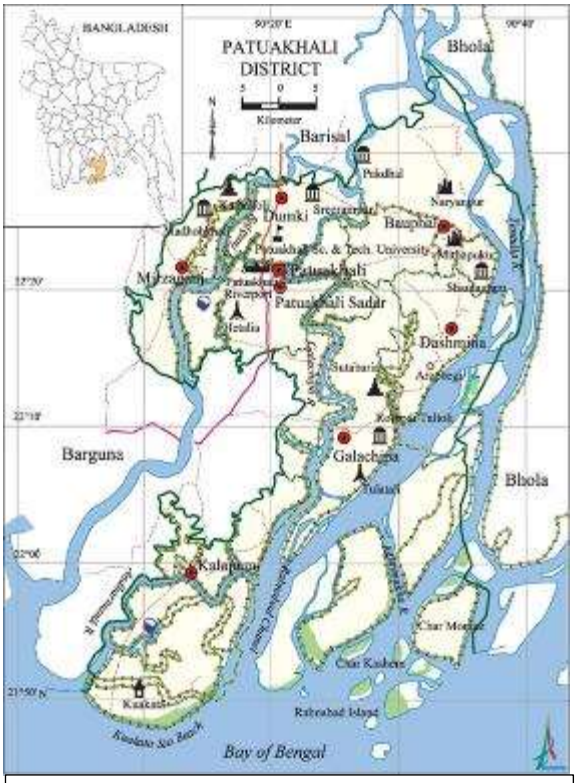

Fig 02 Patuakhali District (Banglapedia, 2003)

2.1.1a Area and Location

The total area of Patuakhali district is 3,221.31 sq. km. It lies between 21°48' and 22°36' north latitudes and between 90°08' and 90°41' east longitudes. The district is bounded on the north by Barisal district, east by Bhola district, south by the Bay of Bengal and west by Barguna district. The total population of the Patuakhali district is 1,535,854 according to the Population Census of 2011 (BBS, 2011).

2.1.2 Barguna District

Barguna is another of the coastal district of Bangladesh that was previously a part of Patuakhali district and was upgraded to district status in 1984. There are no specific sources regarding the name of the district. However, different sources suggest that wood traders from the northern part of the country used to travel en route this route to collect wood from the Sundarbans. Businessmen used to transit at Khagdum River and used to wait for a favorable tide locally known as "BoroGon". As such, the place was called "Boro Gona" (UDD,2021). Another source mentions that the place is named Barguna as the boats had to wait at this place of present district headquarters for "Baragun" meaning large rope to pull their boats against the strong current of the Khagdum River.

2.1.2a Area and Location

The total area of the zila is 1,831.31 sq. km of which 399.74 sq. km is riverine and 97.18 sq. km is under forest. It is bounded on the north by Barisal Zila, Jhalokati Zila, and Patuakhali Zila, on the east by Patuakhali Zila, on the south by the Bay of Bengal and on the west by Pirojpur Zila and a part of Sundarbans under Bagerhat Zila. It lies between 21°48' and 22°29' north latitudes and between 89°52' and 90°22' east longitudes. The total population of Barguna district is 892,781 according to the Population Census 2011 (BBS, 2011).

Fig 03 Barguna District (Banglapedia, 2003)

2.2 Land Use and Land zoning

Among the several upazilas of Patuakhali and Barguna District, a short listed study area has been selected for the purpose to understand the land –river and forest relation. Here a Data of upazila-wise land area distribution are presented in **Table Error! No text of specified style in document.**. Where Kalapara has the highest percentage of land area compared to its total area. Patharghata has lowest land area. Rivers are seen mostly in Galachipa upazila as it has a 44.89% river area. Amtali upazila also has the highest percentage (53.14%) of reserve forest area among the seven Upazilas. Lowest reserve forest is in Galachipa Upazila.

Table Error! No text of specified style in document.**:** Land Area Distribution of the Upazilas (sq. km)

Upazila	Land Area	(%)	Reserve Forest	(%)	River Area	(%)
Galachipa	463.06	(51.79)	29.68	(3.32)	401.31	(44.89)
Kalapara	467.11	(94.96)	21.05	(4.28)	3.73	(0.76)
Rangabali	260.4	(69.57)	20.6	(5.5)	93.32	(24.93)
Patharghata	234.11	(17.54)	37.29	(38.37)	115.96	(29.01)
Amtali	539.3	(40.42)	51.64	(53.14)	129.81	(32.47)

Most part of the study area falls under medium land formation especially flat in nature. Galachipa upazila stands out as the flattest area having no high or low land. Amtali and Taltali upazila's some part are low lying areas, while Amtali has the largest area of high land. Other upazilas are mostly flat with little or no high or low land.

2.3 Housing Structure of this region

From the 'Draft Regional Plan of Payra Kuakata Comprehensive Plan Focusing on Eco-Tourism' by Urban Development Directorate (UDD, 2021), it has observed that there are urban and rural houses with different type of house structure among these upazillas. It is seen that the overwhelmingly large percentage of the households have kutcha houses (fig 04).

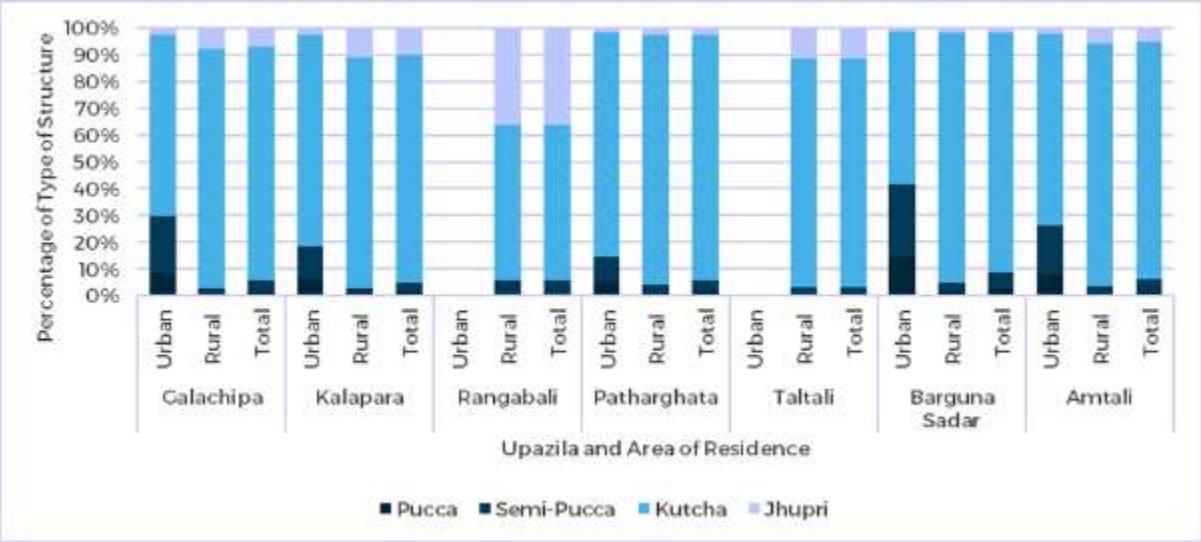

Fig 04: Distribution of Households by Type of Structure and Area of Residence

In Table 2, it has observed that the most of the Pucca houses of the households are in the urban area, Barguna Sadar having the largest percentage (14.3%) followed by Galachipa (8.35%). Structures of Rangabali mostly consist of Kutcha and Jhupri structure indicating a very low-level urbanization rate. Rangabali has the highest percentage of jhupri structures, little over than 36%. Rural areas have the most kutcha structures and lowest number of pucca structures. Among those kutcha houses, most of them are recognized as the traditional vernacular house-form.

Table 2: Distribution of Types of Structures (Source: BBS, 2011)

		Pucca	%	Semi-Pucca	%	Kutcha	%	Jhupri	%	Total
Galachipa	**Urban**	508	8.35	1300	21.37	4117	67.64	161	2.64	6087
	Rural	290	0.57	1218	2.38	45779	89.31	3972	7.75	51260
	Total	799	1.39	2519	4.39	49896	87.01	4133	7.21	57347
Kalapara	**Urban**	539	6.37	1023	12.09	6655	78.66	244	2.88	8461
	Rural	395	0.81	887	1.82	42042	86.20	5448	11.17	48772
	Total	934	1.63	1910	3.34	48697	85.09	5692	9.95	57233
Rangabali	**Urban**	0	0.00	0	0.00	0	0.00	0	0.00	0
	Rural	65	0.29	1254	5.56	13084	58.06	8135	36.10	22537
	Total	65	0.29	1254	5.56	13084	58.06	8135	36.10	22537
Patharghata	**Urban**	377	5.19	671	9.26	6082	83.85	123	1.70	7253
	Rural	356	1.00	1102	3.10	33070	93.00	1031	2.90	35559
	Total	732	1.71	1774	4.14	39152	91.45	1154	2.70	42812

		Pucca	%	Semi-Pucca	%	Kutcha	%	Jhupri	%	Total
Taltali	**Urban**	0	0.00	0	0.00	0	0.00	0	0.00	0
	Rural	108	0.51	527	2.51	17897	85.37	2433	11.60	20964
	Total	108	0.51	527	2.51	17897	85.37	2433	11.60	20964
Barguna Sadar	**Urban**	1009	14.30	1905	27.00	4029	57.10	113	1.60	7056
	Rural	710	1.30	1911	3.50	50896	93.20	1092	2.00	54609
	Total	1719	2.79	3816	6.19	54925	89.07	1205	1.95	61665
Amtali	**Urban**	392	7.77	937	18.55	3604	71.35	117	2.32	5051
	Rural	253	0.68	1093	2.95	33625	90.75	2080	5.61	37051
	Total	645	1.53	2030	4.82	37229	88.43	2198	5.22	42102

From the above understanding and literature review, a sampling frame has been developed to cover the study. Several upazilas from Patuakhali and Barguna district, namely, Galachipa, Kalapara, Rangabali, Amtali, and Taltali has been selected as sample study areas for field survey' (fig 05).

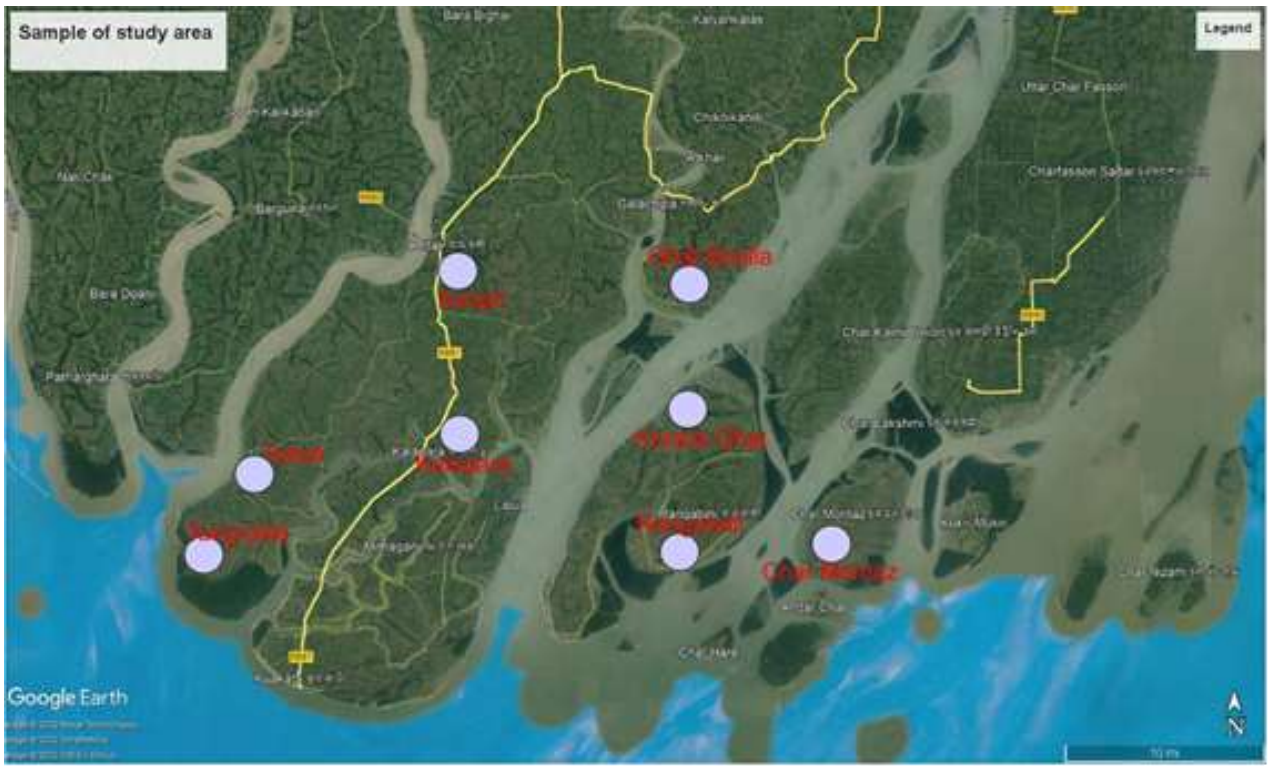

Fig 05: Location of Study area for sampling

3.1 Study on the Traditional Architecture of Payra-Kuakata costal region

Throughout history human architecture is evolved and shaped by social forces and culture (Rapoport: 1969). The vernacular house pattern of Bangladeshi architecture stands no different. It is said that traditional architecture of Bangladesh is a synchronized expression of this land, water, geography, climate and people and here nature and life have played an unparalleled relation to create harmony of build-form with some distinct regional varieties (Doza, 2008).

The vernacular houses of the study area are rich in different architectural elements and features that are interrelated with the surrounding environment and the cultural concerns. A brief summary on settlement, house form, enclosure, materials, and ornamentation has been produced and represented here through visual demonstration.

3.1.1 Settlement and house form

It is necessary to study rural settlement patterns and the formation of homesteads to get a clear understanding about vernacular architecture of the study area. Houses cannot be seen in isolation from the settlement, but most of them should be viewed as part of a total social and spatial system, which relates the houses, way of life, settlement, and even landscape (Rapoport, 1969). So before going to discuss about the individual house form, the formation of settlements and their patterns have explained in the following texts.

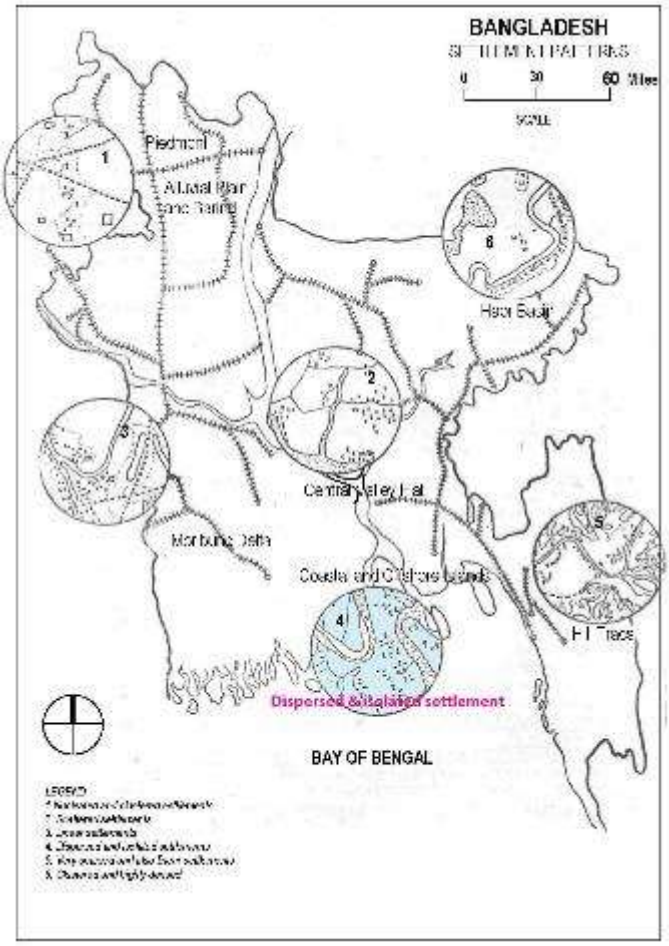

Fig 06: Settlement pattern of Bangladesh (Choudhury & Zaman, 1976)

A network of rivers, with their tributaries and distributaries crisscross the country. These rivers made the major parts of the country flat and fertile with their sedimentations.

According to Choudhury and Zaman, the settlement in south Bangladesh can be categorised as **Dispersed and isolated settlements** (Choudhury & Zaman, 1976). Those type of settlements can be found in the coastal areas and offshore islands of Bangladesh (fig 06). This type of 'Isolated' settlements can be seen in the islands of the Bay of Bengal that formed at the mouth of the Ganges-

Brahmaputra delta. These Islands are extremely fertile as they are formed by the sedimentations of the rivers. These fertile offshore islands are not only potential for agriculture but also for fishing and foresting purpose. Those opportunities of cultivation and fishing inspired people to start living in the offshore islands. Homesteads are also built here an isolated, which gradually resulted in a dispersed and isolated settlement pattern.

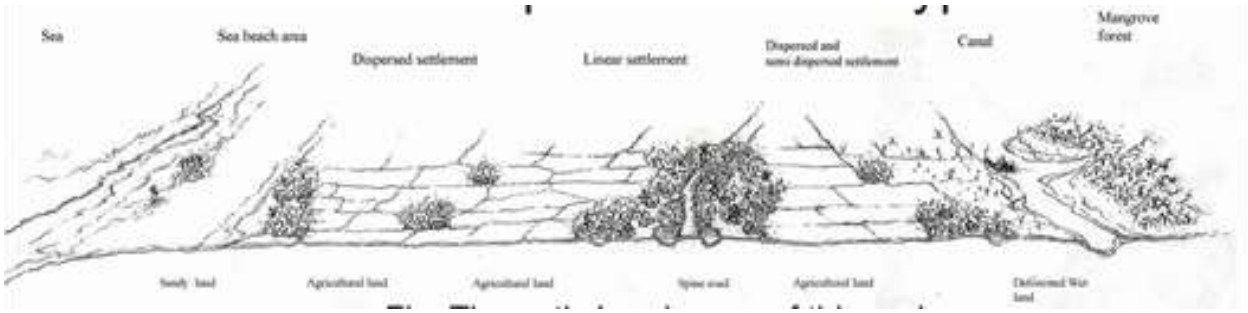

Fig 07: Settlement pattern of Payra-Kuakata Coastal Region, Bangladesh

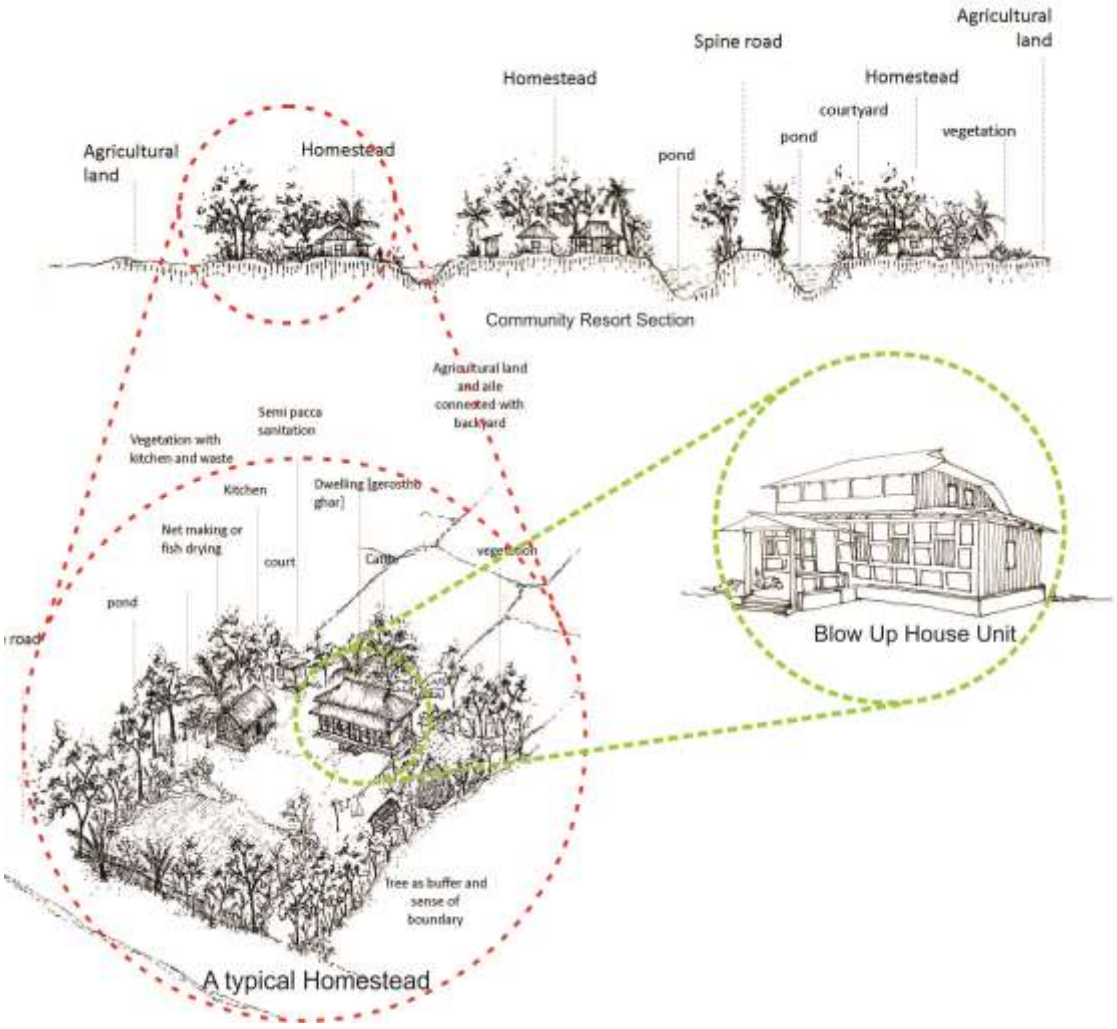

Fig 08: Conceptual Settlement pattern and House-form

3.1.2 Various type of Vernacular house-form

A house is a dwelling place, constructed in vernacular technique of system. It is synonymous with warmth, protection and wellbeing shelter irrespective of whether and whatever its degree of intrinsic architectural interest. The physical appearance of a house depends on the surrounding environment (climate and terrain), available building materials, technological know-how, and such cultural determinants as the social status and economic resources of the owner or owners. In rural areas until modern times, people and animals were often housed together; today's houses frequently include storage, work, and guest areas, with several separate spaces for different activities. Those Traditional house will be

Fig 09: Sketch of typical vernacular house

Fig 10: Elongated roof of vernacular house

Fig 11: Double storied vernacular house

Fig 12: Double storied vernacular house with projected porch

Fig 13: Colorful vernacular house

Fig 14: Homestead of Char area

the source of design ideas for eco resort. A detail study on those houses are need further.

3.1.3 Typology of Vernacular houses

A general typology is workout through the observation during the field survey. A visual

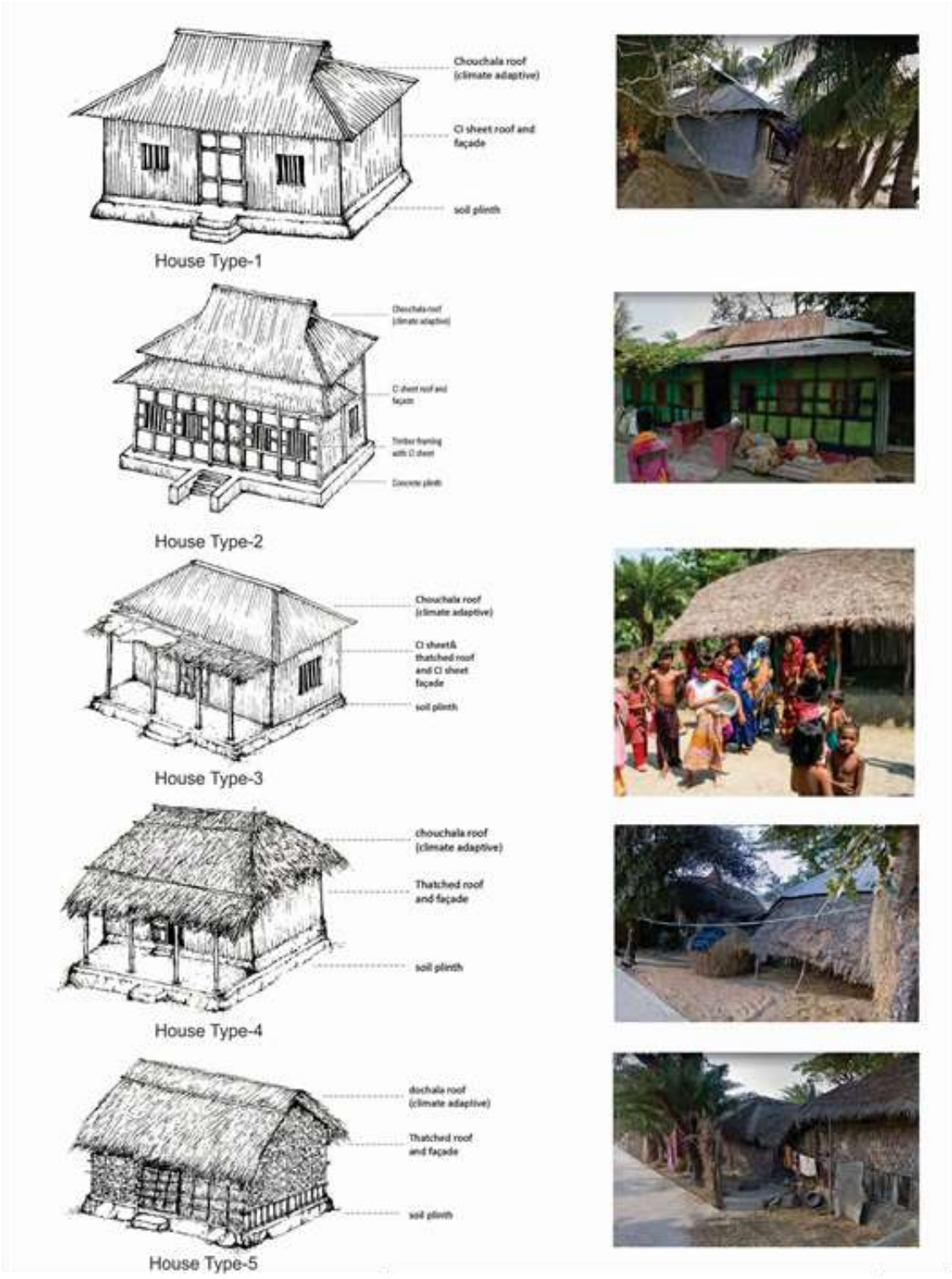

Fig 15: A general typology of vernacular houses, Payra-Kuakata costal region

demonstration is shown below.

Fig 16: elongated Roof

Fig 17: Simple vernacular roof

Fig 18: CGI enclosure

3.1.4 Elements and detailing of vernacular houses of this region

Fig 19: Ornamentation of cornice

Fig 20: Colourful enclosure of a vernacular house

Fig 21: Internal structural system of a vernacular house

Fig 22: Wooden framed enclosure

Fig 23: Roof cornice of a vernacular house

Fig 24: Decorative element of a vernacular house

Fig 25: Typical wooden windows

Fig 26: Cloth chadoya under ceiling

Fig 27: Local Craftsman

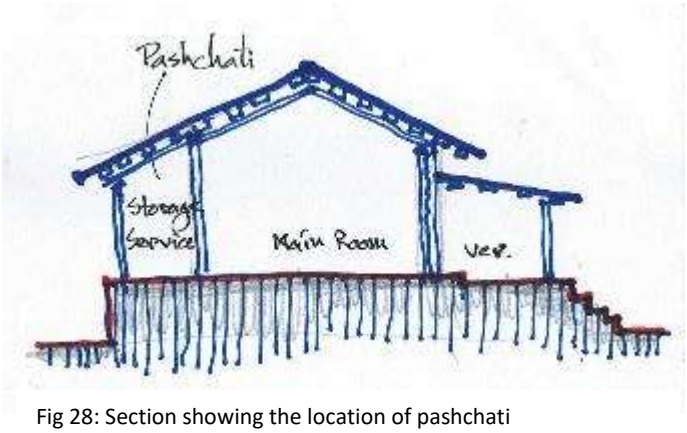

Fig 28: Section showing the location of pashchati

Fig 29: Pashchati present in upper level

3.2. General Characteristics of Vernacular House-form

The summary of the observations are discussed below:

- Generally houses are established in the inner areas of the dam/embankments but sometimes it is seen outside of protected areas.
- Each homestead consists one or more pavilion structure of house-forms.
- One storied and double storied house-form are broadly convenient in each homestead of this study area (fig 11).
- Minimum plinth height 2 feet to 3 feet depending on low-lying areas and flood level. Plinths are generally stabilized/pucca in most cases.
- Durable structural members concerning issue of longer house life span. Cross bracing of appropriate materials needs to use.
- Structural members to be fastened to each other properly (fig 21).

- Additional structural stability to be ensured by the means of introducing bracing elements at various points
- Wooden framed vertical enclosure is the general features of the house-form. In some cases, RCC post and metal/wooden frames are observed as super structure.
- CGI metal sheets are used as roofing material (fig 10) .
- Timber used as door and window frames (fig 25).
- Bamboo mats/ tarpaulins are used under roofs in order to mitigate the heating.
- "Pashchati" as an addition around the main house could be added to accommodate various service oriented functional households' requirements (fig 28,29)
- The frame structures are suitable against the frequent occurrences of cyclone, tidal surge and heavy wind pressure. Due to this structural pattern, frame structure houses will be more resistant to the impacts.
- Besides that, wooden framed vertical enclosures with colorful visual appearance are the distinctive attribute of this coastal region architecture (fig 11,13).
- Variety in roofing like Char chala and Aat chala are observed in different homesteads (fig 10,12,13).
- The elongated slope roof with narrow angle of inclination is one of the identical feature of the house-form in this Payra-Kuakata Coastal Region (fig 10,16).
- Plenty of vegetation is the integral part of each homestead ensuring the nature and landscape. Vegetation also helps against the natural disasters.

It has been observed that inhabitants of this region want to leave their own homesteads with their belongings and livestock. Sometimes this causes higher casualties during cyclones and surge. In these disaster-prone areas they make their own ways of surviving through traditional house construction techniques and settlement patterns. Since this vernacular houses are made of indigenous local materials with native methods, the loss of life and property are enormous sometimes. But in a nutshell, with their construction techniques, houses will be able to withstand storm and surges.

3.3 Ethnic variety of Hose-form in the study area

Both Patuakhali and Barguna districts contain some number of ethnic populations, mainly from Rakhaine tribe. Largest placement of the ethnic population is in Kalapara who are mostly from Rakhain tribe from the Arakan State (Islam et al, 2020).

Thirteen Rakhaine Villages are located throughout the Kabirajpara, Agathakurpara, Tatipara, Monukhapara, Momeshepara, Tongpara, Laupara, Chhatonpara, Talukdarpara, Boro Ankupara, Chhoto Ankupara and Sawdagorpara of Taltoli Upazilla (UDD, 2021). The Rakhaines are ethnic people originally migrated from Myanmar. They live in comprising with some 'Para' and generally the bunch of houses is termed as 'Para'. Their homesteads and house-form have been preserving and upholding their own rich cultural tradition and heritage. Many tourists visit these villages to experience the ethnic lifestyle and acquire the knowledge about the Rakhaines. A sacred Rakhaine temple is situated aside from the village in some study areas.

Fig 30: Typical Rakhaine House on pilotis.

Fig 31: another Rakhaine House.

Rakhaine homesteads are made of bamboo, wood and golpata leaves. Their house is mainly two storied and the ground floor is kept vacant for looming clothes (fig 35). Generally they live on the platform of first floor dividing it into various compartments. In the entrance, the room is earmarked for the guests. The second room is for the master, the third one for the

Fig 32: Typical Rakhaine House on pilotis.

Fig 33: Roof of Rakhaine House

male children, and the fourth and rear room is earmarked for the young un-married daughters (Banglapedia, 2003). It is observed during the study that the construction of

Golpata roof of Rakhine house is unique rather than the local construction (fig 34). They has constructed their roof with multi-folding the each golpata leaves for durability.

Fig 34: Golpata roof of Typical Rakhaine House

Fig 35: Ground level looming area of Rakhaine House

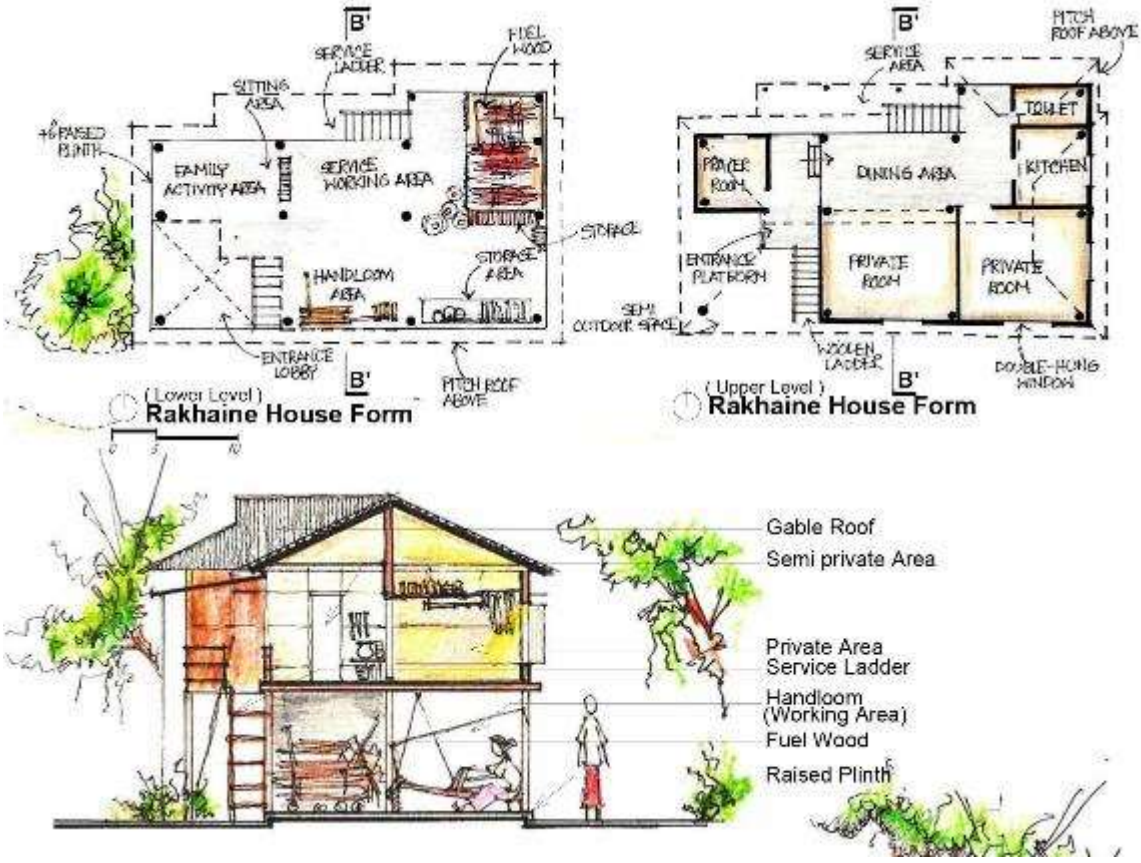

Fig 36: Layout & section of Typical Rakhine house (source Rahman et al , 2021)

Above layout of Rakhine homestead shows their unique and interesting architectural potentialities.

4.1 Conclusion

This study has covered the vernacular house-form for the Payra-Kuakata region along with the architectural potentialities and possibilities. The study will help to act as a major inspiration for the development of Payra-Kuakata Comprehensive Plan Focusing on Eco-Tourism. It also may suggest an eco-concern architecture connecting the local context and the surrounding community with that tourism development. The propose of report is to get some idea and concepts of architectural building that conserve and enhances the natural environment, through human conscience and habitat renovation by introducing different levels of rich sustainability.

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