

VERNACULAR LEARNING CENTER

A Hub for of Sharing Knowledge and Research

By

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August 2016

Submitted in partial fulfillment of the requirements for the degree of
Bachelor of Architecture

Department of Architecture

BRAC University

DISSERTATION

OF

VERNACULAR LEARNING CENTER AT SUNDARBAN VILLAGE, DINAJPUR

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Seminar II

Spring 2016

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Abstract

Vernacular architecture of Bangladesh is the identical, rich building culture that sums up all the stories of life of specific time. It is associated with very native, local, common craftsmanship of the people of the country. Recent time depicts vernacular as backward and underdeveloped being in the contemporary culture of industrialization. Contemporary interpretations of the vernacular architecture might be the reminiscence of what exists.

Vernacular learning center is a project that not only encourages local building craft but aspire enhancement of the traditional and cultural building domain of Bangladesh through architecture. The project is associated the NGO “SAFE” based in Dinajpur who insight the strength of local materials and building techniques and works to improve the sector.

In this thesis emphasis has been given to the explorations that how the prevailing condition can be developed with help of architecture and encouragement of participatory design process. This has also originated to provide a platform for the craftsmen to allow development and interaction at local, national and international levels and celebrate the native building craft. It will also generate the awareness and healthy skepticism towards what is happening and what should have happened. This dissertation includes the rationality, fixation of objective and aim, program generation, case studies, ideologies, zoning of site, necessary plans.

Chapter 01: Introduction

1.8 Project Background

1.9 Project Brief

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1.11 Given Program and functions

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1.1 Project Background

Rural Bangladesh holds a fascinating variety in her traditional buildings. Each of them amalgamates the collective skills over there, of the very native craft person. The people of the countryside design their needs and build what they design. In this simplest building process, the available resources and the knowledge gained from tradition assist to enrich the building craft. Thus, this area of architecture stresses on technologies and materials that are very minor energy consuming as well as viable for its people. Moreover, the building practice is cost effective, ecologically sensible and culturally relevant to the place and its people but remains underdeveloped for not being known to utilize the expedient and lack of awareness. This sector needs a breakthrough to ignite the rural people be confident and decisive about their own buildings to prevent the loss of the culturally relevant buildings.

"We can never get a re-creation of community and heal our society without giving our citizens a sense of belonging."

-Patch Adams, American Physician & Social Activist

In modern time, native building procedures seem almost village-like or backward. Being vernacular is not necessarily being backward, underdeveloped rather it reminds us who we are, where we are from and what we can do with our hands. Lack of knowledge and cognizance of the rural people deprives them being self-realized of the innovative building techniques and resources. Thus, we are vulnerable to the loss of our identical buildings which may have developed with some inputs of appropriate technologies and the same traditional materials. Moreover, builders of these houses with non-schooled knowledge can themselves become trained craftspeople and asset for the society. Here is the need to encourage the enhancement of appropriate technologies that will strengthen the native, available materials and techniques and help reaching to function as those are potent of.

People are often found to come out of their root and adapt the trend of durable materials which is very threatening if considered as vulnerability of losing our cultural as well for the ecology. Some progress to this sector of architecture can overcome the drawbacks which can be stimuli to inspire them in doing appropriate buildings which balances both the aspirations and economic viability. Traditionally available

materials are reminiscence of what exists on there. They have cost effective construction techniques and they encourages local industry. In the rural areas of Bangladesh, most affordable and available materials are mud and bamboo. These materials can be utilized at its most beneficial form by using appropriate building technologies that are easy to learn for the common people rather adapting the materials those has negative impact on environment while production.

However, the basic strategies that almost all the people associated know and practice are the foundation for the practice. A center for sharing the knowledge, research and training to make skillful craftsmen can not only make them artisans but also raise aplomb in dealing with buildings and decisive aspects. A Hub for sharing knowledge would widespread the scope for realization of strength of what we have and hoe it is geographically adaptive to that area. It will also showcase their expertise in form of functional, successful, proper buildings of the country in the country. The innovations can get influence from similar international works and customize it with our region for better outputs.

This project is chosen from the heartfelt necessity to take the native architecture to an advance level with existing potentials and inputs from technologies used in similar cases of the international level and with a vision of it getting further link it to the contemporary domain.

SAFE (Simple Action for The Environment) is an NGO based in Dinajpur in the north west of Bangladesh. They are officially operating from 2009 with support from housing and hazard. SAFE Aims to "Reduce the vulnerability of low income households to environmental hazards such as flooding and strong winds. They do this through promoting improved house building techniques, making building materials from natural resources, providing material support and environmental initiatives such tree planting. Their building program aims at increasing community self-reliance by creating skilled and informed local builders, craftsmen and house owners. This process includes hosting number of local, national and international workshops to promote tried and tested techniques that build on existing construction practices as well.

1.2 Project Brief

Project Name: Vernacular Learning Center _ A Hub for Sharing Knowledge and Research

Project Site: Sundarban village, Dinajpur

Site Area: 8 acre

Client: SAFE Bangladesh

1.3 Project Introduction

Vernacular Learning Center is a place for sharing knowledge of informal architecture of the rural Bangladesh which beholds the culture, lifestyle, habit, value, economy of the place. The project creates a ground to realize, practice and spread the potential of the indigenous building materials and techniques, increases community self-reliance by creating skilled and informed local builders, craftsmen and artisan. It is such a community learning center where building culture is exhibited through the activities, application and sharing. In addition, it aspires to nourish those with help of training, research, practice, learning, innovation and exhibition. This plays a vital role to preserve and promote the uniqueness and identity of vernacular architecture and give essence of the lifestyle to them who are not very use to see it, also to them who grew with it but in a new form with interventions.

1.4 Given Programs and Functions

- A research zone
- A learning zone for sharing local building techniques and materials
- A Residential zone for the trainers and learners
- Public Space
- Office of the NGO
- Artisan working space

1.5 Objective and Aims

Objectives of the project are to

- Create a **Learning field** that will interest people to **explore** and **enrich** knowledge about traditional building materials and building techniques.
- **Restore** confidence of the rural people and make them decisive about their own buildings.
- Create an archive to **Develop, Organize and Preserve** the informal knowledge of building and its evolution.
- **Establish** an education system so that the artisan can develop their ideas, way of implementation.
- Architecture can create the **Bond** of the building culture of the countryside and the generally practiced culture of the urban oriented part. Thus, can create a **Learning field** interactive with exchange of knowledge.
- The project might help to bring to light the **Sufficiency** in each method of construction and further **Improvement** of skills with the help of training and promote the scope with inputs from the similar works of other places.
- Generate **Community Participation**; thus, remove doubt of a huge number of rural people who are not exposed to the potential of the available materials and techniques.
- Make an interactive platform in the community at the same time a learning hub and community center
- Self-realization.
- National and international **Participation** may help throughout the process.

Aims of the project are to

- Explore the morphology of vernacular architecture (Specially, **MATERIALS, CONSTRUCTION, TECHNIQUES, BUILDING TECHNOLOGY and CHARECTERISTICS**) and how it works.
- Learn the **evolution** of indigenous architecture.
- **Revive** the identical architecture, Explore for technological interventions
- Create an **international platform** of **sharing, learning and research** of diversified knowledge on the same topic.
- Get exposed to vernacular architecture and inspire practice help cultural sustainability and explore possibilities of this sustainable and environment friendly living.

1.6 Rationale

“The mother art is architecture. Without an architecture of our own we have no soul of our own civilization.”

-Frank Lloyd Wright

Architecture of a country holds much of the country's cultural history. In our country the most of the story of evolution is told only in the urban areas where the contribution and possibilities of vernacular architecture is overlooked. This phenomenon is resulting of minds shaped by urban thoughts which are the reason for rapid thoughtless urban growth in the countryside.

The village dwellers of Bangladesh misunderstand development with brick buildings when having ample opportunity of improving their indigenous materials. They are not confident about using their indigenous materials and technique as they are not assured of the durability. They tend to go with the brick-concrete culture which uses a lot of energy and resources and at the same time generates a lot of waste. It is essential to stress on technologies and materials that are not very energy consuming as well as recycle the waste our environment generates. The rural Bangladeshi needs to believe in their resources and techniques to utilize them for their welfare and uphold the essence of vernacular architecture and preserve it. Thus, the project is significant as it will create an arena where they will become skillful artisan, self-reliant and exposed. Then, again architecture can be very influential in deriving the aspiration for developing the indigenous techniques and materials which are losing with the popularity. Additionally, it is necessary to promote the strategies to enrich the knowledge the rural people already have and accomplish. This will make effective, ecologically sensible, culturally relevant buildings. It project is significant as it may have inputs from other improved technologies from other countries by international interaction.

A vernacular learning complex will establish an education system that will aid to realize potential of what is there in our backyard and regain lost confidence on the resources. Also, it will raise awareness and make informed and skillful artisan of the place for the place. It will also enrich the field by research, experiments, discussion and spread it by exhibiting the information.

1.7 Methodology

The data used in the report are mostly collected through first-hand study of the area. First-hand data are collected and explored from field research, interview, and group session with the client, area study. Other online researches are done to compliment and enrich the first-hand data. Figures are manually done from the understanding and some are collected from Google images and other desktop research.

Chapter 02: Literature Review

2.1 Understanding Vernacular Architecture

2.2 Influences on vernacular Architecture

2.3 Vernacular architecture in Bangladesh

2.4 Indigenous Materials and Building techniques.

2.5 Understanding Technology

2.6 Technology in Vernacular architecture

2.7 Understanding building Culture, Tradition and Sustainability

2.8 Understanding Learning and Research

2.9 Distinct a community learning center from a school

2.10 Sustainability through Community

2.11 Architectural consideration in Designing a Research and Learning Center

2.12 Deduction

2.1 Understanding Vernacular Architecture

Vernacular architecture is the category of architecture responding to the culture it belongs. It is a term used to categorize methods of construction which use locally available resources and tradition to address local needs. It may also be termed as folk, native, common, traditional, indigenous and popular architecture. It is the native architecture of a place or a group upholding its culture which evolves over time with the contents the local has. Vernacular architecture tends to evolve over time to reflect the environment, culture 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 current design.

Vernacular architecture reflects the historic, geographic, psychological, environmental, climatic, financial, economic, technological, cultural, typological, traditional, available aspects of its place. Vernacular architecture develops carrying out the theme of the place or group. This field of architecture does not include any professional skillful person on building art rather the people of the place. Mostly the buildings are residential building. The buildings make use of common regional forms and materials at a particular place and time based on local need. This is typically found to mix modest and unpretentious, traditional and modern styles, or a hybrid of several styles. Materials and techniques are based on the skill of the locals and availability.

"Folk building growing in response to actual needs, fitted into environment by people who knew no better than to fit them with native feeling"-Frank Lloyd Wright.

This architecture type transfers from generation to generation, time to time, and person to person. It evolves in accordance of need, innovation of materials; local improvement in technology and equipment but the cultural role remains the same.

"...a building designed by an amateur without any training in design; the individual will have been guided by a series of conventions built up in his locality, paying little attention to what may be fashionable. The function of the building would be the dominant factor, aesthetic considerations, though present to some small degree, being quite minimal. Local materials would be used as a matter of course, other materials being chosen and imported quite exceptionally."- Ronald Brunskill.

Though vernacular architecture is the architecture of common people but architect having building art training needs to study to do indigenous architecture of a particular place. He/she has to study on the culture, history, building materials, people, techniques, environment and every other aspect for doing indigenous architecture. It shows that the architecture belongs to the place and the place belongs to its indigenous architecture. For example, Hassan Fathy was appointed to design the town of New Gurna near Luxor. Having studied traditional Nubian settlements and technologies, he incorporated the traditional mud brick vaults of the Nubian settlements in his designs. The experiment failed, due to a variety of social and economic reasons, but is the first recorded attempt by an architect to address the social and environmental requirements of building users by adopting the methods and forms of the vernacular. The traditional architecture also does not guide to do vernacular architecture. Because, Indigenous architecture is based on tradition of the group or place but it is not the same as traditional architecture. Traditional architecture has elements of polite design: temples and palaces which would never be included in vernacular architecture.

Thus, only the place and its surrounding matters like culture, climate, and nomadic life, permanency of dwelling, environment, and people influence vernacular architecture. When locals customize architecture according to their very own issues starting from needs and covering every small instrument to lead life then it forms into vernacular architecture. No two vernacular architectures are same although can be similar.

The purest definition would be “Architecture without Architects”. It is nothing but pure response to a particular person’s or society’s building needs. It fulfills as it is crafted by the individual and the society it is in. In addition, the building methods are tested through trial and error by the society of which they are built until near perfection and tailored to the climate, aesthetics, functional and social needs of their given society. Because the person crafts the structure is the user, the architecture will be perfectly tailored to that particular needs. Function will be framed by the needs and aspirations, aesthetic will be out of the particular sense, climate and social needs will input to make a perfect one of the particular time.



Fig 01: A log cabin in the region of Kysuce



Fig 02: House in Brgule, Serbia



Fig 03: A post-world war II dwelling at the
big Pasture Plateau, Slovenia
Source: www.flickr.com



Fig04: A Mud kitchen, Bangladesh

2.2 Influences on vernacular Architecture

A good number of factors to influence on vernacular architecture of a place are there. Wide ranges of human led influences tend to guide the form, construction, materials. Even neighboring places may have completely different architecture in spite of all the variation there are similarity in the factors that influence it to be different.

Climate

Macro climate of the area is a significant factor to influence building orientation, materials, component, shapes, size, structure, construction methodology. Trial and error led it to a perfection level where the features differ in places of the neighboring villages as the temperature varies. The buildings of the places of higher temperature will insert more openings to its building mass to have a cross ventilated cooler dwelling environment. On the contrary, the cold places will have less to help prevent the temperature decrease due to outside factor. Rain, snow, precipitation influence the pattern of roof and plinth.

Culture

Ways of sleeping, cooking, eating, celebration, size of family, ways of interaction influences vernacular building. Separations of rooms, interactive spaces, habit or religion oriented spaces are results of these cultural factors. Again attachment or debouchment of these primarily divided functions is led by the cultural issues. Religious views, custom, belief pulls the factors to change a vernacular building in its appearance, function and aesthetics. Entry, orientation, shape are also customized according to the cultural factors.

Environment and Materials

Vernacular architecture is rich in using local materials available in the environment. Using resources from the environment without hampering it will be a sustainable form of building. Like where big trees are available will develop a wooden vernacular, where bamboos are available will develop bamboo interventions in buildings and good quality of soil may lead to mud houses.

Dwelling Duration

Permanent dwelling: When made houses for a permanent dwelling place more focus would be given on strong bonds between materials, durability of materials. Here durability and strength is given priority over the cost of the process. At the same time the architecture is subjected to serve the other climatic, environmental, cultural issues.

Nomadic dwelling: Houses of nomadic dwelling tend to have light weight, not so durable, low cost materials since it eventually to be shifted or changed. Notable is the significant impact of the availability of materials and the availability of pack animals or other forms of transport on the ultimate form of the shelters.

2.3 Vernacular architecture in Bangladesh

Building techniques, Local environment factors, privacy concerns of the people are cultivated through generations of experience and a keen awareness of Bangladesh climate and culture. This shaped the morphology of vernacular architecture.

Most of the compounds are their dream houses that the rural people build. To define the different arrangements of homesteads and the elements which define the spaces, the home is arranged to ensconce a central courtyard. The space is defined by a series of independent rooms set on plinths (to prevent flooding). Thick mud walls and overhanging terracotta, thatched and C.I. roofs (varies according to need of different) protect these spaces from the sun and rain. Surrounding foliage and woven bamboo and thatch screens dilute the sun's impact on the home.

Bangladeshi families are not the only inhabitants of these homes. A myriad of goats, hens, cows, dogs, and pigeons also share the space. This large variety of occupants

is facilitated by an equally diverse collection of goat sheds, rice storage silos, chicken coops, cow houses, and pigeon cubbies. These additional components are strategically placed to further define the boundary of the homestead and mediate space between neighbors incorporate what have gleaned from a modern interpretation of Bangladeshi vernacular architecture. The countryside show many of the intricacies of Bangladeshi living and the great variety of architectural pieces it comprises which really spark imagination with design concepts for the houses.

Homestead is arranged around a central courtyard; each homestead is linked by charming, narrow pathways between the buildings. There are three main types of Bangladeshi homestead groupings: the "L-Type", the "U-Type", and the "Parallel Type". The most important buildings are raised on the highest plinths. Plinth heights will also vary within the compound. Most village houses have deep verandas with day beds and chairs on them that the family uses as an outdoor, shaded room. During the day the verandah is used as a workspace. Women will do embroidery or shuck peas, men will repair fish nets or weave baskets. Rice is stored in these cylindrical huts or silos in the courtyard of the homestead. The silos are raised off of the ground to keep the rice dry. A Bangladeshi village toilet sometimes will be a brick structure that houses the squat toilet, but often it is just cordoned off with plants, bamboo screens, a fence made of dried banana leaves.

2.4 Indigenous Materials and Building techniques

The term indigenous building material describes the group of materials produced, living or existing naturally in a particular region or environment where it is to be used. Indigenous material belongs to the locality and is used in building with help of different techniques. These techniques are often grouped under the label "natural building," a building philosophy that relies on materials and techniques which are ecologically sound, culturally sensitive, reliant on local resources and skills, and are within economic reach of local inhabitants, many of whom cannot currently afford shelter.

Indigenous materials usage is more efficient if considered effort, economy and sustainability. It reduces human effort to transport materials from another place and deduct the transportation cost. Using indigenous materials has less negative impact on the environment and zero energy to produce. Along with sustainable features natural material, it can stimulate local people engagement in the whole process of produce, provide and use. So, it helps in local empowerment and economy.

2.5 Understanding Technology

The application of scientific knowledge for practical purposes in the accomplishment of objectives is technology. The human species use of technology began with the conversion of natural resources into simple tools. The prehistoric discovery of how to control fire and the later Neolithic Revolution increased the available sources of food and the invention of the wheel helped humans to travel in and control their

environment. Technology has many effects. It has helped develop more advanced economies (including today's global economy) and has allowed the rise of a leisure class. Many technological processes produce unwanted by-products, known as pollution, and deplete natural resources, to the detriment of Earth's environment. Various implementations of technology influence the values of a society and new technology often raises new ethical questions. Examples include the rise of the notion of efficiency in terms of human productivity, a term originally applied only to machines, and the challenge of traditional norms.

2.6 Technology in Vernacular architecture

Various technologies as can be seen in vernacular architecture especially in traditional buildings and the ways and means to have those technologies applied to the design. It is stressed that the vernacular technologies have been devised uniquely to the region where people lived to cope with the severe climate by inventing various devices without resorting to fossil fuels, thus the form of vernacular architecture representing regionalism of their own. For example earth sheltered buildings corresponds to thatched roof houses where evaporation from the wet surface gives rise to cooling effects in hot and humid climate. The optimum shape of sun shades is devised to a given orientation so that it allows the air to flow through for making ventilate cooling effective. Direct solar heat gain as representing a passive solar system is no less than fundamental for both vernacular and modern architecture with most appropriate design of geometry associated with wall orientation. Various suggestions are given for architects to consider how to apply vernacular technologies to the design of modern architecture.

2.7 Understanding building Culture, Tradition and Sustainability

Buildings culture of a place is tradition from one to other generation and depicts specific time. Building culture develops from the lifestyle of the people of the place and becomes tradition when replicated farther. Building organizational culture stimulates both creativity and innovation which comes from the core of traditional thoughts. How the building looks shapes or oriented are stories of inherent traditional belief with touch of climatic adaption which also associates with how its people are cultured to deal with it.

Preservation of traditional building will ensure cultural sustainability at the same it with saving the natural process of building, story of evolution. Building culture involves the materials, who grows them and, treatment process, techniques, tools used, who makes the tools and how and many other. This shows the integration and involvement of each people associated with the culture and carrying the tradition from specific time to other. The interrelated activities are the aspiration to ensure cultural sustainability.

“Awareness is the silent and choice less observation of what is; in this awareness the problem unrolls itself, and thus it is fully and completely understood. A problem is never solved on its own level; being complex, it must be understood in its total process.” - J.krishnamurti

2.8 Understanding Learning and Research

Learning is a process of acquiring knowledge, skills, values, preference that brings relatively permanent change in action. Learning can refer to reinforcement, modification of prevailing skills, knowledge, values. Formal or practiced way of learning and informal way of learning can be distinguished by how knowledge is acquired and in what conditions. The act of learning associated with experiencing, observing for both formal and informal type of learning. In formal learning one has a limit to learn a dedicated amount of knowledge or skills but informal learning facilitate gaining knowledge to wider extend for the specific purpose. Informal learning relates with field of interest and can offer lifetime urge to know about a sector.

Research is systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions as well to describe, explain, predict and control the observed phenomenon. Research is associated with exploration, fact-finding, analysis and probing. Research about a particular area enriches its appendix and stimulate further arena of research on similar topic.

Learning and research on associated topics of vernacular architecture can build up new possibility to add to this already rich arena. Doing research based work will explore for new dimensions of the topic and bring out possibilities to enhance and popularize the learning of this unlearnt knowledge. Also, the topic would be brought to light for those who are not known and list bothered about the development of traditional building craft including who are used to experience it and who are not.

2.9 Distinct a community learning center from a school

A community learning center and a school has notable differences in their way to function, formulation, formation, target group, focus, duration, procedure and other aspects. The most distinct aspect of a community learning center to a general school is the informal approach to go close to the general community and develop their life-style. A community learning center grows focusing only to the specific community's needs and evolves according to response. Such a learning center can become a cultural hub, a meeting place, interactive space within the community to serve a breathing space for the community.

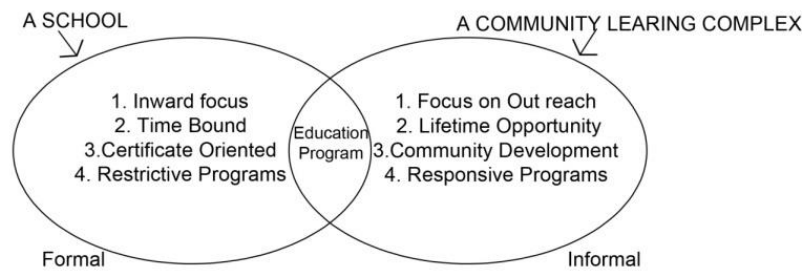


Fig05: Distinct Between a school and community learning center; Source: Aneeka Habib, 2016

2.10 Sustainability through Community

When shown to a community its potential in easy-doable matters, they will become the foremost people to uphold it, nourish it, and bring forward in more fruitful way. Also, community participation is valuable because, they are the people to find their problems, become the power and be the solution. The benefited society with the sustainable approaches will generate more stimuli to encourage the empowerment of the community people.

Community participation will encourage the people to hold the trend to work for their own welfare, development of the community and its economic condition with the very native and locally available resources. People will develop skills and become artisan who will gain expertise at what they do.

2.11 Architectural consideration in Designing a Research and Learning Center

A learning center encourages much of interaction between participants, instructors, guests and the associated people over there. Thus, compulsorily the center has to accommodate the scopes to hold the interaction and gathering in desirable spaces to do so. Architecture comes to the assistance in this fact to create the ambience.

Learning through books, articles might not affect everyone effectively. In such cases architectural space might help to create a journey which gives experience and through conditioning one can learn. This learning process is focused mostly the proposed center. More practical training and skills development will play important role to the verge of losing its character of being naturally built community.

Incorporation of complete open spaces, semi open spaces with the gathering and working court and shaded corridors in between them as thresholds will create delight to experience the journey through the building. The Building itself is an exhibit of the

potential of the indigenous building materials and the innovative, creations, the techniques. The journey breaks into relaxation spaces, tea stalls, and terminates to an important part of the project the botanical garden. Architecture plays a vital role here to design the informality and give the feel of vernacular.

2.12 Deduction

The learning and research center will incorporate the features of production house of the building materials (tile and blocks mainly) with mud and treatment plant for bamboo, a work station for the NGO “SAFE”. It will be a learning field for people interested in building crafts and the process .The center will have the character of an interactive ground for the community people and for its guests having exhibition space, multipurpose hall and other support functions. The project celebrates the local building craft so it requires having certain aspects that makes it culturally relevant, self-sustained and adaptable. The center will also have library, labs, soil-arium and research section to foster learning and further development of the sector.

Chapter 03: Contextual Study

3.1 Architectural Character of the Area

3.2 People

3.3 Availability of the materials and craftsmen

3.4 Possibility for such a center

3.1 Architectural Character of the Area



Fig 06: Local architectural character; Source: Aneeka Habib, 2016

Defining an architectural character of an area is seems difficult as a huge number of factor influences the typology more than a location. In a same territorial area materials are seem to be similar in rural Bangladesh but the character of each building may differ because, these buildings are more traditional need driven than locally identical. Choice of materials depends on the owner's preference than appropriateness, yet both preference and appropriateness can merge.

At Dinajpur, Particularly in Sundarban village, almost all the buildings are the houses till the eyes goes. There are very few community houses, school and other structures having similar type of characteristics. In the midst of lush green agricultural lands and diversity of trees some small areas are occupied by the farmers as to settle their houses. Different types of settlement are present molded by the need for life and living. Kaccha, Pucca, semi-pucca houses are seen according to different perspective, perception and affordability of the owner. In most of the houses made of Mud, brick, bamboo are used ase the wall and plinth materials, Bamboo, timber as structure, Clay tiles, thatch, C.I sheet is used as roofing.

3.2 People

The people in the discussed context are hardworking, Survival Skills, expert in building mud and bamboo houses. Mostly earns by agriculture, fishing, building craft, other crafts, shops, and small business. Negative point to be noted that, they are way too over attracted to and influenced by the surrounding progress that are not always appropriate for them. Thought this characteristic can be used as shield to tend them to the appropriate, achievable and affordable progress by building an exemplar to serve them a model for future development.

3.3 Availability of the materials and craftsmen

Bamboo and earth is very available materials of the place. Bamboo is cultivated and grows naturally here. It almost ever needs a distance to go to carry bamboo for one place to another. Also bamboo is very light weight to carry hand to hand.

The people are also very use to building from bamboo, they knows few techniques which needs improvements for making durable houses. The craftspeople are pretty good at making mud houses. These people might become assets for the community

with help of the vernacular learning complex by improving their skill and knowledge to contribute to the advancement of rural architecture in vernacular level.



Fig07: Bamboo garden near the site; Source: Aneeka Habib, 2016

3.4 Possibility for such a center

In the context of Dinajpur, where there is ample growth of a sustainable & versatile material, bamboo and availability of earth with potential of different building experiments, additionally having qualified craft people known of indigenous techniques, is a very relevant place to establish such complex where the indigenous materials and building techniques will be cultured to establish its inevitable stand in the field of architecture as same as other domain of architecture. It will play vital role for the rural people only not by generating awareness but establishing a ground for making their own identical building they dreamt of but had not been fulfilled because of their ignorance to some simple techniques that could have made their effort less and saved resources and energy. Illustration of the practicing process will help to comprehend better and adapt undoubtedly. The learning complex will enhance the expedient to opportune the rural people celebrate the vast possibility lying in the materials growing around them with just a few improvement in techniques. A building made with the local materials inputting technologies could make a prototype for future building development. Thus a complex like this can discourage thoughtless imitation of urban building culture in rural neighborhood and facilitate a sustainable future in easier, hassle free achievements coming from the core of the rural culture.

Chapter 04: Case Study

4.1 Introduction to Case Studies

4.2 Cases (International)

4.3 Cases (Local)

4.4 Philosophy and Ideology

5.1 Introduction to Case Study

The chosen cases are successfully functioning projects and are selected considering the possibilities concerned with such center. There are Projects from the country, region and abroad in the paper to inquire the issues vary because of the site and the context. To open up the scope and possibility for the vernacular learning center, these cases facilitate the factors to develop the programs, their arrangement, and simultaneously the focus of the project that is to explored materials and technology usage similar to the context in the particular cases. This paper includes the cases that correlate opportunities, objective, and ideologies that are beneficial to inspire in developing the procedure. Whereas, some cases directly relate to the objectivity of the center and others concerns the essence.

4.2 Cases (International)

4.2.1 Hunnarshala Office Campus, Bhuj, Kutch, Gujarat, India



Fig08: Hunnarshala Foundation; Source: Vermani.S. (2014). Innovative Traditional system.architecture+design

Fact File

Typology: Office Campus

Location: Bhuj, Kutchchh, Gujarat, India

Architects: Hunarshala Foundation, Bhuj

Design team: Inputs from innumerable architects

And artisans were assimilated.

The design was orchestrated by Kiran Vaghela

Constructors: The artisans of Hunarshala

Status: Built

Built up area: Covered area: 845sqm;

Semi-covered area: 345sqm;

Landscaped area: 1170sqm

Project cost: 8000000 (till date)

Project duration: 2 months

Main Programs:

- Development and Research center
- Project management
- Design studios
- Karigarshala
- Workshops: Ozari, Carpentry
- Laboratories: Structural, Environmental
- Office: Director, Admin and Accounts
- Caretaker's Shelter
- Artisan's working space
- Parking, Store, Pantry

Hunnarshala Foundation is a craftsmen based local research center situated in Bhuj in Kutch district of Gujrat state in western India. Hunnarshala practice was born with the earthquake in Kutch in 2001. Since then the foundation supported the post disaster rehabilitation efforts all over the world. It also gave the opportunity to

discover the rich living building tradition of artisans and their community. It facilitates innovative traditional system to establish social sustainability. The foundation works for improving self- sustaining housing for the poor, favor artisans involvement in mainstreaming buildings and promotes local eco-friendly and cost-effective materials and technologies like earth, bamboo and sewerage recycling. It helps empowerment of the community and train artisan along with establishing policy for government. This is a nugget building in Kutch of knowledge, a skill and sometimes the artisan themselves from all over the world.

The **core activities** of Hunnarshala foundation:

Community Empowerment

Hunnarshala Foundation has contribution in using green approaches and technologies with the available materials in large scale such as mass housing and city level. They encourage the community to participate in reviving the tradition of building technology and materials. Hunnarshala has collaboration with its sister organizations to get inputs particularly on water, renewable energy, bio-diversity, etc. The foundation makes effort to empower both the rural and urban community.

Rural Community: Rural community empowerment conducted through the projects of Hunnarshala. Shaam-e-Sarahad village resorts, Kachchh earthquake reconstruction, Kosi flood rehabilitation, Indira Awas Yojana are rural development project which has contributed to the innovation in long-lasting and multi-hazard proof affordable technologies.

Urban Community: Urban community development and sewerage recycling are urban development programs of the foundation.

Artisan Empowerment

Artisan Enterprises: For promoting artisanship, Hunnarshala Foundation work with master artisans in developing the green potential of a traditional technology and adapting them into a product for the contemporary market. The artisans are equal partners in this design and research exercise. They demonstrate the proof of concept by using these technologies in the projects we execute and we encourage artisan collectives to take the product to market on their own. Layers, Wood Grains,

Mathachhaj, Span, Lustre are companies specialized in the particular fields of construction. Hunnarshala helps these companies at every stage from providing formal training to providing design support for projects, to financial, accounting and administrative as well as legal support.

Technology Intervention: Hunnarshala works with different stakeholders where the artisans interact with various architects to develop design details and technological interventions. Constant innovation driven by debate is the cornerstone of the working philosophy of Hunnarshala Foundation.

Hunnarshala Foundation Campus: Technological interventions are experimented and made unique for that material in term of technique used.

Khamir craft facility: An important innovation that was done at this campus was that the walls on the 1st floor were made with Wattle & Daub panels. These panels were plastered with lime. On the ground floor all the construction is rammed earth.

Restoring the heritage mud forts of UAE: The project illustrates the value of a master artisan and the role he has to play in the conservation of heritage that made it important for Hunnarshala Foundation. It corroborates the Foundation's core belief that there is immense value in conserving our traditional knowledge.

Karigarshala (Artisan School)

Hunnarshala Foundation's permanent projects are an education initiative as well as an entrepreneurship incubation cell. A Karigarshala or artisan school where dropouts from the formal education system aged between 16 to 18 are trained in carpentry and masonry. At the end of their yearlong training, they are helped them find work as artisans. In the absence of such training, they would be relegated to being unskilled migrant labor. Strengthen the artisan to use the resources and make them work as their culture demands additionally sustainable and time tested approaches with that. This empowerment helps the whole community as what they are doing is not individual achievement but the whole community. Hunnarshala helps the community to get together and educate, promote & motivate the skilled and passionate artisans about the different techniques.

The campus:

The Hunarshala campus building was completely an evolving structure itself. It was designed with a sole reason to demonstrate all the alternative constructional technologies they excel or research in construction practices such as stabilized rammed earth construction, Space frame systems, Thatch installation, wood roof understructures & CSEB. It was designed to create a platform for the artisans and professionals to support their curiosity to learn and share the knowledge. The whole project was treated like an experiment to adapt the techniques they have researched or excelled and check the performance of the same. The material from the old building was recycled and used in the new building. Hunnarshala's office became a symphony of discovery of sustainable building practices taken from various traditions. Also it gives guidance to the principals of new construction. Some of the features that contribute to the design of the Hunnarshala Foundation campus that also contribute to the ecology of the whole campus and also sustainable practice for the society

Weaving reeds around bamboo strip: The women from Mughal community learnt this Indonesian thatch technique to make independent panels that can then be put together on the under structure to create thick, beautiful and long lasting roofs.

Space frame: Wood was traditional roof material to use as structure under the roof sheet. Post the earthquake (2001) space frame was introduced by simply bolting pipes together to stop wanton cutting of thorn forest. This 'Span' now provides service to iconic buildings with large shelter and post disaster shelters.

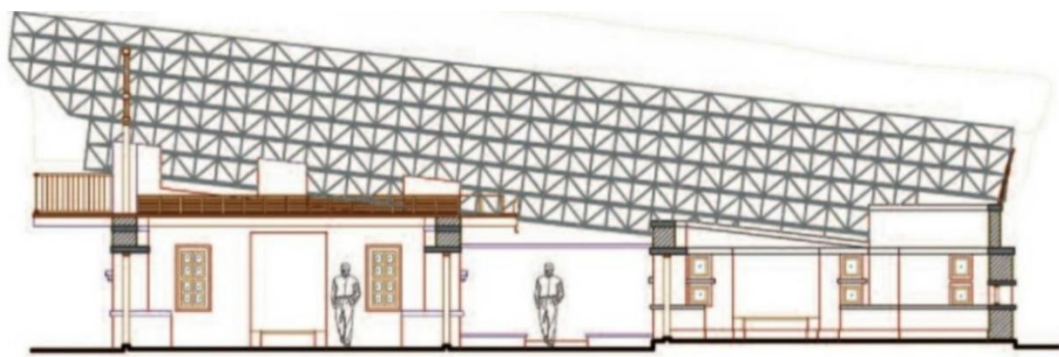


Fig09: Section showing space frame use; Source: Vermani.S. (2014). Innovative Traditional system.architecture+design

The Rammed earth walls: Done by a migrant labor who provides his expertise in prestigious restoration projects on UNESCO sites in UAE.

Stabilized earth blocks for tsunami reconstruction

The **functions** are all focused to achieve the reality of the goals.

Karigarshala: it is a training facility center they educate, promote & motivate the skilled and passionate artisans about the different techniques developed by Hunnarshala. It was designed by the foundation and was constructed by the artisans and its students.

The artisan school: the school provides an environment where the students gets an opportunity to interact with visiting students of architecture, engineering, fine arts etc. the team involved in this program ensures that education for these student's means providing an overall exposure to become accomplished "Karighars" and future entrepreneurs of the specific trade.

Laboratories: an archive to test adapt, confirm the traditional materials and their technologies. Also soil from every place the India where they have worked are collected, tested, and the information are displayed in the soil-arium in the laboratory.

Project analysis

Inspiration part: The most significant part for choosing this case is the objectives, goals, work of the Hunnarshala Foundation being similar and inspiring for the project (vernacular learning center) with proper combination of programs and them working effectively. This inspires making a vernacular learning center particularly in Bangladesh where most of the Much of the vernacular built tradition uses earth and bamboo as building materials. Moreover, we see a successful amalgamation of idea and that being made up to work effectively in our neighboring country.

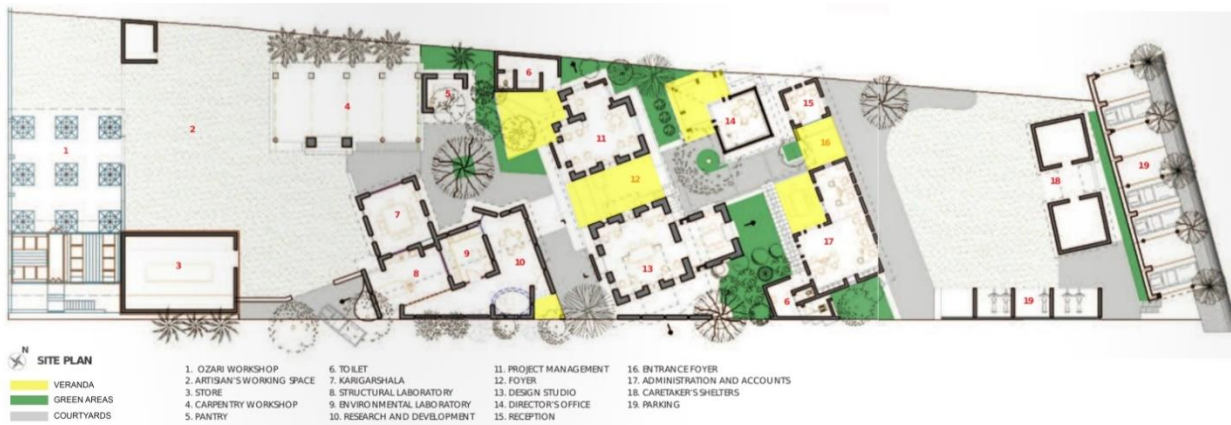


Fig10: Plan analysis of Hunnarshala Foundation; Source: Vermani.S. (2014). Innovative Traditional system.architecture+design; edited by, Aneeka Habib, 2016

Plan Analysis:

- The plan of Hunnarshala reflects and represents the traditional design aspects. Features rooted on tradition like, Courtyards, verandahs, and other features that also helps passive solar cooling to respond to climatic needs and adds traditional vocabulary to the design. The materials and technologies are promoted and used by the foundation includes lime, earth, thatch, country tiles along with roof water harvesting, and decentralized waste water recycling.
- Landscape perforates the buildings in a perfect manner to make the campus potent of holding public gathering with full of campus activities.
- Scattered functions surrounding the landscapes a guideline to the journey inside the space of the campus. Also the functions influence outdoor activities along with indoor which helps in the process of sharing.
- One big open space is left space for the artisan to work,
- The materials and technologies used in the building campus are i.e lime, earth, thatch, country tiles along with roof water harvesting, and decentralized waste water recycling. Hunnarshala Foundation works with stabilised and non-stabilised mud blocks, rammed earth, wattle & daub and adobe.

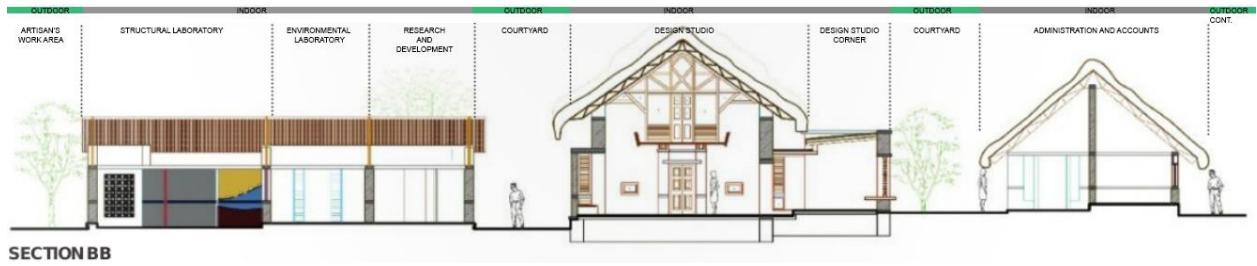


Fig11: Section analysis of Hunnarshala Foundation; Source: Vermani.S. (2014). Innovative Traditional system.architecture+design; edited by, Aneeka Habib, 2016



Fig12: Images of Hunnarshala Foundation spaces; Source: Vermani.S. (2014). Innovative Traditional system.architecture+design; edited by, Aneeka Habib, 2016

4.2.2 Residence in Bali Indonesia



Fig13: Residence in Bali; Source: www.panoramio.com

Fact File

Typology: Family Home

Location: Bali, Indonesia

Design: Elora Hardy

Constructors: The Bolognese craft people

Status: Built

Built up area: 3500 SFT

Project cost: \$ 500k

Main Programs:

- Bed rooms
- Toilet
- Kitchen
- Living

- Work area of the owner

This building is a private four bedrooms family home on the tropical island of Bali Indonesia. It was built for real-state CEO Peter Burge and his wife who are the first owners to build home in the green village. Set alongside the rushing Ayung River, the Green Village rises out of the lush jungle in Sibang, Bali. This village of 18 homes provides luxury without the guilt, as the properties are all crafted from sustainably-sourced bamboo. The Green Village consists of 18 homes priced up to £1.2m built from locally sourced bamboo around a communal center. These homes stuck into the jungles look like something out of a fairy tale. Specifically this house from the sustainable homes in village is designed after the shape of a lotus flower. It is five-star living with vast spiral staircases, bridges and stunning sloping roofs. The building is designed to have shoring roof light, few walls or windows, everything fashioned from bamboo. To consider it's practicality, bugs, gecko stays around with the home dwellers. The house is not vulnerable to earthquake as it gently shifts during earthquake to save it ad it's people. The designer wanted the home to be cathedral of building green and it will inspire people by bending and blowing mind with bamboo.

"This house is made of grass that can grow in few years. You can build something that is magnificent, exiting and can blow people's mind and yet it's just grass"

- Elora Hardy, Ibuku founder

Project Analysis

Materials: The whole six storied building is made out of bamboo using it's versatile, light weight nature. Bamboo bending, curving, etching, connections are used to have a huge house (vertical). For air conditioning of the house, finish floor, roof, beams, floors, railing, furniture everything is made of bamboo using different techniques by the Bolognese craft people's experimentation.

Structure: The structure of the building uses the bamboo like in nature as element of it which made it look like growing around but at the same time it carries the load to the six-story

Space quality: The home has all the facilities like a modern house additionally with less windows and walls to let the nature in which made wallpaper with the nature to the home. Using natural light through shoring roof light, holding wild life makes the building better a place with no complain from the client.

Air Conditioned bed: Since there is no window, there rise the question of comfort as it gets hot in summer in Bali. The designer came up with an air conditioned bed. Air is piped through bamboo post to cool the bed that is wrapped in mosquito net at night. This process is run through a bent bamboo pole over the bed.

The vision of the designer is spoken in the quote,

““There was a time when you could not be poor enough, or rural enough, to want to live in a bamboo house”



Fig14: Images of residence in Bali; Source: www.panoramio.com

4.2.3 Suoi re Village Community House, Vietnam



Fig15: Suoi Re village, Vietnam; Source: www.archdaily.com

Fact file

Architects: 1+1>2

Location: Suoi Re village, Luong Son, Hoa Binh province, Vietnam

Architects: Hoàng Thúc Hào, Nguyễn Duy Thanh

Architects and Investor: 1+1>2 Group

Project Year: 2010

This community house situates in a place where people don't have time for education, cultural and spiritual developments of their own as well as their children's. Where people get exhausted to earn their bread, a spaces for communal activities, kindergartens, health care stations, post offices, libraries seem to be luxuries. Besides, the increase gap between urban and rural areas due to the urbanization and the economic development has made the social relationship increasingly loose

and be in danger of disintegration. In this context, the multifunctional community house was made and it leans on the mountain avoids storms, flash floods and faces towards the valley.

Project analysis

Materials: This community house is made out of bamboo, earth, stone, palm leaves but it's efficiency of space and the utility of each element made air, wind, sun, jungle sounds elements of the building which is very importance and enjoyable for the villagers to strengthen the bonds of community, contributing to consolidation, maintenance and development of regional identity. This is a direction, can take the experience and replicate the model for rural midland area.

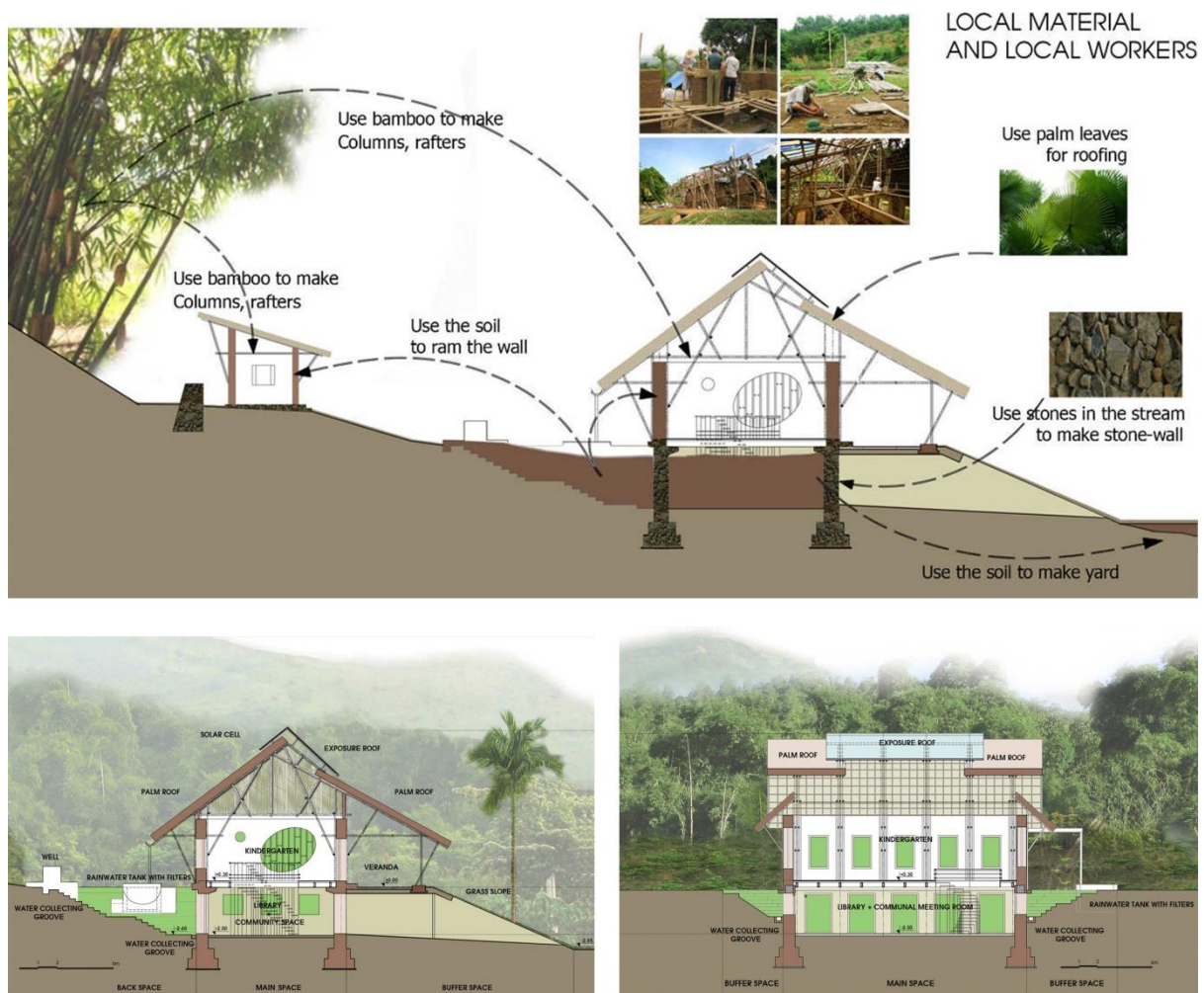


Fig16: Sections showing materials use; Source: www.archdaily.com

Structure: Simple idea that follows the principal “unity in diversity contrast” comes out to be very economical, achievable and with local materials. Ground floor is made

of rugged-stone wall, bamboo doors, fine-bamboo ceiling those make people feel warm and balance in the house. Upstairs is made of brown and smooth rammed-soil wall with heavy stones beneath, bamboo frames, palm leaves roof. Solar cell system, filter rainwater collection tanks, geothermal, monsoon, power-saving LEDs, five-compartment septic tanks which is not polluted. They are the test solutions of green architecture, energy efficient and friendly environment.

Space Quality:

CONTINUOUS CHAIN OF SPACE

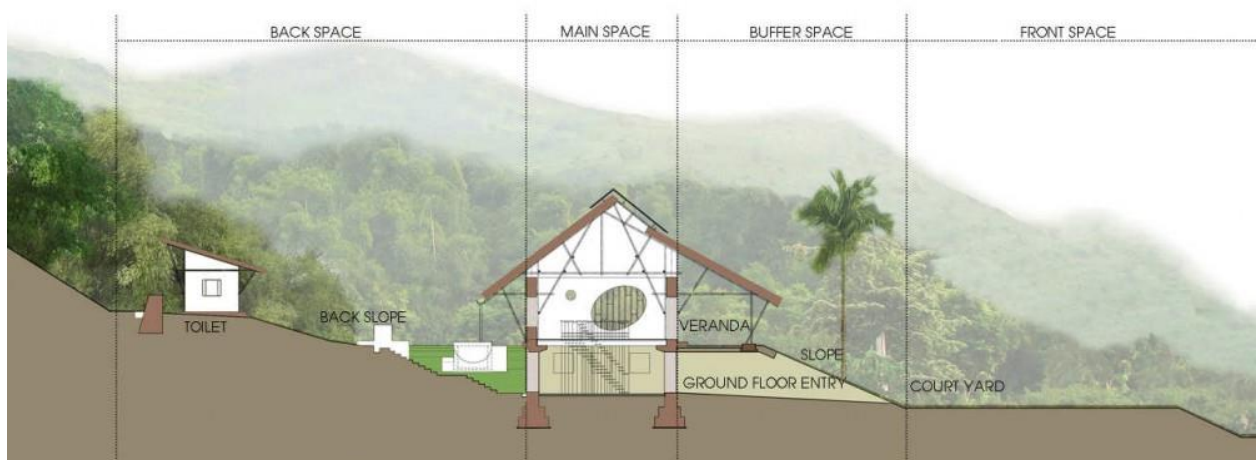


Fig17: Sections showing space use; Source: www.archdaily.com

The overall spatial structure is organized in a chain. Front space is the open courtyard, where holds the outdoor activities. The main living space lies in the middle part, consisting of two floors. A convection wind tunnel, the ellipsoid open space, the grass steps, slopes taper, exposure roof make all those connect with the front and the back, the interior and the exterior, the upstairs and the downstairs, creating a continuous chain of open space. Ground floor: Ground floor is designed to fit the concave slopes, utilizing geothermal. Space leads to the mountain and bamboo forest. On the ground floor, villagers gather, doing the sidelines. Especially, young children and the elderly may be staying here during the very cold or hot times of the years.

Upper Floor: Upstairs is a kindergarten combining with library, meeting area and the function interlocks flexibly. Wide veranda with lawns acts as a green cushion with high visibility.

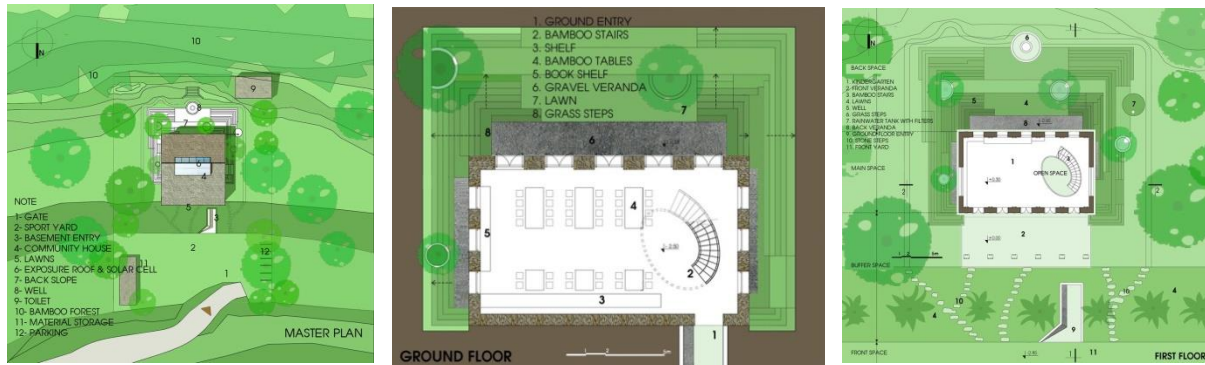


Fig18: 1. Master Plan of the Community house, 2. Ground Floor Plan of the Community house, 3.

First Floor Plan of the Community house; Source: www.archdaily.com

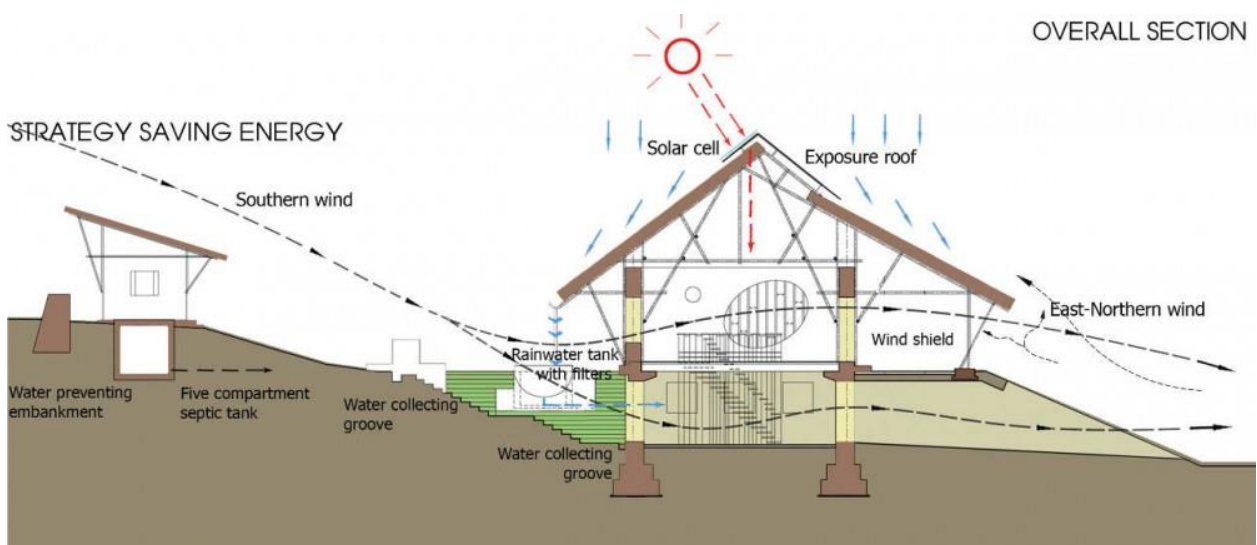


Fig19: Section of the community house; Source: www.archdaily.com

Climate and Context responsiveness:

- Ground floor placement on concave slope avoids east northern monsoon (which is very dry and cold in the winter) and collect east-southern monsoon (that makes the house warm in winter and cool in summer).
- The majority Kinh people and the minority Muong people have lived in harmony in the land of acculturation for a long time. Therefore, morphological of the house has inherited the structure of five-room traditional house of Kinh people as well as traditional stilt house of Muong people.

4.3 Case Study (Local)

4.3.1 METI_ Handmade School at Rudrapur, Dinajpur, Bangladesh



Fig 20: METI School; Source: Aneeka Habib, 2015

Fact File

Typology: Primary School for 168 Students

Location: Rudrapur, Dinajpur, Bangladesh

Design and concept: Anna Heringer

Technical, Detailed planning and Realisation: Anna heringer and Eike Roswag

Status: Built

Structural Engineering: Ziegert Roswag Seiler Architekten Ingenieure
Bürogemeinschaft

Client: Dipshikha/ METI non-formal education, training and research society for village development

Construction: Dipshikha/METI (Modern Education and Training Institute) with local labourers and own training workshop

Built up area:

Foot Print Area: 275 sqm

Area: 325 sqm

Project cost: \$ 22,835

Project duration

Commission: January 2004

Design: March 2004 – august 2005

Construction: September 2005 – December 2005

Occupancy: December 2005

Main Programs:

Additional Classrooms for the Dipshikha School

The METI Handmade School is a primary school for 168 students located in Rudrapur in northern Bangladesh. The project's main strategy is to communicate and develop knowledge and skills within the local population so that they can make the best possible use of their available resources. Historic building techniques are developed and improved and the skills passed on to local tradesmen transforming in the process the image of the building techniques using traditional materials, primarily mud and bamboo. The intension was to inform the rural people the potential of the indigenous materials and change perspective toward the traditional techniques. Combination of traditional building knowledge and experiment to strength them not only allowed cooperation between architects, craftsmen, clients and users but also made it an example of unique and sustainable practice. With the architect's strategic approach the project has got some architectural vocabularies that made the project exceptionally influencial for the people of Rudrapur. This project received Aga Khan Award in 2007 for the beautiful, simple, humane and sustainable approach.

Project Analysis

Materials: The building reflects the different properties of the materials used. The traditional local materials are bamboo for constructions and earth for walls and foundations, straw for the roofs and jute rope for lashing constructions.

Building technology:

Earth Construction:

The construction method used is a historical earth building technique similar to cob-walling which is ideal for 'self-building'. The wet earth is mixed with straw and applied to the wall in layers. Each layer is approximately 50-70 cm high, and after a couple of days drying, it is trimmed on the sides with a sharp spade to obtain a regular flat wall surface. After a second drying period, a further layer can be added. The earth in this region is well-suited for such construction and the stability of the mixture was improved by adding rice, straw and jute.

Brick foundations were used to minimize the effects of moisture on the earthen walls. The notable advances made improvement in the use of local materials were the introduction of a damp-proof course and a brick foundation as well as the addition of straw to the loam mixture of earth and water. The traditional building technique (which uses very wet earth) has been replaced by the 'weller' technique that is quite similar to the traditional one. The bricks used for plinth were made by local craftsmen while the remaining construction work was a collaborative effort by the architects, teachers, students and locals.

Bamboo Construction:

The architects developed a design based on regional construction methods but introducing new approaches for efficiency and structural integrity which resulted to add a second story to the building with improvement to the bamboo structures and lashing. In regard to the use of bamboo, a layered ceiling of bamboo sticks, bamboo boards and earth, and in building the first floor walls and roof with a frame consisting of beams with four layers of joined bamboo sticks and vertical and diagonal poles are major progresses made in constructing. The ceiling consists of three layers of bamboo poles arranged perpendicularly to one another with bamboo boarding and

an earth filling as the surface of the floor. The same construction in a modified form can be used for general residential buildings.

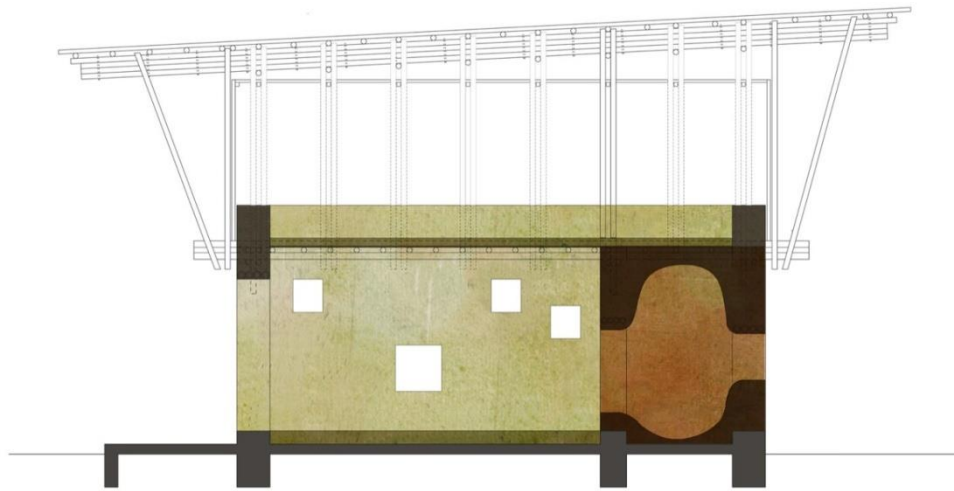


Fig21: Section showing the construction in brief; Source: www.archdaily.com

Colorful textile hangings, bamboo cane latticework for shading creepers, as well as a greened roof are some of the additional features used to create a comfortable indoor room climate.

Space quality: The philosophy of METI (modern education and training institute) is learning with joy. The teachers help the children to develop their own potential and use it in a creative and responsible way. The building reflects these ideas through its materials, techniques and architectural design. The European team joined forces with members of the local community and started an important development process for an essential sociocultural infrastructure of popular community centers. The typically local, threefold hybridity of this new building type that includes room quality, construction typology and materiality is based on a transfer of technology, knowledge and experience from various cultural regions and climate zones in Europe and Asia.

Ground floor:

On the ground floor with its thick earth walls, three classrooms are located each with their own access opening to an organically shaped system of 'caves' to the rear of the classroom. The soft interiors of these spaces are for touching, for nestling up against, for retreating into for exploration or concentration, on one's own or in a group. These molded 'cave spaces' are an area to retreat into for contemplation and

concentrated work. Additionally these 'cave spaces' located on the west side of the building help absorb the sun's heat during the afternoon. Openings (doors and windows) are on all the walls at the ground floor that helps better air circulation. Also the solid mud walls on the ground floor form closed, darker and cool rooms.

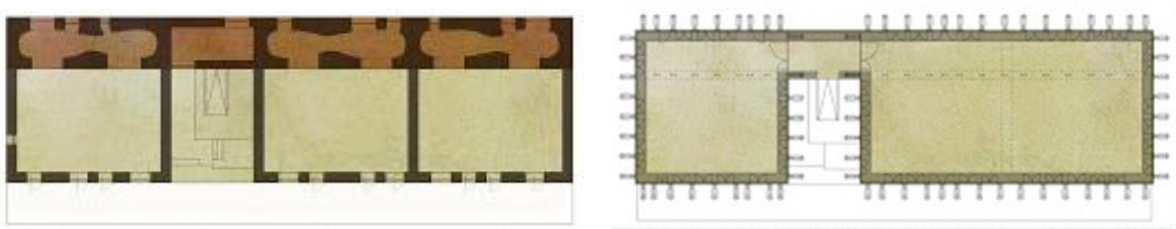


Fig 22: Plan METI School; Source: www.archdaily.com

Upper floor:

The light bamboo structure of the upper story creates bright, ventilated and extroverted rooms. The space is by contrast light and open, the openings in its bamboo walls offering sweeping views across the surroundings, its large interior providing space for movement. Bamboo material on the upper story filters day light and increases air flow and the metal roof has been lifted above first floor ceiling to help allow hot air to escape. The view expands across the treetops and the village pond. Light and shadows from the bamboo strips play across the earth floor and contrast with the colorful materials of the saris on the ceiling.

Finishes and fittings: The exterior surface of the earth walls remains visible and the window jambs are rendered with a lime plaster. The framework construction of the green façade to the rear is made of bamboo canes seated in footings made of old well pipe and with split horizontal timbers as latticework. The interior surfaces are plastered with a clay paster and painted with a lime-based paint. The 'caves' are made of a straw-earth daub applied to a supporting structure of bamboo canes and plastered with a red earth plaster. The upper story façades are clad with window frames covered with bamboo strips and coupling elements hung onto the columns of the frame construction. A fifth layer of cob walling provides a parapet around the upper story forming a bench run- nine around the perimeter of the building and anchoring the upper story frame construction and roof against wind from beneath. A textile ceiling is hung beneath the roof is lit from behind in the evening. The cavity behind the textiles ventilates the roof space. (From the architect)

Exemplary nature, transferability, follow-on projects: School handmade showcases the potential of good planning and design, from the arrangement of the building on the site to the realisation of aspects in detail. Furthermore it demonstrates the possibilities of building with earth and bamboo using simple methods as the continuation of a local rural building tradition and can serve as an example for future building developments in the area.



Fig 23: METI School Exterior; Source: www.archdaily.com



Fig 24: Interior, Exterior, Construction detail; Source: Aneeka Habib, 2015

4.4 Philosophy and Ideology

4.4.1 Auroville City

Auroville is a universal township in the making for a population of up to 50,000 people from around the world. The concept of Auroville is an ideal township devoted to an experiment in human unity since the 1930s when the idea generated. The purpose of Auroville is to realize human unity in diversity. Auroville is recognized as the first and only internationally endorsed ongoing experiment in human unity and transformation of consciousness, also concerned with - and practically researching into sustainable living and the future cultural, environmental, social and spiritual needs of mankind.

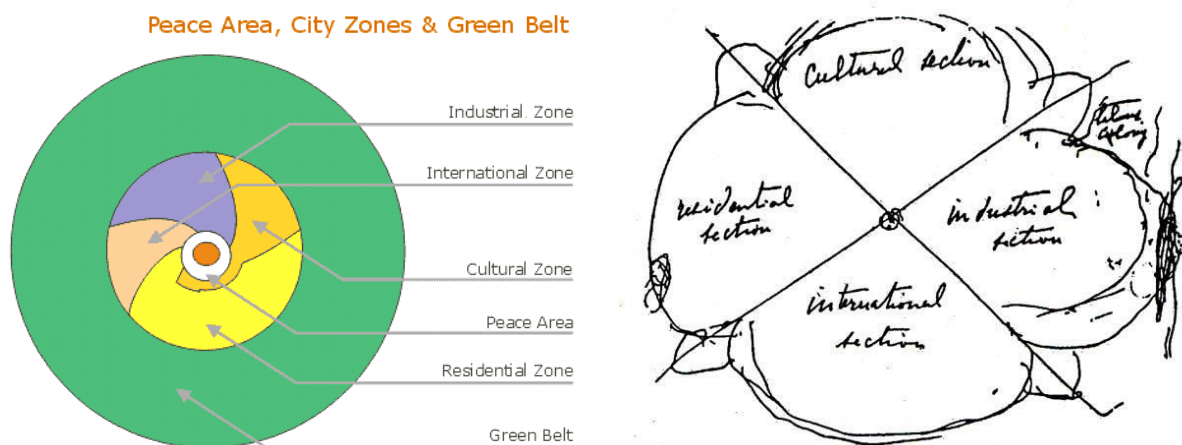


Fig 25: Auroville city layout and its initial sketch; Source: <http://info@aurville.org.in/>

There are segments of Auroville's Building Techniques & Research unit such as Auroville earth institute, Auroville building Center, Experimental construction, Thatched roof, Ferro cement and vermiculite, Roofing techniques.

The Auroville Earth Institute (AVEI), already known as the Auroville Building Center/Earth Unit, was established by HUDCO, Government of India, in 1989. The previous building focus dynamically advanced and took the name of the Auroville Earth Institute in 2004. The Earth Institute likewise offers customary instructional classes that have been gone to by a huge number of understudies from 76 unique nations since 1989. The Auroville Earth Institute has ended up one of the world's top communities for incredibleness in earthen engineering, working in 35 nations to advance and move information in earth design. The work of the Earth Institute has endeavored to resuscitate customary abilities and to connect tribal and vernacular

conventions of crude earth development with the cutting edge innovation of balanced out earth. Packed Stabilized Earth Blocks (CSEBs) are made in a manual press (composed and produced in Auroville) utilizing a blend of earth with 5% bond. A portion of the benefits of utilizing CSEBs for development are that they can be made nearby and their assembling needs a great deal less vitality and decreases contamination (a CSEB utilizes 10.7 times less vitality to make than a nation let go block).

4.4.2 Hassan Fathy

Hassan Fathy was an Egyptian architect who has contributed significantly in the legendary of humanism that comprises with the self-image of architecture in the third world. Fathy articulated culture and authenticity and rejected architecture that is not indigenous and rooted in location and culture of the area which is the truest expression of vernacular architecture. He was open to use appropriate technology and did not hesitate to transplant dome building techniques of southern Egyptian countries to northern Egyptian countries. Thermal efficiency, cost, energy efficiency and other measures of suitability of materials and appropriateness of relationship of spaces and volumes were prior in his considerations. He tested seven chambers built in different techniques to find the desirable Egyptian climatic condition. He also promoted user participation in design. He accomplished an architectural craftsman with an artistic eye for harmony, balance and form. The leaned casualness of his layouts and utmost simplicity of his facades owe much more to his creative genius than to the vernacular “architecture without architects” that inspired him.

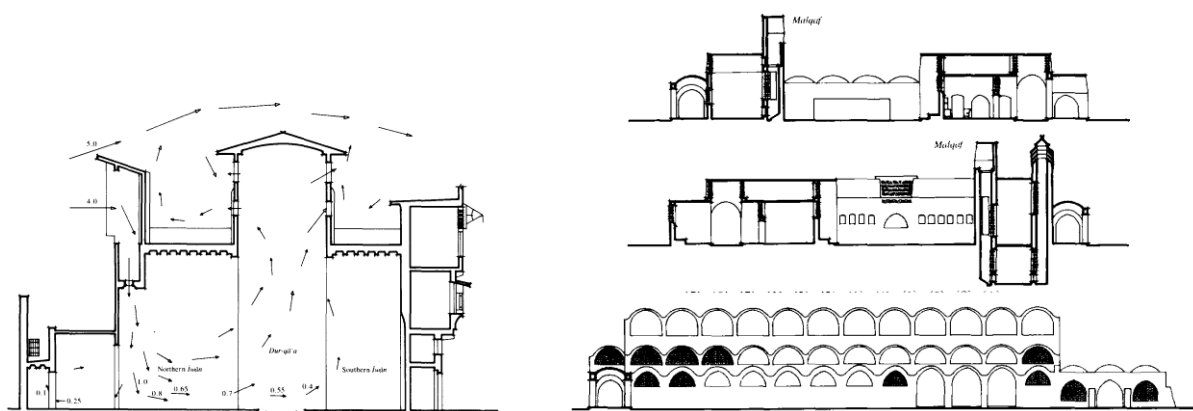


Fig 26: Fathy's architecture of natural energy; Source: (1986). Natural Energy and Vernacular Architecture: Principles and Examples with Reference to Hot Arid Climates.UNU

4.4.3 Nader Khalili

Nader Khalili was an Iranian-conceived American designer, essayist. In USA he spearheaded the strategy known as Super Adobe or Earth bag Construction. Designed initially in response to a NASA call for establishing human settlements on the Moon and Mars, this simple yet highly effective construction method can be used to build shelters quickly and without the need for specialist building skills. It has been utilized to develop crisis covers following the principal Gulf War where the strategy was utilized as a part of association with the UN Refugee Agency UNHCR to house outcasts in Iran. In 1991 Khalili established the California Institute of Earth and Architecture (Cal-Earth) to do specialized exploration identified with the Super Adobe technique. The non-benefit association outlines and tests models in the amazing climatic states of the Mojave Desert.

Nader Khalili first depicts his progressive systems of "earth design" where he offers a regulated manual for the basic and normal procedure of utilizing dirt earth to manufacture adobe houses and fire the structures with potters' coating to make artistic houses. His methods, which incorporate representation, model, craftsmanship, and engineering, are anything but difficult to take after and apply. Khalili's systems can be utilized effectively by any individual who needs to manufacture an economical, tough, and vitality productive house that completely communicates the individual's taste and creative ability. Whether you need to construct one of your own or just take in more about the procedure, Ceramic Houses depicts both the old and present day systems of working with the components accessible to everybody: earth, water, air and fire. He put in five years contemplating the vernacular desert engineering and the work of Jalaluddin Rumi, the Sufi artist and rationalist whom Khalili saw as a noteworthy impact. The Super Adobe strategy was an advancement of this prior work, an endeavor to adjust adobe development for connections where there was no earlier learning of such building strategies. Sandbags loaded with earth are laid in courses to build a structure that has pressure quality taking into account the basic rule of vaults, whilst security fencing set between the packs gives rigidity, additionally making it seismic tremor safe. . If available, a locally sourced stabilizer such as lime, cement or asphalt is added to the earth. The appeal of this system is that it does not require skilled labor and is built entirely from readily available, local and environmentally friendly material. The

structures can be adapted both in form and spatial layout and the flexible system can either be used temporarily or made permanent with a waterproof finish applied to the exterior. The structures can be adjusted both in structure and spatial format and the adaptable framework can either be utilized incidentally or made lasting with a waterproof completion connected to the outside. This alternative to change over an impermanent structure into a perpetual asylum is particularly helpful in a debacle alleviation circumstances and in exile camps where host nations may not lean toward lasting structures but rather the substances of war can request generally. As opposed to utilizing contractual workers for master work, these safe houses can be worked by the displaced people themselves including ladies, kids and the elderly. It likewise energizes nearby economies instead of depending on vast internationally working development organizations.



Fig 27: Nader Khalili's architecture with earth bags; Source: (2012). Nader Khalili - Designer of domes for the Moon and maybe on 15th October. British Standard.

Chapter 05: Program Analysis and Development

5.1 Events and activities

5.2 Basis of program formulation

5.2 Basic Programs

5.3 Program Analysis

5.4 Space Allocation

5.1 Event and Activities

5.1.1 Regular Activities:

- Regular classes on materials and technology
- Project management and Design of the ongoing projects
- Research on the past, running, possible and projected areas of knowledge and development
- Resource Development, Archive & Records
- Work on Materials Production and supply
- Communication regarding materials supply
- Information facilities
- Lab testing and treatment of bamboo
- Office activities; accounts, administration, documentation
- A portion of exhibition and library facilities

5.1.2 Periodic Activities

- Workshops (local, national, international)
- Seminar on various topic (open, participants only, guests)
- Open exhibitions
- Tree plantation
- On site works

5.1.3 Other Activities

- Special Seminar
- Small scale local events
- Children learning activities
- Cultural programs

5.2 Basis of Program Formulation

The basic programs are generated from the hypothesis. The whole program be categorized into three portions by seeing ahead, according to span of time spent in the space, one is public zone, second is the educational zone and residential zone. A research space to enrich the knowledge that will go on show in the exhibition space is very relatable in the learning procedure. Labs functioning for different study will be used for educational purposes and research. This complex will help the people to develop their skill thus, artisan work space be very progressive space. The educational center includes different areas dedicated to the learning about different

demand driven platforms to practice particular materials and techniques. A residential zone is located that will meet the need of every group of participants, learner, trainer, researcher, employee who will come to attend the workshops, activities and seminar hosted by the complex.

5.3 Basic Programs

Basic programs for the Vernacular Learning center are as follows-

i. Office:

- Reception and Information center
- Lobby and Waiting room
- Souvenir Shop
- Office: Administration office
 - Accounts office
 - Director's office
 - Register's office
 - Project management
 - Research and development
- Conference Room
- Store
- Toilet

ii. Education Center

- Classrooms
- Work studios
- Store

For, _Bamboo construction

_Earth construction

_Wooden craft

_Metal Works

- Design studio
- Trainer's common room

- Meeting room
- Toilets (for trainers and participants)

iii. **Lab**

- Research Lab
- Computer Lab
- Structural lab
- Environmental lab
- Treatment Plant (for bamboo)
- Soil-arium

iv. **Library**

- Material Library:
 - Display
 - Study and Store
 - Librarian's cubical
- General Library
 - Lobby,
 - _Check area and Locker,
 - _Reading Area
 - _Book Stack
 - _Librarian's Cubical
 - _Audio-visual
 - _Copy Section
 - _Store

v. **Common spaces**

- Exhibition space
- Multipurpose hall
- Pantry
- Prayer space
- Medical and health
- Artisan working space
- Test site

vi. **Residential Zone**

- Dorm
- Dining Hall and kitchen

- Toilets

vii. Botanical Garden

5.4 Program Analysis

This analysis is done to inquire type of scape for each function, who are the user Group and what is the core use of the function. This is derived from the cases studies and observation of the client's existing workstation. The functions are categorized to have open, shaded open, closed, divided, undivided spaces according to the requirements seeing ahead.

FUNCTION	USE	USER GROUP	SPACE
Reception Souvenir Shop	Welcome and Guide people	Employee+ Consumer	 Closed Space  Pass to other function
Lobby and waiting	Waiting+Interaction	Employee+ Consumer	 Shaded
Office	Work, Share, Document	Employee+ Guests	
Exhibition Space	Exhibition, Interaction, sharing	All	 Permanent  Temporary  Open
Multipurpose Hall	Program, Seminar, Workshop	All	
Pantry	Food service	All	
Medical unit	Health care	All	
Prayer Hall	Prayer	All	
Conference room	Meeting, Small seminar	Employee	 Usual  Function demand
Library	Study	All	 Partially
Classrooms	Classes	Trainer+Trainee	 Shaded and divided
Trainer's Common room	Meeting+ Interaction	Trainers	
Dorm Rooms Dining Kitchen	Sleep, Rest, Eat, Cook	Trainers, Learner, Researcher	  
Design Studio	Design Works	Trainer, Participants	
Labs (All)	Test, Experiment	Trainer+Learner+ Researcher	
Treatment Plant	Treat Bamboo	Trainer+Learner+ Researcher+artisan	
Soil-arium	Archive	All	

Fig 28: Program Analysis; Source: Aneeka Habib, 2016

5.5 Space Allocation

This segment the dissertation shows tables with the space allocation for the listed functional requirement. The calculation for each requirement is mostly done with count number of people, required area per unit or per person and the sum of it requires the total. Additionally, circulation is added (30% of the sub total) with the sum to determine the Total space for each zone. Units counts are done according to the number of people for the specific function and requirement of the basic program list.

5.5.1 OFFICE Spaces

FUNCTION	SPACE REQUIRED PER PERSON (SFT)	SPACE REQUIRED PER UNIT (SFT)	UNIT	NO. OF USER	ALLOCATED AREA (SFT) AREA X USER NO. X UNIT
Reception	-	100	1	2	100X1=100
Waiting Room+ Lobby	15	-	1	30	15X30X1= 450
Souvenir Shop	-	250	1	-	250X1=250
Admin Office	80	-	1	6	80X6X1=480
Accounts Office	80	-	1	4	80X4X1=320
Project Management	80	-	1	4	80X4X1=320
Research	80	-	1	15	80X15X1=1200
Director	-	300	1	1	300X1X1=300
Register	-	300	1	1	300X1X1=300
Information Center	-	300	1	-	300X1X1=300
Conference	20	-	2	15	20X15X2=600
Record Room	-	250	1	-	250X1=250
TOILETS MALE	-	160	2		160X2=320
FEMALE	-	160	2		160X2=320
Sub Total					5510
CIRCULATION(30%)					1653
TOTAL					7163

5.5.2 Educational Zone

FUNCTION	SPACE REQUIRED PER PERSON (SFT)	SPACE REQUIRED PER UNIT (SFT)	UNIT	NO. OF USER	ALLOCATED AREA (SFT) AREA X USER NO. X UNIT
Work studio	50	-	4	Learner: 30	50X30X4= 6000
Class room	20	-	4	Trainer:2	20X30X4= 2400
Store (for Bamboo construction, Earth construction, Wooden craft, Metal Works)	-	200	4	Assistant:1	200X4= 800
Design Studio	50	-	1	30	50X30x1= 1500
Trainer's Common Room	20		1	15	20X15x1= 300
Meeting Room		500	1	-	500X1= 500
TOILETS					
MALE	-	160	3	-	160X3= 480
FEMALE	-	160	3	-	160X3= 480
SUB TOTAL					12,460
CIRCULATION(30%)					3,738
TOTAL					16,198

5.5.3 Common Functions

FUNCTION	SPACE REQUIRED PER PERSON (SFT)	SPACE REQUIRED PER UNIT (SFT)	UNIT	NO. OF USER	ALLOCATED AREA (SFT) AREA X USER NO. X UNIT
Multipurpose Hall	10	-	1	200	10X200X1= 2,000
Toilets					
Male	-	160	2		160X2= 320
Female	-	160	2		160X2= 320
Exhibition Gallery	-	2500 (TEMPORARY) 7500 (PERMANANT)	1 1	-	2500+7500X1X1= 10,000
Lobby	15	-	1	15	15X15X1= 225
Prayer Hall					
Male	-	500	1		500X2= 1,000
Female	-	500	1		
Medical Center	-	200	1	-	200X1= 200
Pantry	-	500	1	-	500X1= 200

Artisan work space	-	7000	1	-	7000X1=7,000
Toilets					
Male	-	160	2		160X2=320
Female	-	160	2		160X2=320
Sub Total					2,1905
CIRCULATION(30%)					6,572
TOTAL					28,477

5.5.4 LAB and Library

FUNCTION	SPACE REQUIRED PER PERSON (SFT)	SPACE REQUIRED PER UNIT (SFT)	UNIT	NO. OF USER	ALLOCATED AREA (SFT) AREA X USER NO. X UNIT
Lab		-			
Research Lab	50		1	15	50X15X1=750
Computer Lab	10	-	2	30	10X30X2=600
Environment Lab	-	2,000	1	-	2,000X1=2,000
Treatment Plant	-	2,000	1	-	2,000X1=2,000
Soil- arium	-	3,000	1	-	3,000X1=3,000
Library					
General Library					
Lobby	-	150	1	1	150x1=150
Check and locker	-	200	1	1	200X1=200
Reading space	10	-	1	150	10X150=1,500
Book stack	0.1	-	20k books	20k books	0.1X20,000=2,000
Librarian's cubicle	-	100	1	2	100X1= 100
Audio-visual	-	1,000	1	1	1,000X1=1,000
Copy Section	-	300	1	1	300X1=300
Store	-	200	1	1	200X1=200
Material Library					
Display	-	700	1	-	700X1=700
Study	-	400	4	-	400X4=1600
Librarian cubicle	-	100	1	1	100X1=100
Store	-	500	1	-	500X1=500
Sub Total					16,700
CIRCULATION(30%)					5,010
TOTAL					21,710

5.5.5 Residential Functions

FUNCTION	SPACE REQUIRED PER PERSON (SFT)	SPACE REQUIRED PER UNIT (SFT)	UNIT	NO. OF USER	ALLOCATED AREA (SFT) AREA X USER NO. X UNIT
Rooms (accommodates 4 people) for Male Female	120	480	20 10	80 40	120 X 80 = 9,600 120 X 40 = 4,800
Rooms (accommodates 2 people) for Male Female	120	240	10 5	20 10	120 X 20 = 2,400 120 X 10 = 1,200
TOILET (3 stalls)		220	4		220 X 4 = 880
TOILET (2 stalls)		150	4		150 X 4 = 600
Dining	15		1	250	15 X 250 X 1 = 3,750
Support functions of Dining Kitchen Storage Receive Wash Pantry		1000 600 200 200 300	1 1 1 1 1		1000 X 1 = 1,000 600 X 1 = 600 200 X 1 = 200 200 X 1 = 200 300 X 1 = 300
Sub Total					25,530
CIRCULATION(30%)					7,659
TOTAL					33,189

5.5.6 GRAND TOTAL

FUNCTION	ALLOCATED SPACE
OFFICE	7,163
EDUCATIONAL ZONE	16,198
COMMON FUNCTIONS	28,477
LAB & LIBRARY	21,710
RESIDENTIAL ZONE	33,189
TOTAL	106,737

Chapter 06: Site Appraisal

6.1 Site at a Glance

6.2 Chosen area study

6.3 Surrounding area Study

6.4 Other issues

6.5 SWOT Analysis

6.6 Possibilities

6.7 Site images

6.8 Site rationale

6.1 Site at a glance

6.1.1 Size of the site: 8 Acre (348,480SFT)

6.1.2 Location of the site

The site is at Sundarban Village in Ramdubihat Sadar Upuzila, Dinajpur district, northern Rangpur Division. At present, SAFE Bangladesh head office situates in a part of it and rest is an agricultural land divided into plots owned by public owners. The site is tad away from the Dinajpur town but connected by the Dhaka-Rangpur highway in Sundarban village which situates on both sides of the main highway on the midway of Dinajpur and Saidpur.

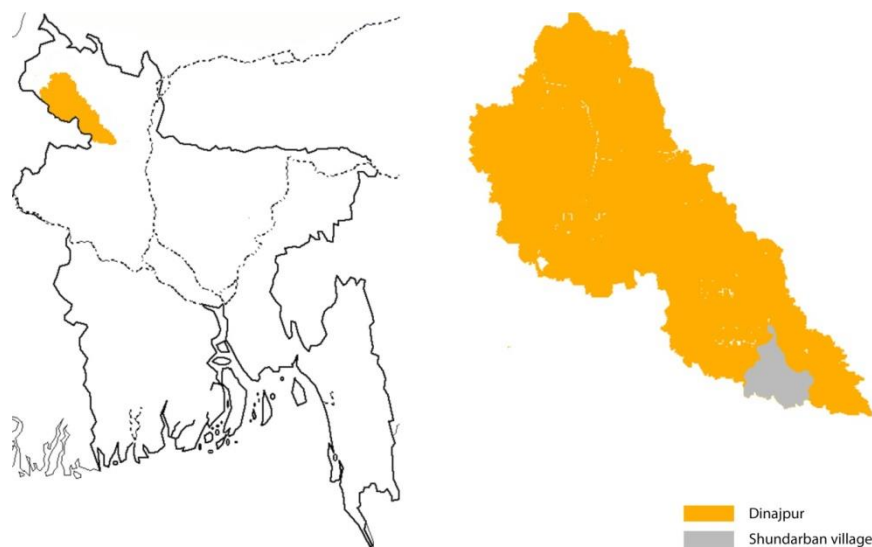


Fig 29: Site Location: 1: In reference to the country; 2: In reference to Dinajpur city;
Source: Aneeka Habib, 2016

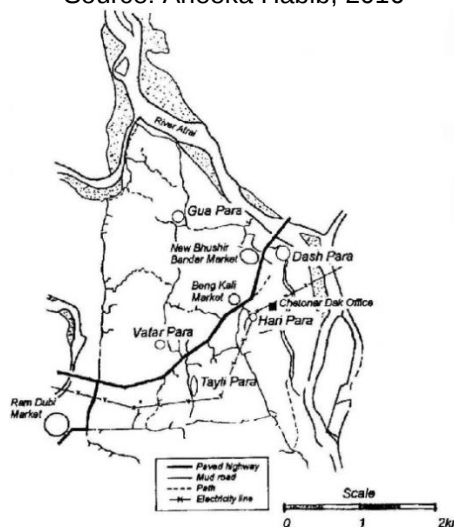


Fig 30: Map of Sundarban village; Source: Compiled by Matthew Carter and Azit Kumar Roy,
November, 1996

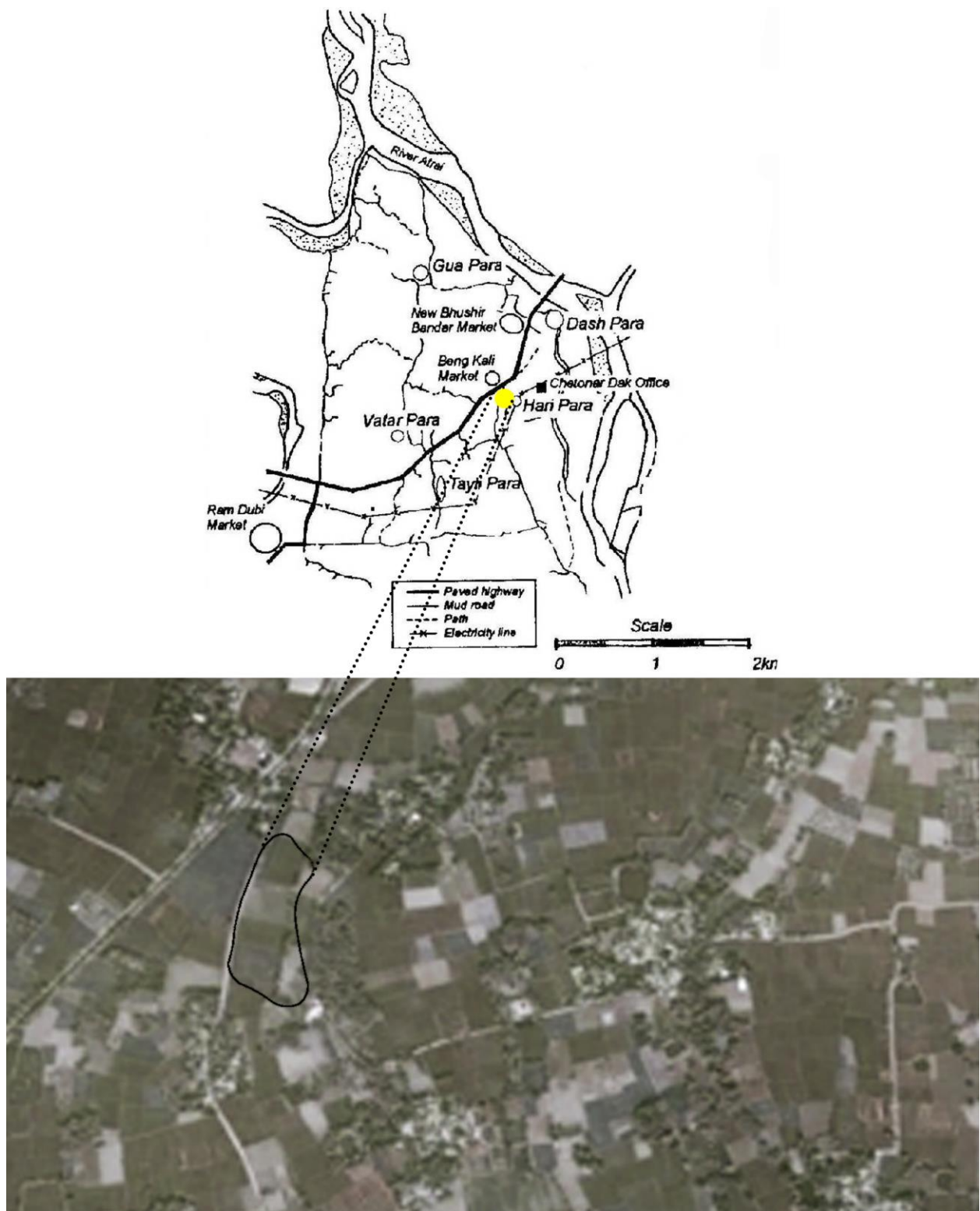


Fig 31: Site territory; Source: Aneeka Habib, 2016

6.2 Chosen area Study



Fig 32: Transport and pedestrian network; Source: Aneeka Habib, 2016



Fig 33: Water body: Atrai River; Source: Aneeka Habib, 2016



Fig 34: Surrounding Growth: Bengkali Bazar; Source: Aneeka Habib, 2016



Fig 35: Land use pattern: agricultural Land; Source: Aneeka Habib, 2016



Fig 36: Vegetation; Source: Aneeka Habib, 2016



Fig 37: Settlement pattern: Low-rise; Source: Aneeka Habib, 2016



Fig 38: Built forms: school; Source: Aneeka Habib, 2016



Fig 39: Overlaid on map; Source: Aneeka Habib, 2016

6.3 Site surrounding area study



Fig 40: Site surrounding Area; Source: Aneeka Habib, 2016



Fig 41: Panorama of the riverside; Source: Aneeka Habib, 2016



Fig 42: Panorama of the side; Source: Aneeka Habib, 2016

6.4 Other Issues

6.4.1 Geography

Sundarban village is situated in Dinajpur district in Rangpur Division situated in northern part of Bangladesh. Dinajpur is one of the ancient towns formed in Bangladesh. Dinajpur was once a part of the ancient state of Pundrabardhwan .The British administrative control in Dinajpur was established in 1786. At the time of Partition of Bengal in 1947, part of greater Dinajpur district was included in West Bengal and it was named West Dinajpur district. It is bounded on the north by Suihari, Katapara, Bangi Bechapara, Pulhat, Koshba on the south, on the east of Sheikhupura and by the river Punarbhaba on the west. The districts bound Dinajpur are Thakurgaon and Panchagarh districts on the north, Gaibandha and Joypurhat districts on the south, Nilphamari and Rangpur districts on the east, the Indian state of West Bengal on the south west. The total area of the district is 3,437.98 km²

6.4.2 Land Condition

Plain high agricultural land and not flood prone

6.4.3 Typography

It is primarily an agricultural land which is 33 meters elevated above the sea level. The land of this area is on alluvial plain. The site contains a large number of trees around including Bamboo, mango, palm, and eucalyptus, boroi with a few fruit tree variations and other trees with medicine value. There are a few varieties of creeper, wild flower, corn field and shrubbery present around the site. Also the client SAFE Bangladesh perform tree plantation program plant tree on the both side of the pedestrian's way from benkali bazar up to the block of Sundarban village where their current work station is situated and Atrai river side in football place which adds some more variety of medicine and fruit bearing plants. At present the site contains no built structure except the existing SAFE Bangladesh office. There is a small online school ran by JAGGO foundation on the south of the site, benkali bazar on the north-west which sits on the both side of the road and in far north and east there are some villagers houses which makes no tall building around or in the site. The site has vehicular and pedestrian access from the highway on northwest of the site and a secondary road that allows vehicle just adjacent at west to the site.

6.4.4 Climate of Dinajpur

In Dinajpur, the climate is warm and temperate. The summers are much rainier than the winters in Dinajpur. This location is classified as Cwa by Köppen and Geiger. The average temperature in Dinajpur is 25.0 °C. Precipitation here averages 1728 mm. Dinajpur has a tropical wet and dry climate. But it remains hot-dry in most of the time of an year. The district has a distinct monsoonal season, with an average of 28.8 °C, June is the warmest month. The lowest average temperatures in the year occur in January, when it is around 17.4 °C. The driest month is December. There is 1 mm of precipitation in December. The greatest amount of precipitation occurs in July; with an average of 402 mm. Annual rainfall is measured 2,536mm. The precipitation varies 401 mm between the driest month and the wettest month. The variation in temperatures throughout the year is 11.4 °C.

month	1	2	3	4	5	6	7	8	9	10	11	12
mm	13	8	17	50	159	337	402	328	275	130	8	1
°C	17.4	19.8	24.3	27.9	28.5	28.8	28.7	28.8	28.4	26.6	22.3	18.8
°C (min)	10.4	12.3	16.7	21.5	23.9	25.3	25.9	25.9	25.2	22.3	16.0	11.9
°C (max)	24.5	27.3	32.0	34.3	33.1	32.3	31.6	31.7	31.7	31.0	28.7	25.7
°F	63.3	67.6	75.7	82.2	83.3	83.8	83.7	83.8	83.1	79.9	72.1	65.8
°F (min)	50.7	54.1	62.1	70.7	75.0	77.5	78.6	78.6	77.4	72.1	60.8	53.4
°F (max)	76.1	81.1	89.6	93.7	91.6	90.1	88.9	89.1	89.1	87.8	83.7	78.3

Fig 43: Climate table; Source: <http://en.climate-data.org/location>

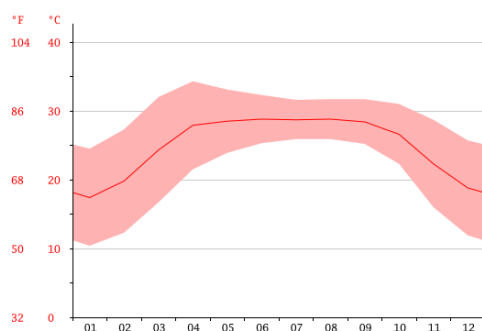


Fig 44: Temperature Graph

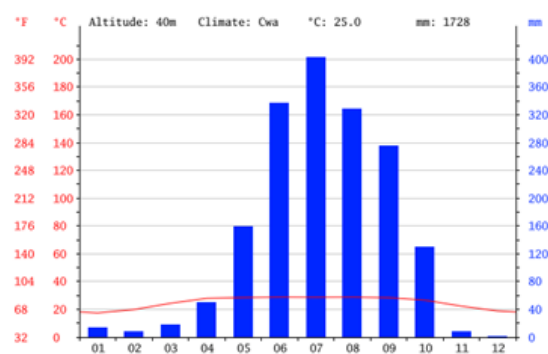


Fig 45: Climate Graph

Source: <http://en.climate-data.org/location>

6.4.5 Sites of Archaeological importance of Dinajpur:

There are several archeological sites at Dinajpur and also at a good distance from the site. Aowkora Mosque, Baraduari, Dinajpur Museum, Ghughu-danga Zamindar Bari, Gour Gabindha, Habra Zamindar Bari, Kantajew Temple, Matasagar, Nayabad mosque, Dinajpur Rajbari, Ramsagar tank, Shingha Darwaza – Meaning, "Lion Gate", Shita Coat Bihar (The oldest Buddhist Bihar in the world), Sitar Kuthuri, Sukhsagar, The tombs of Chehel Gazi and Gor-e-Shahid Moydan are significant Archeological sites and frequently visited by the people from all over the country and the world.



Fig46: Nayabad Mosque, Dinajpur



Fig47: Kantajir Temple



Fig48: Ghughudanga Zamindarbari Gate



Fig49: Dinajpur Rajbari

Source: www.flickr.com

6.5 SWOT analysis

6.5.1 Strength:

- The site is situated in a district which is a very suitable strategic location to facilitate learning, research and related activities since this area has got some touch of this issue and needs more development to create an landmark for the area of architecture
- The site is a very short distance from the main town, while it is tad far from to be a part of the crowded city
- The site is easy accessible since it is near the highway and connected secondary road adjacent to the site. In addition, there is dedicated pedestrian access and cycle way to the village block and Atrai River.
- The roads are much developed to allow all kind of vehicles to the site.
- There is a small bazar (benkali bazar) facility near the site which generates activity will expose the complex in future

- There are two schools (Jagoo school and Sundarban school) at very close walk from the site. This will encourage the young learner to the subject
- Raised land around the site can be used for future extension
- Having still being untouched by urbanization, the site allows nature to be realized as wild
- The area is free from noise pollution
- Variety of plants and wild life are seen to play around

6.5.2 Weakness:

- Being a bit far from the main road there may be transportation problem at times
- Wet-dry climate will be difficult to cope with

6.5.3 Opportunity:

- Good place to explore materials since there are a lot of bamboo trees around
- Many local people are involved in the building procedure may help the initial progress of the complex
- Climatic issues can be solved with help of architecture
- Nature can contribute to enhance the spaces of the building at the same time building can preserve the untouched experience of nature and wild life that is present in the site
- Can make a landmark for the place
- Can produce an example of an architecture and system of the area and point out the sustainable future in real
- Transportation problem will allow the people to walk or cycle and enjoy the nature and the project merging

6.5.4 Threads:

- There are many plot empty surrounding the site. Thus there is tread of unplanned development
- Price of local materials may rise because of the increased demand
- Nature can get harmed for using excessive natural resource

6.6 Possibilities

The site and its surrounding show the tremendous effort of the people living there in its cultivable land and handmade shelters. It seems like a bright possibility of the vernacular learning center to function with the manpower and available recourses.

6.7 Site Images



Fig 50: Site images; Source: Aneeka Habib, 2016

6.8 Site Rationale

The specific part of the site is chosen where the SAFE Bangladesh's current work station sits. All around the site significant contribution of the NGO is prominent in bringing change to the block the block it situates on and some areas near about which takes 10-20 minutes (in car) to reach. It will help to portray the actual effect in firsthand experience for anyone to understand the significance of the project. The site is easy accessible from the Dhaka-Rangpur highway still provides indirect access to the site. The site also has the potential to facilitate certain crowd at times and calm environment due to the buffer space between the site and the highway. This is very important issue to consider as a proper area for such learning complex to bring people in there.

This area also situates at 5 minutes' walk to the Atrai River that will farther add to the learning environment a scope to facilitate a recreational ground for the complex. The site area also surrounds with ample of green combining the big trees on the lands on lease and the rented paddy fields. The place has the allowance to explore bamboo as material and experiment since there is good number of bamboo trees both intentionally and unintentionally grown.

The district Dinajpur is famous for its archeological and ancient spots like, Kantajir Temple, Dinajpur Rajbari, and places for exploration and research for interested people and tourists. The site location will help the complex to become a hub for communication that will connect it nationally and internationally.

Chapter 07: Design Phase

7.1 Reaffirming: The issue; where to intervene; the outcomes

7.2 Development phases

7.2.1 Concept Development

7.2.2 Physical Development

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7.1 Reaffirming: The issue; where to intervene; the outcomes

Rural Architecture is a little known and less explored field that is concerned with holistic architectural building traditions that are cost effective, ecologically sensible and culturally relevant. This project is to establish a particular ground to celebrate this field and uproot the possibilities.

The reason why rural architecture is less developed is the lost confidence in the indigenous building materials due to lack of knowledge of technologies about how to build with them. A complex where learning, sharing knowledge and research take place undoubtedly can become a hub for innovation and developing skill.

In the process, Communication is very important, Communication of a just community and a concerned context. Thus, a platform is needed to shelter the communication and foster development. So, the process can be the following in very initial thought is

To

Bring back Faith

Initiatives to

Prove the potential

To prove needs

Communication

Needs

A Shelter_ Settlement_ A platform

i.e.

A vernacular Learning center

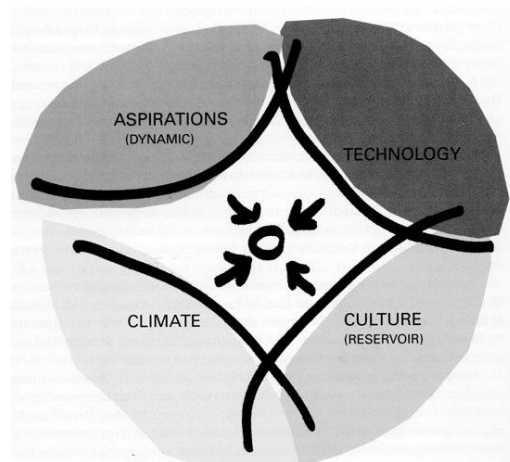


Fig 51: Reaffirming; Source: collected

7.2 Development phases

7.2.1 Concept Development

A PLACE TO LEARN & TO LEARN FROM

i. To make Settlement to Shelter Communication within it yet outreach focused

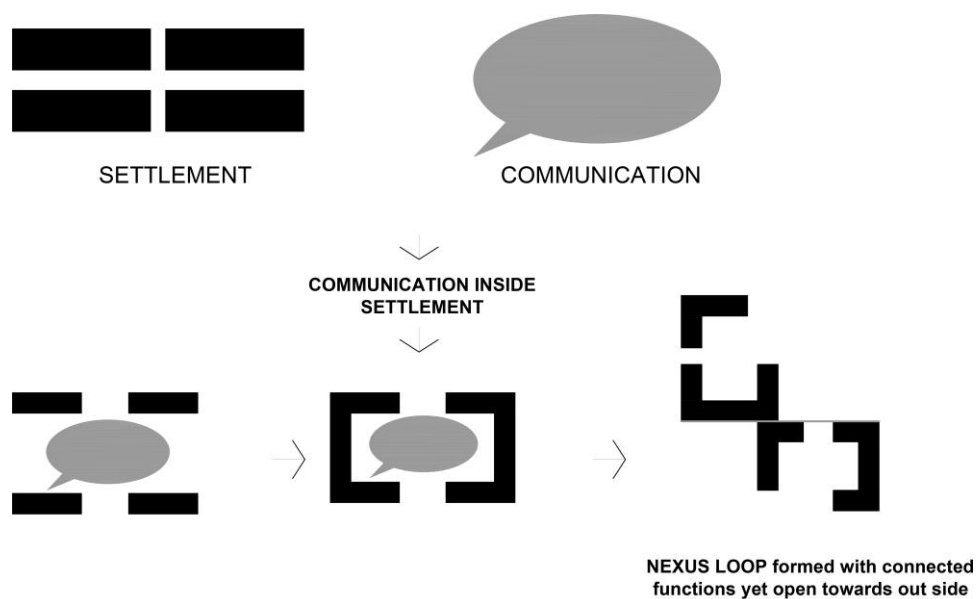


Fig 52: Concept Development; Source: Aneeka Habib, 2016

ii. Will be indigenous materials and techniques stressed building so that the building appears as if they were a part of the eco system with constructive role. Here the ecosystem starts from growing materials to become the building and the process in between. Also will showcase the process of building craft; little work on paper and rest on site.

iii. To make an exemplar of rural building with maximum potential of technological intervention & experiment as a symbolic catalyst for the future architectural pedagogy.

iv. A major initiative of an NGO is to go close to the general mass and assist them by staying close to them. So the building requires having the characteristics that welcomes general mass, assure them it's their place. To do that, the center has the character to blend with the site with site like considerations (low-rises surrounded by big trees and opens) and is an unseparated part of the place.



Fig 53: NGO Targets common people; Source: Aneeka Habib, 2016

7.2.2 Physical Development _Form generation

Main programs of the project are-

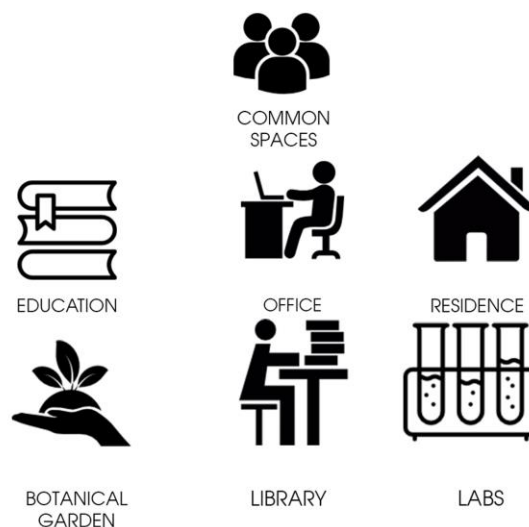
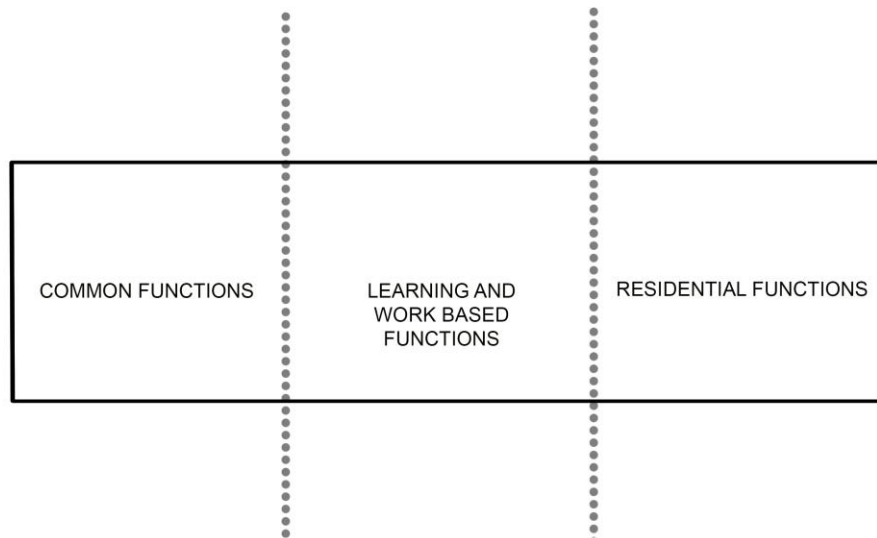
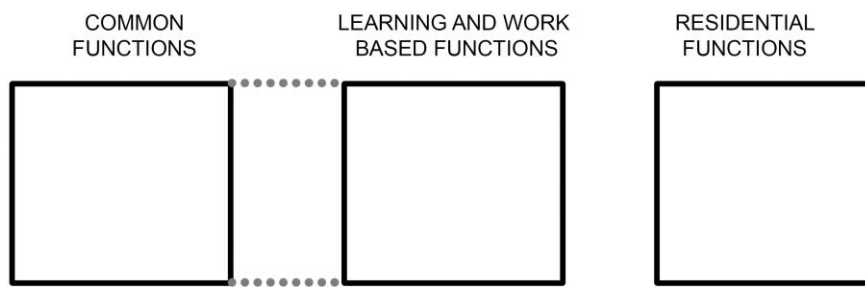


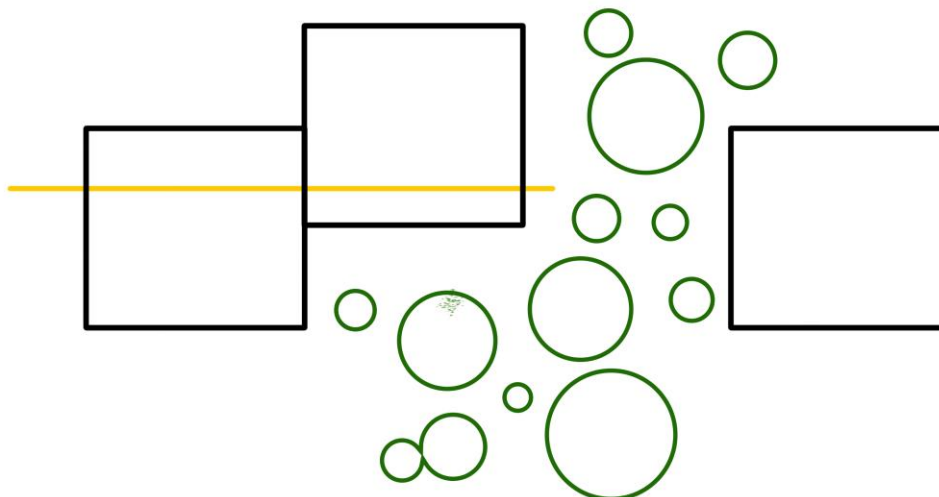
Fig 54: Main Programs; Source Aneeka Habib, 2016



DIVIDING THE WHOLE PROGARM PRIMARILY INTO **THREE**



KNITTIONG BACK THE COMMON AND EDUCATIONAL FUNCTION
CONSIDERING THE INTEGRETU OF THE PROGAM OF THE FUNCTIONS



A BOTANICAL GARDEN (ENHANCE THE TREE PLANTATION PROGRAM OF THE CLIENT) AS **BUFFER** BETWEEN THE
COMMON ZONE AND RESIDENTIAL ZONE TO
TERMINALE THE JOURNEY INTO THE COMPLEX

Fig 55: Form generation; Source: Aneeka Habib, 2016

7.2.2.1 Placement on the site

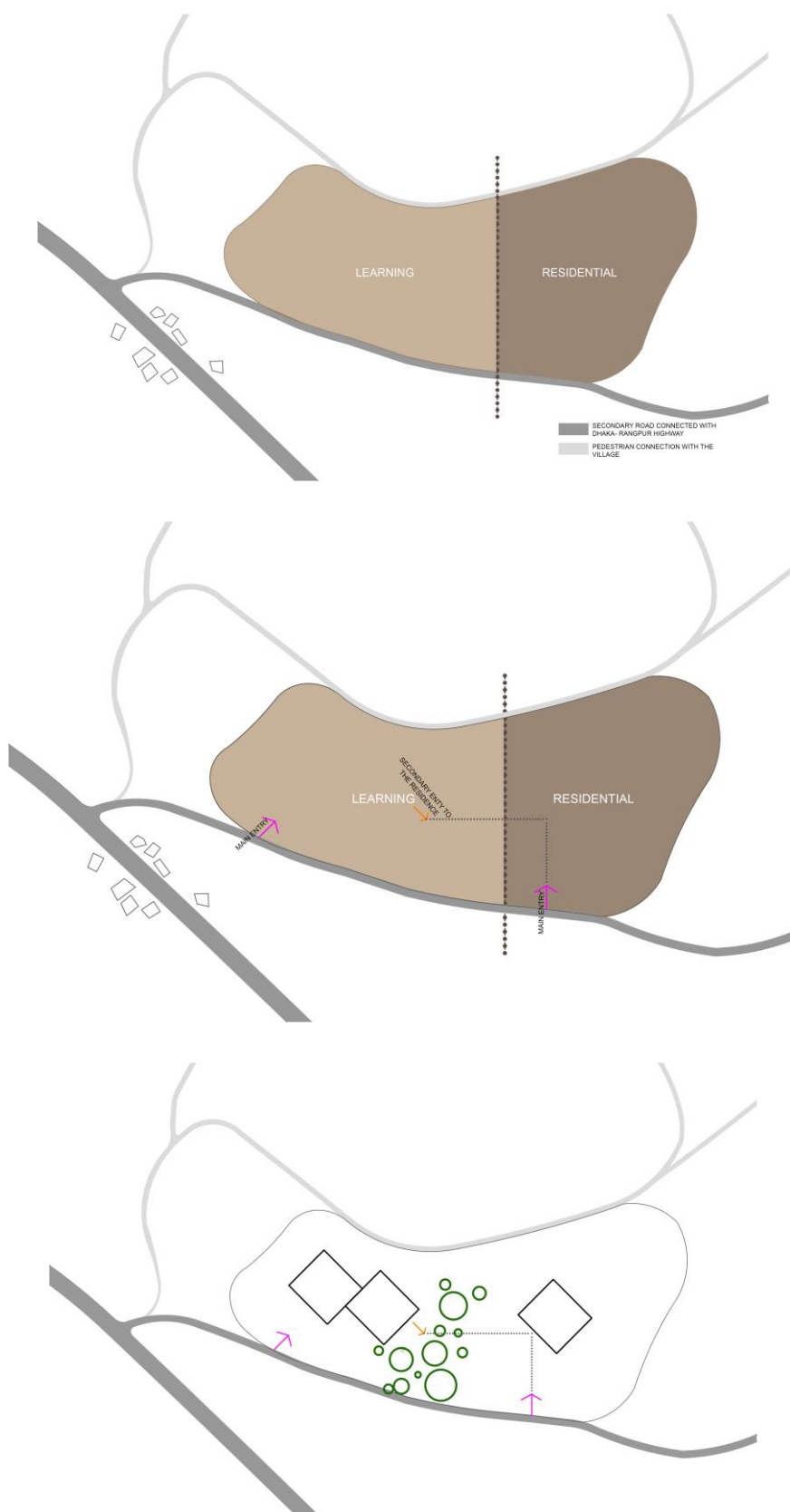
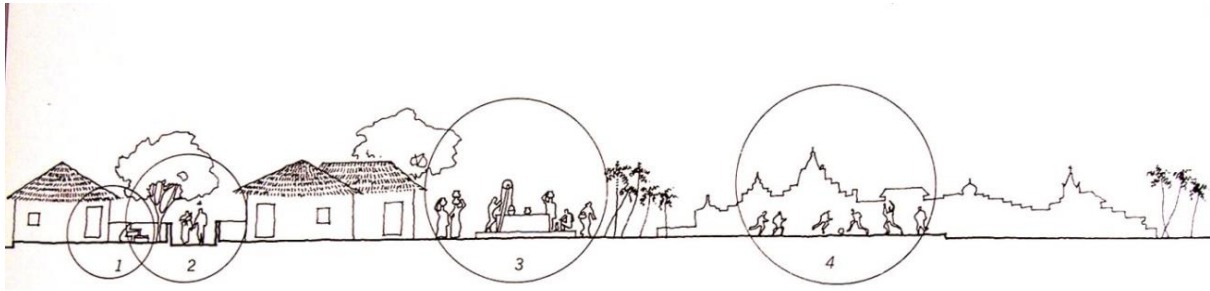


Fig 56: Placement on site; Source: Aneeka Habib, 2016

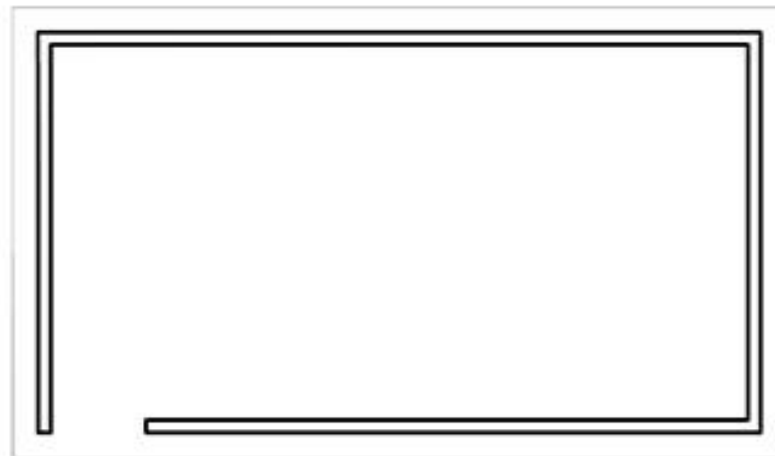
7.2.3 Space Development



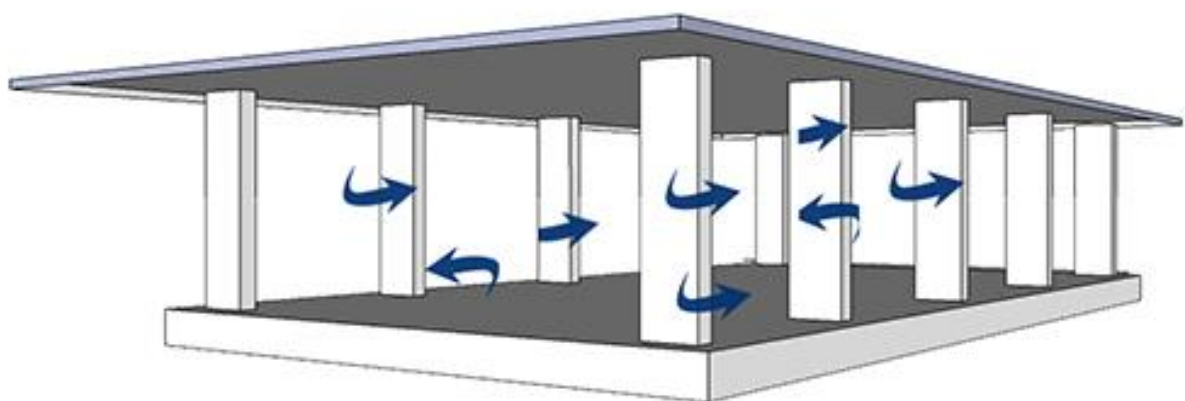
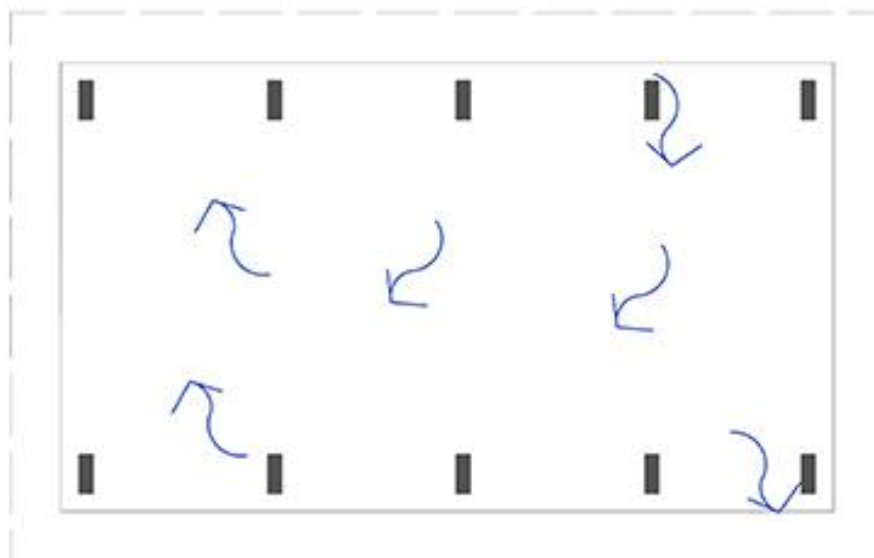
“Architecture is not only a building mass it’s about space” -Charles COorrae

In Bangladesh climate (warm-humid) the desirable condition of a building needs an overhang roof over the structures which allows the maximum air flow and gives shade. From the study of program analysis section (5.3), most of the functions do not need enclosed or formal spaces. Keeping in mind that and giving formal spaces where needed wall has been minimized as much possible to make it like a pavilion and the functions are placed in a way that they become unseparated part of the pavilion and merge with the pavilion. The pavilion structure can take the highest advantage of the vast green that surround the site.

Since the core of vernacular is learning informally, the center is designed keeping in mind the fact of creating the ambience of an informal yet organized learning, gathering field. There are wide corridors that are thresholds between the semi-open, open, closed spaces and the outdoor socializing courts inside the complex. There are places for hang around, walk and simply lazing around. It has the environment for the expected works to be done and for all the supporting acts it needs.



When wall surrounds a space



Condition when wall does not surround a space: better air flow, naturally ventilated and lit

Fig 57: Space generation; Source: Aneeka Habib, 2016

7.2.4 Structure, Fenestration, Landscape Development

Structure, Fenestration and Landscape of this project is developed considering its set up in rural site, difference in materiality and reflection on internal spaces. These three (structure, fenestration and landscape) are integrated to create a picture of a desirable ambience of such a center.

Most of the structural members are mud walls made with blocks of 10" X 12". For the core structure mud wall, a hat and boot is needed to protect it from rain water and insects. For the complex, brick plinth and overhang roofs are used to make the mud walls last well and long. There are vertical structures of bamboo and all other horizontal and roof trusses made with bamboo connections.

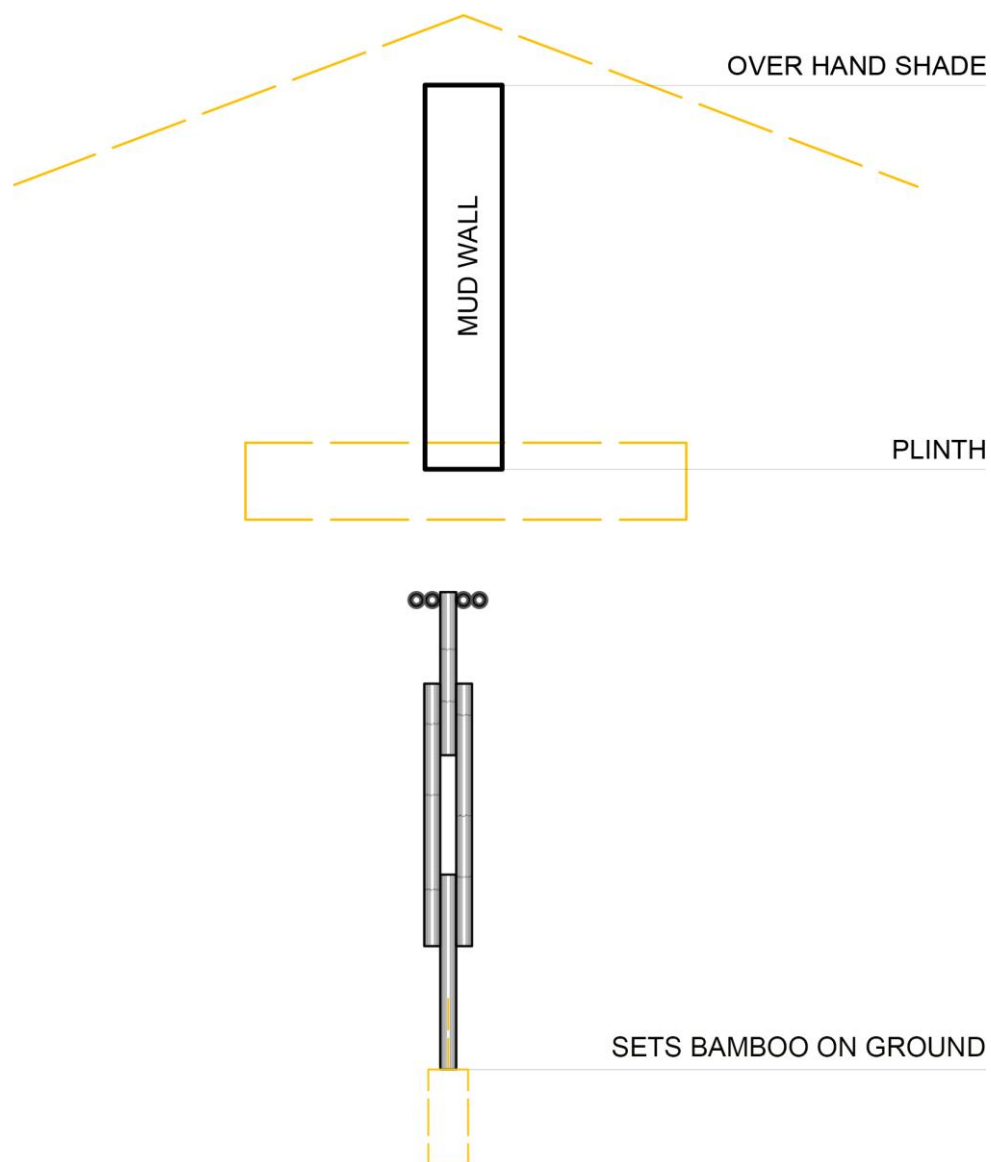


Fig 58: Protecting mud-wall and Bamboo; Source: Aneeka Habib, 2016

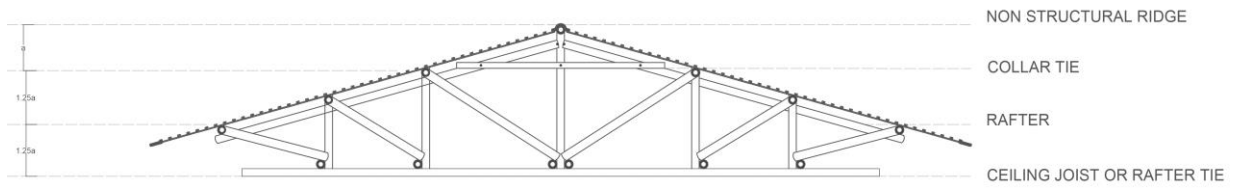


Fig 59: Bamboo connection of Roof; Source: Aneeka Habib, 2016

The whole complex is designed like a pavilion and the functions are arranged so that it becomes unseparated part of the pavilion and merges with it. Most of the functions are semi open with over hanging roofs and the closed ones has operable facades that can open the internal space to merge with the pavilion and the landscape. The landscape has exactly the site like characters with large trees providing big canopies. Also the provided botanical garden makes it more similar as the tree and settlement pattern of the area.

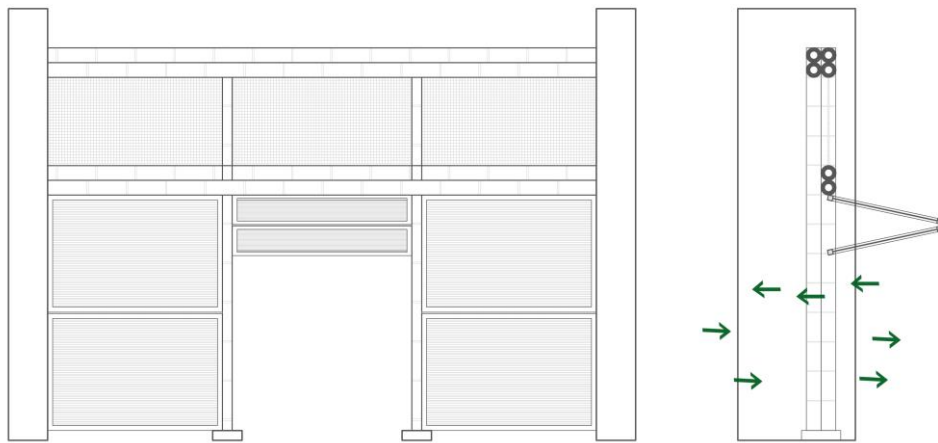


Fig 60: Fenestration Treatment; Source: Aneeka Habib, 2016



Fig 61: Study Model; Source: Aneeka Habib, 2016

7.3 Final Design

7.3.1 Plans



Fig 62: Roof plan; Source: Aneeka Habib, 2016



Fig 63: Ground floor plan; Source: Aneeka Habib, 2016

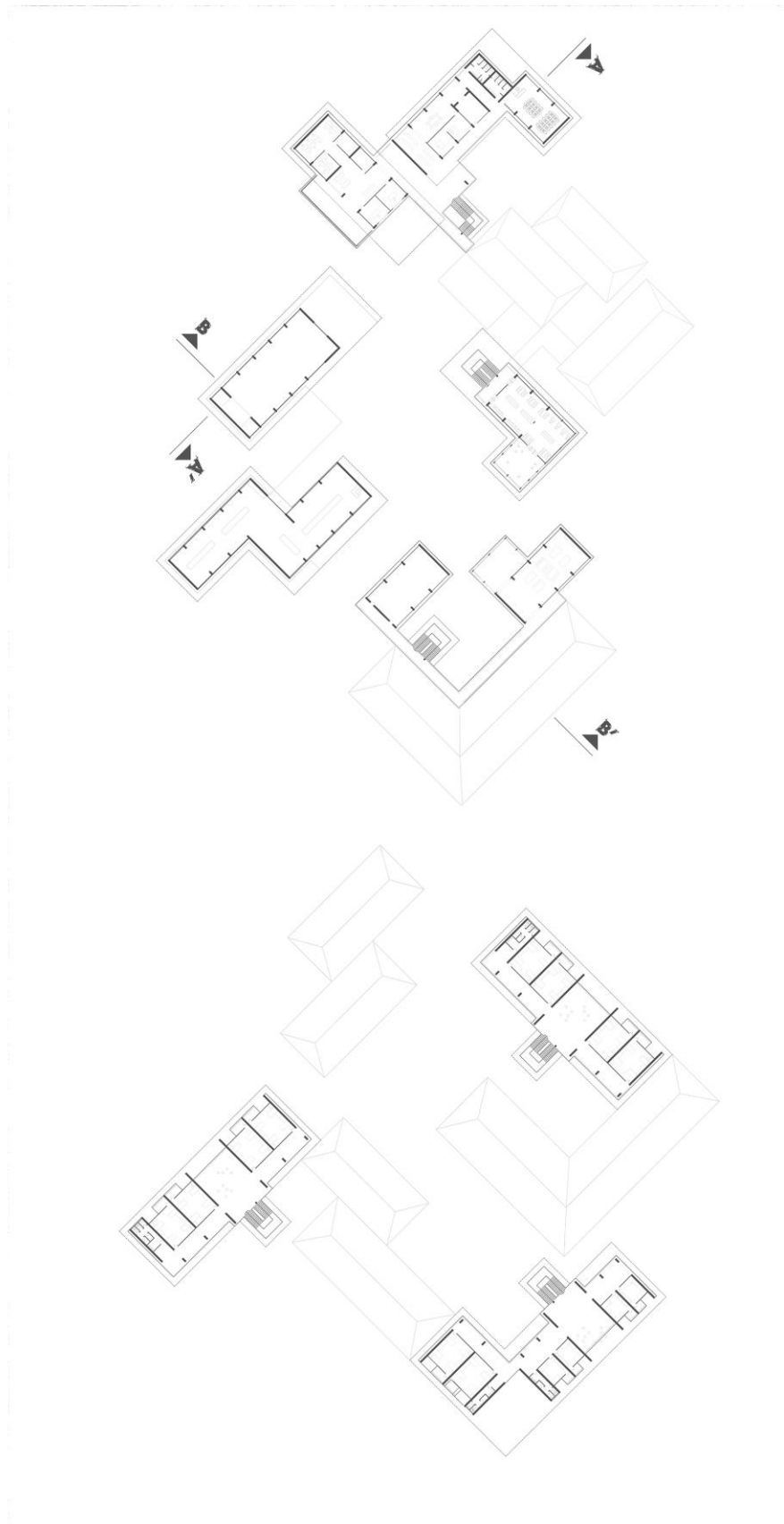


Fig 64: Upper floor plan; Source: Aneeka Habib, 2016

7.3.2 Elevation, Sections and Perspective



Fig 65: Elevation towards the entry; Source: Aneeka Habib, 2016

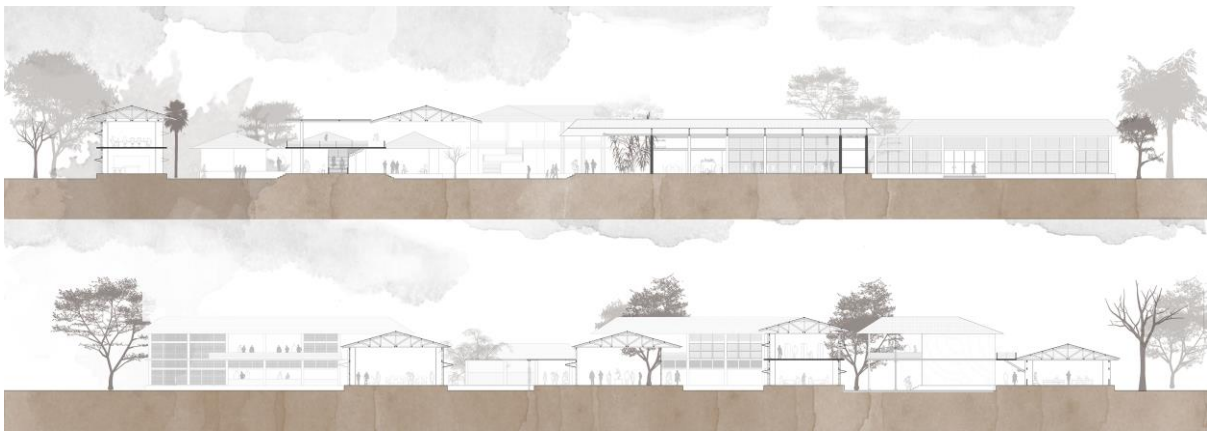


Fig 66: Sections (A-A' and B-B' respectively); Source: Aneeka Habib, 2016



Fig 67: Perspective; Source: Aneeka Habib, 2016

7.3.3 Construction Detail

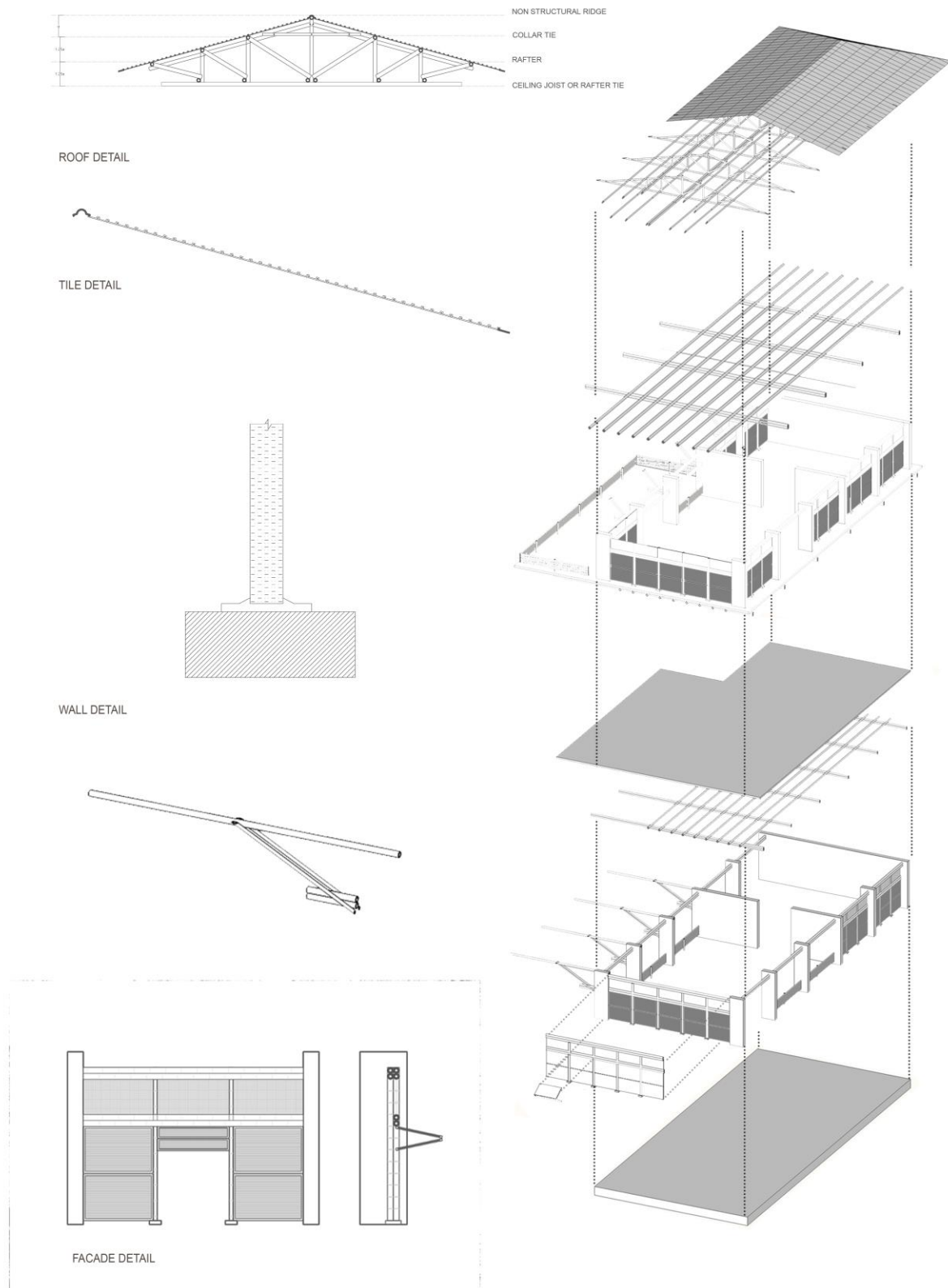


Fig 68: Construction Details; Source: Aneeka Habib

7.3.4 Model Images

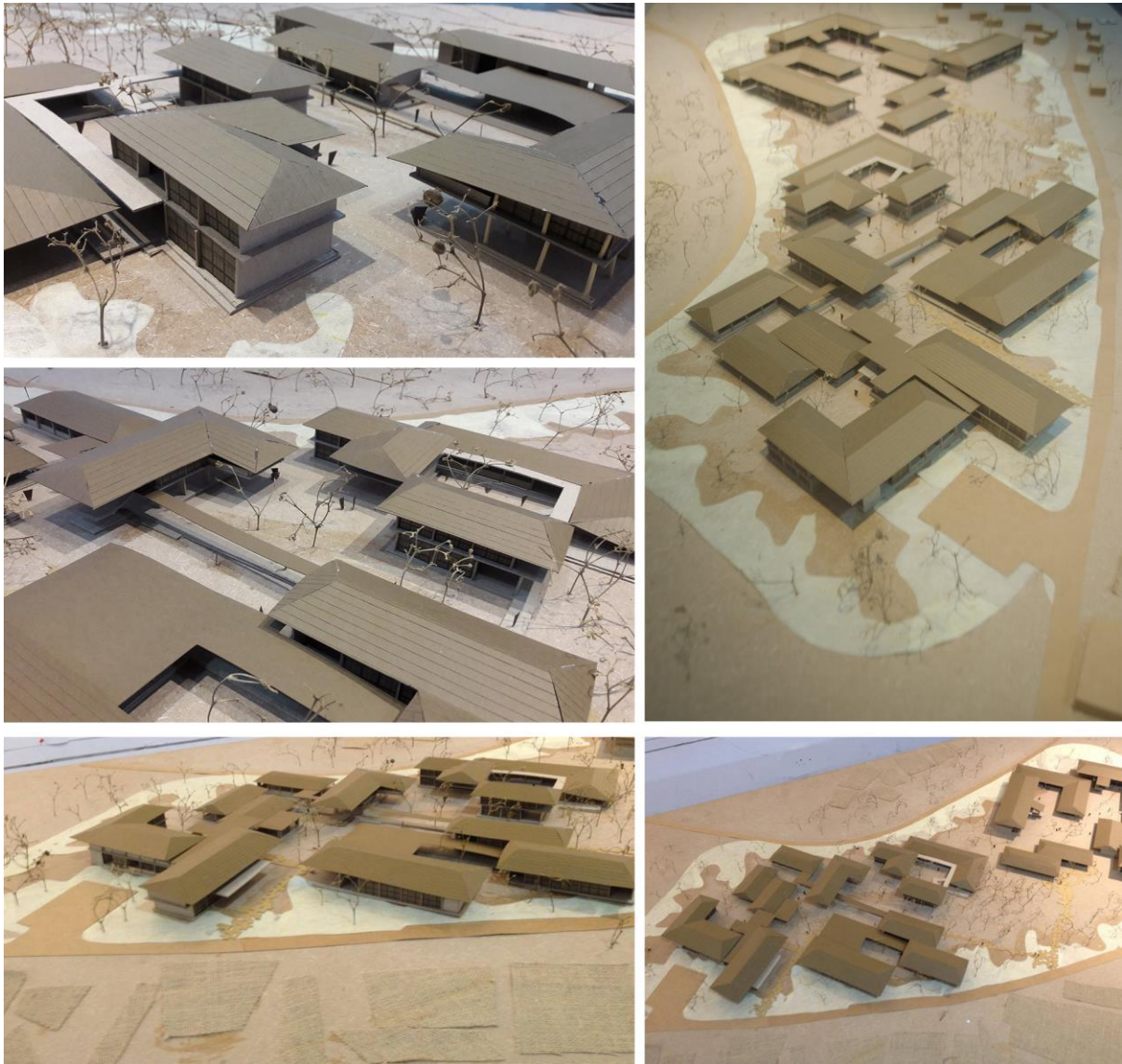


Fig 69: Model images; Source: Aneeka Habib, 2016



Fig 70: Blow up Model images; Source: Aneeka Habib, 2016

8.1 Conclusion

Vernacular Learning center is a project taken up to glorify the significance and ample potential of our native architecture that lives on traditionally available materials and unlearned indigenous building techniques. The project claims the need to promote the sustainable building practice, generates awareness and healthy skepticism towards everything that is termed modern or industrial. We should not unquestioningly adapt something just because it is said developed or technologically advanced that we ignore something that is there at our own backyard and we should be the first people to do this.

The project is designed not replicating the way it has been done but give it a twist that does not give up the traditionally used ways of building and adapting maximum potential of experiment with a vision of a constructive role to play in assuring about the local material and techniques in order to regain lost hope.

“Let people, be the solution.”-Somsook Boonyabancha

The project ensures a good chance to get exposure and spread wide the possibilities of the indigenous practice as the whole process would include community participation and include the indigenous resources. A place of communication of community and sustainable practice, interaction, exploration, learning and appreciation of what we already have. In brief, it is a place to learn and to learn from.

Acknowledgement

I would begin in the name of merciful ALLAH and thank him for blessing me with patience and capability to complete my thesis project, which is very close to my heart. Also he has granted me with my beloved parents, to whom I am forever grateful for their deepest love, unconditional care and constant support in since my birth.

I would like to thank the thesis dissertation guides and thesis studio instructors Dr. Mohammad Habib Reza, Abul Fazal Mahmudun Nobi, Iftekhar Ahmed, and Badruzzahan Ahmed for valuable studio experience.

Very special thanks to the “SAFE” team who has inspired me to choose the project and helped me throughout the process of my thesis. Gratitude to my supporting team Bronte, Injamul, Walid, Tahreem and Meead.

Citation

1. Glassie, H. (2000). Vernacular architecture. Indiana University Press.
2. Vermani.S. (2014). Innovative Traditional system.architecture+design
3. Oliver, P. (2007). Built to meet needs: Cultural issues in vernacular architecture. Routledge.
4. Taur.R. and Devi.V. (2009). Low cost Housing. BITS Pilani, India
5. Agung Dwi, Tim Street-Porter/OTTO
6. Special Issues on Role of Community Learning Center for the Promotion of Literacy and Quality of Life (1999). LITERACY WATCH COMMITTEE OF NEPAL BULLETIN NO. 9
7. (2011)."Suoi Re Village Community House / 1+1>2" 2011. ArchDaily.
8. (2010). "Handmade School / ". ArchDaily.
9. Aga Khan Award for Architecture 2004: Sandbag Shelter Prototypes