Unlearning Sustainability
A critical approach in understanding the scope of sustainable architecture in Bangladesh

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Abstract

This paper is an extract from an ongoing research termed ‘Understanding Context’. The paper aims at critically exposing the hidden contradictions behind the ‘sustainability project’. It also tries to evaluate the effectiveness of ‘sustainability’ as a strategy for developing our built environment while at the same time searching for what ‘sustainability’ could actually mean within our context. Architecture initially evolved from man’s need for shelter. As human history evolved man’s needs for shelter became more complex. And so did the means through which he provided himself with it. This constant negotiation between man and his surroundings has shaped architecture throughout centuries. It is only in the past few hundred years that the drastic advancements in building technology has altered and often denied the primeval relationship between architecture and its environs. Although ecstatic at first the more recent realizations of global warming, imminent rise of sea water, impending shortages of non-renewable resources and reserves and the degradation of the natural environment in general has given us cause to question our egotistic squandering of natural resources and elements. With more than half of the world’s population already living in urban areas we can no longer go back to our pre-industrial modes of living. That would be impractical. However what we can do, within very realistic terms, is to try and develop a non linear understanding of the dynamics between various grounds of human activity and the diverse range of innovative solutions and architectural responses that have emerged from them. This could actually facilitate in creating our own perception of the problems pertaining to our context and help in learning how to solve them.

Key words: Sustainability, Neoliberalism, Understanding context, Difference, Innovative solutions
1. The ‘Sustainability’ Project

In 1983 the World Commission on Environment and Development was established by the UN General Assembly. Also known as the Brundtland Commission, it published a report on March 20, 1987 in which the Commission described sustainable development as, “... development that meets the needs of the present without compromising the ability of future generations to meet their own needs (UN Document, 1987).” One of the main and long term impacts of the report was the realization that economic and environmental policy could not be dealt with in separate compartments. In the words of Nitin Desai, a senior adviser to the Brundtland Commission and a key draftsman of the report, “The report came at a time when the oil shocks of the seventies, droughts in Africa, concerns about tropical forests, the depletion of the ozone layer and several other problems were posing great challenges to policy at every level, and it offered a way of looking at these problems in a holistic way (Backgrounder, 2007).”

Interestingly, although the initial concerns about the environment were triggered from the over exhaustive use of resources by the developed or industrialized countries, the report ties poverty and inequity to be directly related to ecological and other crises. In its effort to help mitigate the future depletion of natural resources and the ecological means of the planet the report suggests “the promotion of values that encourage consumption standards that are within the bounds of the ecological possible and to which all can reasonably aspire (UN Document, 1987).” This advocates that the world, in general, should consume resources (food, energy, building materials etc.) in a restrained and evenly distributed manner so as to maintain an ecologically viable consumption level. It also suggests that there actually exists a certain ‘standard’ of consumption that can help keep a stable ecological balance. Assuming that such a standard can actually be defined we arrive at the major incongruity behind the ‘sustainability’ issue. A majority of the development models proposed to developing countries involve the growth of industry and the mechanization of production processes. Whereas the main menace behind global warming and the energy crises is known to be the over exhaustive consumption of energy and fossil fuels by the industrialized countries why is it that we are so keen on spreading similar ‘development models’ throughout the rest of the globe? And why is it that alternative models for development have not arisen from the third world countries themselves?

To understand the globally accepted instrument of ‘development’ it is necessary to go back in history a bit. As J.W. Smith said, “One cannot separate economics, political science, and history. Politics is the control of the economy. History, when accurately and fully recorded, is that story. In most textbooks and classrooms, not only are these three fields of study separated, but they are further compartmentalized into separate subfields, obscuring the close interconnections between them (Smith, 1994).” Any attempt to understand the history of the various development strategies that are prescribed by the west will be in vain unless we try to understand the socio-political and economic conditions from which these strategies emerged.

The history of ‘development’ and its ensuing ‘sustainable’ version is very much connected to the history of the free market. In his 1776 publication of The Wealth of Nations, British economist Adam Smith suggested that for maximum efficiency, all forms of government interventions in economic issues should be removed and that there should be no restrictions or tariffs on manufacturing and commerce within a nation for it to develop. This eventually led to the modern system of free trade and market-based economies as we know today. The initial challenge of this imposed economic system came in the form of the Great Global Depression of 1873 which revealed that, in order to maintain capitalist expansion and perpetual growth there must be a ready supply of raw materials and an increasing demand for goods, along with ways to invest profits and capital (Robbins 2010). After the Depression the colonial empires started to rapidly increase their imperialist hold in the areas relatively unmarked by capitalist activity namely Africa, Asia, and the Pacific. Free trade, accompanied by geopolitics, allowed that Great Britain and the United States (as well as other Colonial
nations) could produce vast wealth at the expense of the subjugation of other nations. During the Great Depression in the 1930s, an economist, John Maynard Keynes, suggested that regulation and government intervention was actually needed in order to provide more equity in development. This led to the “Keynesian” model of development which, after World War II, formed the foundation for the rebuilding of the U.S-European-centered international economic system. In fact, the Bretton Woods Institutions (namely the International Monetary Fund (IMF) and the World Bank Group (formerly known as the International Bank for Reconstruction and Development) were actually designed with Keynesian policies in mind; to help prevent future conflicts by lending for reconstruction and development in war affected countries and by smoothing out temporary balance of payments problems (George, 1999).

Initially, the Bretton Woods Institutions had no control over individual government’s economic decisions nor did their mandate include a license to intervene in national policy. However, the elites and corporations soon realized that this equalizing effect was diminishing profits and attempted to revive economic liberalism. This new form was not just limited to national boundaries, but instead was applied to international economics as well under the ideology of “neoliberalism. In the early 70’s the Nixon Administration dropped the gold standard and lifted restrictions on capital flows allowing the mercantilist policies of imperialism and colonialism to re-surface under the veil of globalization. The introduction of Structural Adjustment Policies of the World Bank and IMF during the Reagan and Thatcher era further ensured, often through military action, that big businesses from the developed countries could own or access many resources found in developing nations readily and cheaply. During this period aid policy became a key political instrument in bolstering the position of the US in international power politics.

A major drawback in the advent of “neoliberalism” is that developing countries inadvertently succumbed to the western view of development and civilization without assessing their own lot in the state of things. Besieged by the pledge of economic advancement and access to the free-market economy, governments and states throughout the developing world readily accepted the terms and conditions set by the development agencies. In the long run however, they merely served as a stage for large trans-national corporations to enter, extract large profits and then leave with carnage in their wake (Thistle, 2000). The concept of the ‘free market’ remains more or less a misnomer and the ‘freedom to choose’ is a deceptive device controlled by the projection of lifestyles and commodities through widespread media and advertising (Jameson 1991). The entire notion of a globalized economy, in fact, is maintained by the creation of ‘false’ wants and imposed ‘needs’. Needless to say a majority of ‘needs’ and ‘wants’ projected by the development agencies as essential for the betterment of developing economies are unrepresentative of the actual needs of the people.

Now coming back to the issue of sustainability, the Brundtland Report, more widely known as ‘Our Common Future’, provides guidelines for Policy Directions and Institutional Reform with the aim of attaining sustainable development. In certain cases it even identifies certain anomalies within the structure of development strategies themselves. And yet, despite such insight, it still chooses to set about sustainable development through the prevalent western doctrine of development. It also insists on the involvement of the World Bank and other such agencies in implementing these strategies in various developing countries. With this in view the entire arena of ‘sustainable development’ comes into question. The two key concepts – that of needs and limitations- also comes under speculation. More importantly the various sectors and methods through which it was thought to be attainable demand instant revision. We now know, standing in the face of impending ecological and natural disasters, that the necessity of sustainable development practices can no longer be denied. Needless to say, it is burgeoning economies like ours that will be affected most viciously.

2. The Problem of Sustainability in Architecture:

The publication of ‘Our Common Future’, in reality, paved the way for ‘sustainability’ to be integrated in to mainstream ‘development’ policies and worldwide ‘development’ schemes
through the already widespread activities of the World Bank, IMF and other such organizations. Caught within its own limitations of economic development and the intended proliferation of neo liberalism the term ‘sustainability’ carries the rhetoric of a doctrine that is in all likelihood inherently ‘first world’ and pro ‘development’. Naturally, when carried into the field of architecture it is confined by that same dogma.

Initially the issue of sustainability in architecture was raised from concerns about the use of energy by the buildings themselves in largely urbanized ‘industrialized’ countries. Most of these countries already have a huge bulk of buildings which rely on and consume a major portion of energy and other non-renewable resources. In the United States alone, buildings account for 39% of total energy use, 72% of total electricity consumption, and 38% of total carbon dioxide emissions (Green Building, 2009). In the EU the figure is even greater (OECD, 2003). The harsh cold climate and few hours of daylight available during the winter make heating and lighting imperative in these zones. In fact space heating accounts for the largest share of final energy consumption in these moderately cooler temperatures (OECD, 2003). Lowering energy consumption of the already existing building mass and avoiding excessive use of non-renewable energy in the future is a major challenge for these nations which (OECD, 2003), unsurprisingly, are also the major contributors to CO2 emissions (note 01). The evaluation and financing of buildings based on their CO2 market value is a strategy that is readily being integrated in to their property sectors (Schawrz, 2010).

Unfortunately these contemporary trends of ‘sustainable’ or ‘green’ architecture which try to address issues of environmentally conscious design using ‘energy-saving technologies, energy sources that are easy on resources and sustainable products for the property sector’ (Schawrz, 2010) are being advocated in developing countries as well. The various organizations that are advocating sustainable strategies such as OECD, UNEP (note 02) etc already hold development and technology to be pre conditional to sustainability. This, coupled with the apprehension regarding the ‘sustainability project’ and its neoliberalist drive gives ample reason to question whether the current leaning towards ‘sustainable’ practices in architecture is directed towards the appropriate solutions for developing countries or whether they are just another tactic of the neoliberalist market forces. Since the dogma of a primarily ‘first world’ predicament is already internalized within the scope of ‘sustainable architecture’ we must re-asses, for ourselves, the entire project of a ‘sustainable architecture’ for Bangladesh. At the same time we should be cautious so as to not conform to non-contextual policies or the unnecessary introduction of energy efficient products that are highly expensive and need to be imported as well.

3. Understanding Context:

We have already established certain distrust in the ‘sustainability’ project in being able to understand the problems that are relevant to our context. We will now establish the need for understanding it better. However before attempting to do so it is crucial that we understand the concept of non-linearity and the impact of that understanding in our current problematic. Looking at the following headlines may be of some use-

- Arctic sea ice extent fell to 4.10 million square kilometers (1.58 million square miles) on August 26, 2012. This was 70,000 square kilometers (27,000 square miles) below the September 18, 2007 daily extent of 4.17 million square kilometers (1.61 million square miles).  
  *Source National Snow and Ice Data Center*

- In 2008, for the first time in history, more than half of the world’s population will be living in towns and cities. By 2030 this number will swell to almost 5 billion, with urban growth concentrated in Africa and Asia. While mega-cities have captured much public attention, most of the new growth will occur in smaller towns and cities, which have fewer resources to respond to the magnitude of the change.  
  *Source UNFPA*
At the first glance the above headlines may seem random, isolated and maybe even immaterial. And no one is to blame. In today’s world we are often so inadvertently bombarded with news, facts and information we often overlook even the most significant of facts with a casual aversion. Things that are seemingly distant are disregarded in favor of the more near and immediate essentials of life. In fact the contemporary consumer culture has a tendency of rendering down all issues, facts and information to the same level of significance. Hence an advertisement for a dishwashing liquid and the news of rapid deforestation, for example, may be served up on the same platter. In most cases the latter would actually get much less ‘air time’ than the other. This being the case, can we really be blamed for any redundancy on our part when it comes to our knowledge and understanding of the non linear dynamics of our environment? We can. As a profession engaged directly with the conditioning of the built environment it is preposterous to think that architecture can avoid any such associations. Not only are we responsible for what we build but also how we choose to build. Our impact on the environment is not limited to the physical environment only but rather to the entire political arena that informs our architectural decisions. Architecture can never be apolitical as it cannot be non-contextual. The history of human habitats throughout the world reveals that all initial forms of human habitats emerged as a result of the non linear dynamics of contextual parameters and practical, problem-solving experience that materialized over centuries.

Now coming back to the three headlines stated above. The three different headlines are each concerned with a different zone or spatial entity, each varies in the scale and magnitude of their extent. Yet a closer inspection reveals a complex set of non linear relationships through which they each result in or influence another on many levels. In the context of Bangladesh, for example, the potential threats of global warming and the rise of sea levels as stated in ‘headline 01’ remain a potential hazard in the low lying deltaic belt of the south. The consequences of such inundation by salt waters will only feed into the subsequent affects of the loss of agricultural land, mass migration and unforeseen urbanization as stated in ‘headline 02’. The sudden flux of population in developing urban areas, therewith, means the further destruction of forests, wetlands and other natural reserves as shown in ‘headline 3’. This again induces adverse changes in ecological systems as affirmed in ‘headline 01’ and also ensues in the migration of people and wildlife from their original habitats. This, again, creates more pressure on the newly emerging urban zones as well as the existing ones. What is being said here is that whatever we, as architects, design and build feeds in to this system, affects, alters and shapes it. When we design in bulk the consequences are amplified manifold. If is therefore imperative that we understand and acknowledge the context that we build in.

4. Sustainable architecture and Bangladesh:

The importance of learning methods for sustainable design in Bangladesh cannot be overstressed. The recent power shortages have clearly shown how energy-dependent our urban condition has become even for the very basic of services such as fresh air, light and sanitation. In a country where only 27.1 % (http://www.tradingeconomics.com) of the population live in urban areas it is rather strange that 43% of the total electricity is consumed by residential buildings alone and another 44% by the industrial sector (https://energypedia.info). The rural settlements, which are regarded as ‘under-developed’, use very little or no non-renewable energy sources at all. The basic contradiction that is presented here is that through ‘sustainable design’ methods we are supposed to minimize our dependency on non-renewable energy sources (Williams, 2007) and yet we disregard the pre-existing model of building that has intrinsically achieved that within its own architectural apparatus.

Rapid urbanization and uncontrolled population growth in major cities especially Dhaka has unleashed a multitude of problems - receding water tables, shortage of utility supplies, the
growth of urban heat islands, pollution, water logging, the growth of slum areas, unemployment – the list could go on. The building industry itself is under constant pressure of developing even larger numbers of facilities for commercial and residential use. Unfortunately much of this ‘development’ is non-contemplated for in terms of the use of energy and resources. However, given the fact that the conventionally accepted idea of sustainable design is neither appropriate nor adequate for understanding the problems pertaining to our context, we must attempt to develop a clear and informed understanding of its dynamics ourselves.

Bangladesh is still primarily an agriculture based economy with most of the people living in rural areas. Even today the rural homestead or ‘vitte baari’ is probably the closest existing model of a sustainable way of building. Informed by centuries of experience and a clear understanding of local climate, materials, techniques and mode of production (Note 03) the village homestead has evolved from the non-linear dynamics of its immediate context. Carrying extremely low energy footprints and almost no embedded energy this type of homestead was once easily found throughout the villages of Bangladesh. However recent improvements in transportation and road networks and the availability of CI sheets and various imported materials has made it difficult to find a non-adulterated version of this homestead. However, the fact remains that the various details and methods that have been appropriated for our context through time are manifestations of a truly sustainable way of living. Analyzing these houses based on how they perform on the issues related to sustainability might help us develop a direction on how we must address our present urban context.

5. The agent of difference:

One of the key elements in understanding sustainability is difference. Throughout history difference in climatic conditions, local materials and production methods influenced human habitats to develop differently in different parts of the world. Even within regions that are geographically close changes in altitude or topography can alter climatic conditions and architectural solutions drastically. Seeing the generic city of today it is hard to imagine a non-homogenous urban character in any part of the world. However, architectural solutions that are truly sustainable must address this difference. Therefore, any study into pre-existing relationships between architecture and context must be site or zone specific.

For purpose of exemplifying the agent of difference and how it affects architectural solutions five distinctly different regions of Bangladesh have been selected here. Each region is from a different agro-ecological zone and has different climatic features (Asiatic Society of Bangladesh, 2008). In each region architecture has evolved as a problem-solving process that addresses the climate, topography and resources that are specific to that region. Several households have been studied for the purpose of this research. However because of the limitation of this text only one household that best exemplifies the dynamics of that region is discussed here. Thereafter all of the five households are assessed on the basis of certain criteria to determine their value as ‘sustainable’ (Note 04).

Zone 01: Naogaon

Naogaon is situated in the Tista meander flood plane and lower Atrai basin. It has an average temperature of 12-43 degrees Celsius and annual rainfall of 150 cm. Because it does not fall in the flood affected area mud houses are abundant. The soil found here are clays of different type and locally known as shada mati (white earth), lal mati (red earth) and kalo mati (black earth). Most of the houses that were studied in this area showed the use of the three kinds of earth for varying purposes. The thick mud walls help in keeping the house cool through the hot summer. The zone has Muslim, Hindu and Shaontal communities.

Mostak Residence: This household belonging to a Muslim family is situated near a bazaar in Shapahar Upazilla. The partially two-storied household is defined by a thick perimeter wall
which is typical of this region. It is oriented primarily in the north south direction with the courtyard situated in the south-east. Previously the roof used to be made of chon (note 05) or rice straws (note 06) however both methods have become obsolete in this area due changes in agricultural production brought by the ‘green’ revolution.

**Minimizing Heat Gain:** The use of thick mud walls, deep verandahs and extended roof overhangs reduce heat gain to a minimum. Trees provide shade from the western sun.

**Ventilation and Cooling:** All the rooms are well ventilated by alternately positioned windows. Because of continuous airflow heat from the CI sheet roof does not affect the internal comfort that much.

**Protection from Solar Radiation and Glare:** The absence of glazing and the use of recessed windows minimize any potential of solar radiation and glare. The courtyard is shaded from the south western sun.

**Rain Protection:** The pitched roof directs rainwater away from the mud walls. A secondary shade is provided on the walls of the two storied block to protect the exterior walls of the ground floor.

**Daylight Utilization:** The interior rooms have low visibility. In most cases, however, the bedrooms are used for sleeping purposes. All kinds of activities that need ample daylight are carried on in the shade of the verandah or in the courtyard.

**Building Materials and Furnishings:** The household is constructed of mud with bamboo lintels and wooden doors. The staircase on the upper floor also utilizes a bamboo structure and wooden beam for support. A bamboo frame supports the CI sheet roof. The floor is finished with the laal mati which gives better compaction against daily use. Wall mounted shelves are made from bamboo or wooden planks.

**Natural Resources:** The household makes best use of the natural resources that are found in its proximity.

**Innovative Tools:** The double wall acts as a buffer and keeps out the heat. A secondary staircase is provided from the main bedrooms to the roof in order to allow the owner to secretly escape incase of an attack by dacoits.
Zone 02: Habiganj

Habiganj is situated in the eastern Surma-Kushiara flood plain and the northern and eastern piedmont plain. It has an average temperature of 5-39 degrees Celsius and annual rainfall of 300 cm. It is located in a flood affected area and is partially inundated for a large part of the year. Because of the recurrent floods mud houses are rarely seen. Bamboo is abundant and it makes up for the majority of the building material. A technique called ‘wattle and daub’ is
typically used in this region in which a ‘chatai’ or bamboo mat is covered by mud plaster to protect it from the incessant rains (Ahmed, 1994).

**Aurus Ullah Residence:** This household belongs to a family of craftsmen in Devpara under Nabiganj Upazilla. The village is very close to a haor area although the village itself is not flooded. The structures are oriented in the north south direction with trees providing shade in the west.

**Minimizing Heat Gain:** The use of mud plaster on the walls helps in reducing heat gain. The CI roof becomes hot during the day but does not affect the internal temperature too much because of passive cooling.

**Ventilation and Cooling:** The house is ventilated through small unplastered openings in the ‘chatai’. Passive cooling occurs through gaps just beneath the roof that are also left unplastered. Hot air passes out through these gaps allowing the building to continually breathe.

**Protection from Solar Radiation and Glare:** The wattle and daub walls allow a diffused light to penetrate the household minimizing glare.

**Rain Protection:** The pitched roof is steeply angled. The mud plaster is mixed with lime which protects the walls from the pouring rains typical of this region.

**Daylight Utilization:** The large multi-purpose room has ample visibility even when it is overcast. The other rooms also have moderate visibility.

**Building Materials and Furnishings:** The house utilizes bamboo and bamboo mats in various ways. The main structure is bamboo and the ‘chatai’ acts as an infill. A special device made from bamboo is hung over the workspace to hold tools etc.

**Natural Resources:** The household efficiently uses the natural resources that are found in its proximity not only for building but also in producing various handicrafts which act as a prime source of income. The members also gather medicinal plants from the surrounding which they sell.

**Innovative Tools:** The kitchen is interestingly detailed so that the smoke rises out through a vertical vent without affecting the eyes off the person who is cooking. The use of passive cooling methods is also noteworthy.

**Zone 03: Gazipur**

Gazipur is situated in the Madhupur Tract in the south central zone of Bangladesh. It has an average temperature of 8-40 degrees Celsius and annual rainfall of 200 cm. The ground level is relatively high and ideal for mud houses. Unlike Naogaon the earth here is of a grayish tone.

**Ahmad Ali Residence:** This household belongs to a Muslim farmer and is situated in an old and largely populated village in Kapasia, Gazipur. The household is built around a large courtyard that is open towards the south east corner. The main structure is oriented in the north south direction and accommodates a loft space which makes it higher than the other structures. The loft is separated by a system of false ceilings that act as storage space and also act as a passive cooling device.

**Minimizing Heat Gain:** The use of mud walls and extended roof overhangs reduce heat gain to a minimum. The courtyard is shaded by large trees in the west and south west corners.

**Ventilation and Cooling:** All the rooms are well ventilated between the roof and the mud walls allows passive cooling to occur leaving the interior cool.
Protection from Solar Radiation and Glare: The windows are deeply recessed and either protected by an overhang, a deep verandah or a thatch screen. This reduces glare. Radiation is not an issue.

Rain Protection: The pitched roof is provided in two tiers so as to completely protect the walls from rain water. The walls are finished with a mixture of mud and rice husks. This creates a smooth and water repellant finish.

Daylight Utilization: The interior rooms have moderate visibility. The wide verandah which wraps around the house is used for various activities during the day time has ample diffused light.

Building Materials and Furnishings: The household is constructed of mud with a wood and bamboo frame to hold up the roof. The loft area has a false ceiling that is made of thin bamboo canes placed side by side on wooden beams. This acts as a storage space.

Natural Resources: The household makes best use of the natural resources that are found in its proximity. Dried leaves of khejur (date), taal (Borassus palm) etc trees are used as roofing material and boundary walls.

Innovative Tool: The kitchen is designed optimizing the available materials in accordance with the program and orientation. All four walls of the kitchen are constructed with bamboo weavings of different density that are carefully placed according to the position of the ‘chuula’ and the direction of wind.

Zone 04: Patuakhali

Patuakhali is situated in the Ganges tidal flood plain in the south eastern zone of Bangladesh. It has an average temperature of 12-35 degrees Celsius and annual rainfall of 250-300 cm. The architecture of this region is characterized by its habitual struggle with coastal winds and tidal surges.

Miah Residence: This house is surrounded by water bodies and is approached by a narrow walkway. It is raised on an earthen mound. Interestingly local materials like ‘chon’ and ‘golpata’ (Nypa palm) are still abundantly used in this area for roofing purposes. The angle of the roof is very shallow and almost comes to the ground making it resistant to strong winds. The structure of the roof is made strong with a dense frame of bamboo. In fact the entire house acts like a composite mesh because of the complex structural system.

Minimizing Heat Gain: The use of ‘chon’ on the walls and roof causes almost no heat gain.

Ventilation and Cooling: The exterior skin made of overlapping strands of ‘chon’ is permeable and allows the house to breathe.

Protection from Solar Radiation and Glare: The building has no issues of radiation or glare.

Rain Protection: The pitched roof and overhangs allow water to drain off easily. The chon is placed in multiple layers so thick that water drains off before penetrating through.

Utilization: The interior space does not have much visibility. However in some other instances a special type of opening was observed by tying the strands of ‘golpata’ in repetitive bundles.

Building Materials and Furnishings: The household is constructed with a very sturdy bamboo frame covered with ‘chon’. The house has minimum furnishings.
Natural Resources: The household efficiently uses the natural resources that are found in its proximity and is completely biodegradable.

Innovative Tools: The form of the structure and the specific angle of the roof provide an added advantage in battling storm winds.

Zone 05: Bandarban
Bandarban is situated amongst the Eastern Hills in the south eastern climatic zone. It has an average temperature of 12-29 degrees Celsius and annual rainfall of 200-250 cm. The average altitude is 732 feet above sea level. Bamboo is abundant and extensively used in various ways. The area, which was once densely covered in forests, still has diverse wildlife and foliage. All the houses are raised on bamboo stilts or wooden logs.

Theolang Khumi Residence: This house is situated in Betchori in a village called Longthapara which is a twenty minute bus ride and almost two hour walk away from the main Bandarban town. It is a Khumi village. The village can only be approached by foot. Surprisingly, even so, the majority of the houses have CI sheet roofs. The houses are oriented so that one of the longer sides is attached to the edge of the hilltop thus creating a kind of collective boundary.

Minimizing Heat Gain: The building materials have very low thermal conductivity rates. Moreover the area is surrounded by tall trees which provide shade throughout the day.

Ventilation and Cooling: The house is continually ventilated through the gaps in the bamboo mats which are used as walls and floor material. Small openings are provided which are operable but the house is able to breathe even if they are closed.

Protection from Solar Radiation and Glare: The contextual setting and use of materials automatically minimizes any scope of radiation or glare.

Rain Protection: All rainwater is drained away off the roof or through the bamboo mats in the outside platform. Some houses have a double skin of bamboo mats which protects the interior.

Daylight Utilization: The bamboo mats provide a comfortable diffused light quality in the interior spaces. The raised platform in the front is used for all other activities that require special task lighting such as weaving.

Building Materials and Furnishings: The household is constructed primarily of bamboo. Different types of details and weaves are improvised for various purposes. The staircase is cut out of a single log.

Natural Resources: The household makes efficient use of the natural resources that are abundantly found in its surroundings. The Khumi people weave their own clothes from cotton found in local trees. Water is gathered from nearby streams in vessels made from dried squash. All their food is grown in the proximity of their household as well.

Innovative Tools: The Khumi have developed several innovative tools for their daily use. There are several genuine ideas incorporated in their architecture as well. For example the cooking zone is situated inside the house and made fire resistant through creating a raised floor and covering it with mud plaster. The use of sliding panels for the door, the weaving of the floor mats, the sensitivity through which they site their buildings all reflect a very refined approach towards architectural solutions.
6. Re-assessing sustainability:

In each of the homesteads that have been discussed architecture is a direct response to the climatic peculiarities or challenges of that area and the production processes that the users are involved with. This gives rise to various different forms of architectural apparatus which through time have appropriated various details and innovations that are locally produced and sustained. By default they also solve all the issues pertaining to our current discussion of ‘sustainable’ building. In fact in these examples the entire process of architecture is embedded with the notion of using resources in a way “that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

Interestingly the indigenous house form not only evolves from its context but also allows a certain flexibility through which it can adapt to changes over time. The architectural form addresses the immediate issues of programmatic arrangement and also incorporates the various seasonal and climatic aspects of use. This capacity to change, shift and evolve is one of the major characteristics that provide indigenous architecture with an enduring eminence. The materials that are used also contribute to this constant cycle of change. It is only in recent times that the use of more permanent materials like corrugated iron sheets have hampered the enduring quality of the architecture.

Now a question that is often raised is whether we can transport this ‘indigenous’ approach to our urban conditions. Of course, we cannot. But what we must realize is the importance of understanding our context and creating an architecture that intrinsically responds to it. Architectural education, if anything, has crippled our understanding of contextual parameters to a great deal. The majority of what is taught in architectural schools, starting from the formation of curriculum to the text books that are used as reference, is based on knowledge and academia that is based on a ‘eurocentric’ view of architectural education. This view, developed at the time of high modernism and carried on throughout the various post-modern ordeals, holds technology and standardization to be indispensable to architecture. It is the kind of education that made way for the generic city, a monotonous ‘sameness’ that glorifies the advent of the capital world. Such an education does not equip us with the necessary tools for understanding our context; it definitely does not promote site specific innovation.

At this point another question that can be raised is that in urban conditions capital investors, realtors and profit margins govern much of the context. That is true. But dealing with the context does not necessarily have to conflict with their interests. What is needed is a change in attitude towards design and a continuous critical assessment of the urban scenario. Instead of approaching architecture as an end product comfortably placed in the dogma of some ‘ism’ we need to approach architecture as the basic problem solving tool that it needs to be. The urban scenario presents its own peculiar set of problems- bringing light and fresh air into large floor areas, density, heat and humidity, the creation of localized micro climates, security - the list could go on. Being able to address all the issues in order to come to an optimized solution that is climatically and economically viable is of major concern.

Documenting and assessing the various indigenous households has made one thing very clear. Architecture that responds to very basic issues of climatic and geographical parameters has a greater chance of being sustainable in the long run. The common significant factors that can be ascertained from the various examples are-

1. We should opt for custom made solutions rather than standardized solutions. This minimizes waste and also utilizes manpower which is a valuable resource. (note 07)
2. Climate is the prime decisive factor for formal arrangement and building orientation.
3. The use of local materials with low heat absorption rates can drastically alter interior temperatures. Other architectural devices such as double walls, perforated screens etc also minimize heat gain.
4. Buildings must be allowed to breathe. Passive cooling methods can induce ventilation.
5. Daylight must be utilized to its maximum potential. Programmatic arrangements should be coordinated with the amount of light in internal spaces.
6. The design should incorporate flexibility through which it can adapt to seasonal and programmatic changes over time.
7. Just by addressing the basic issues of micro climate and maximizing daylight a building can operate without non-renewable energy sources at least in the day time.
8. Trees provide a major role in providing shade and reducing heat gain.

7. Re-learning Sustainability:

Born out of a first world perspective that had already accepted technology and industrialization to be synonymous to development, the doctrine of ‘sustainability’ was institutionalized throughout the third world with a more or less Post-Fordist attitude of creating local markets for a globalized production process. The integration of third world labor and resources accelerated its drive in creating further reaching markets with an ever increasing market population. The various loans and subsidies provided for sustainable development are more often linked to the interests of the donor agencies rather than the actual needs of the recipient. This results in a huge gap between the true potential of ‘sustainable’ development and its actual implementation.

By virtue of its inherent contradictions, the sustainability project as we know it, fails to understand the primeval relationship between architecture and its context. This, in the past, has already lead to an architecture that is devoid of contextual empathy, a generic architecture that only responds to the global flow of monetary gains. In order to achieve any sort of sustainable architecture for the future we must indeed look into the past. But when looking at the past we must be wary of coming to any conclusions based on formal expression and aesthetic assumptions. In that case we will only end up with repeating the EPCOT syndrome (Leach, 1997) and re-iterating the late-capitalist agenda of re-inventing identity. This is something we definitely do not need to recur. But what we do need is a critical and thorough understanding of the dynamics of our architecture and its relationship with its context. Here architecture must be looked upon as ‘handicraft’, as a ‘fittingness of means to an end’ (Leach, 1997). This, of course, also carries the fear of becoming fetishized, of becoming an end in itself. However in order to arrive at a truly sustainable architecture - one that is based on local knowledge, materials, skill, labor and ecological balance - we must learn to respond to local conditions and the realtives of local economy without sacrificing our vigor for innovation.

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Notes

Note 01 The majority of OECD countries, for example, have the highest or second highest rate of CO2 emission as shown in Fig. A5. Source: Michael Bauer, Peter Mosle and Michael Schawrz, 2010, Green Building – Guidebook for Sustainable Architecture. (p. 13)
Note 02 Recently the Bangladesh Government has drafted a report called ‘National Sustainable Development Strategy’ under the supervision of the United Nations Environment Program (UNEP).
Note 03: In the writings of Karl Marx and the Marxist theory of historical materialism, a mode of production is a specific combination of Productive forces and the Social and technical relations of production. In ‘The Production of Space’, Henri Lefebvre appropriates this idea to the production of space under the complex conditions of neocapitalism. Source- Henri Lefebvre, 1991, The Production of Space. (p. 32, 62, 82, 89-90, 412)
Note 04: The criteria of evaluation are chosen based on relevance to our climate using the aid of the design strategies for ‘Green’ buildings. Source: M Bauer, P Mosle and M Schawrz, 2010, Green Building – Guidebook for Sustainable Architecture. (p. 66-107)
Note 05: Chon is a type of grass which abundantly grew and was used for roofing purposes due to its low cost, straight stems and relative longevity. However, since the ‘green revolution’ the sites where it used to grow have been put to use for rice cultivation making it almost obsolete as a building material. Source: Author and S M Seraj, R L P Hodgson and J R Choudhury (eds), 1999, Affordable Village Building Technologies, R L P Hodgson & M L Carter, Some Factors Governing Choices of Building Materials in Rural Bangladesh (p. 95)

Note 06: Rice straw from the rapidly growing ‘high-yield’ variations is of poor quality as a roofing material and needs rethatching every one or two years. Source: Author and S M Seraj, R L P Hodgson and J R Choudhury (eds), 1999, Affordable Village Building Technologies, ISBN 0 9535078 15, R L P Hodgson & M L Carter, Some Factors Governing Choices of Building Materials in Rural Bangladesh. (p. 95)

Note 07: The OECD, for example, sees flexibility in building processes and heterogeneity as a barrier in creating ‘sustainable architecture’. Source: OECD, 2003, Environmentally Sustainable Buildings Challenges and Policies. (pg 52)

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